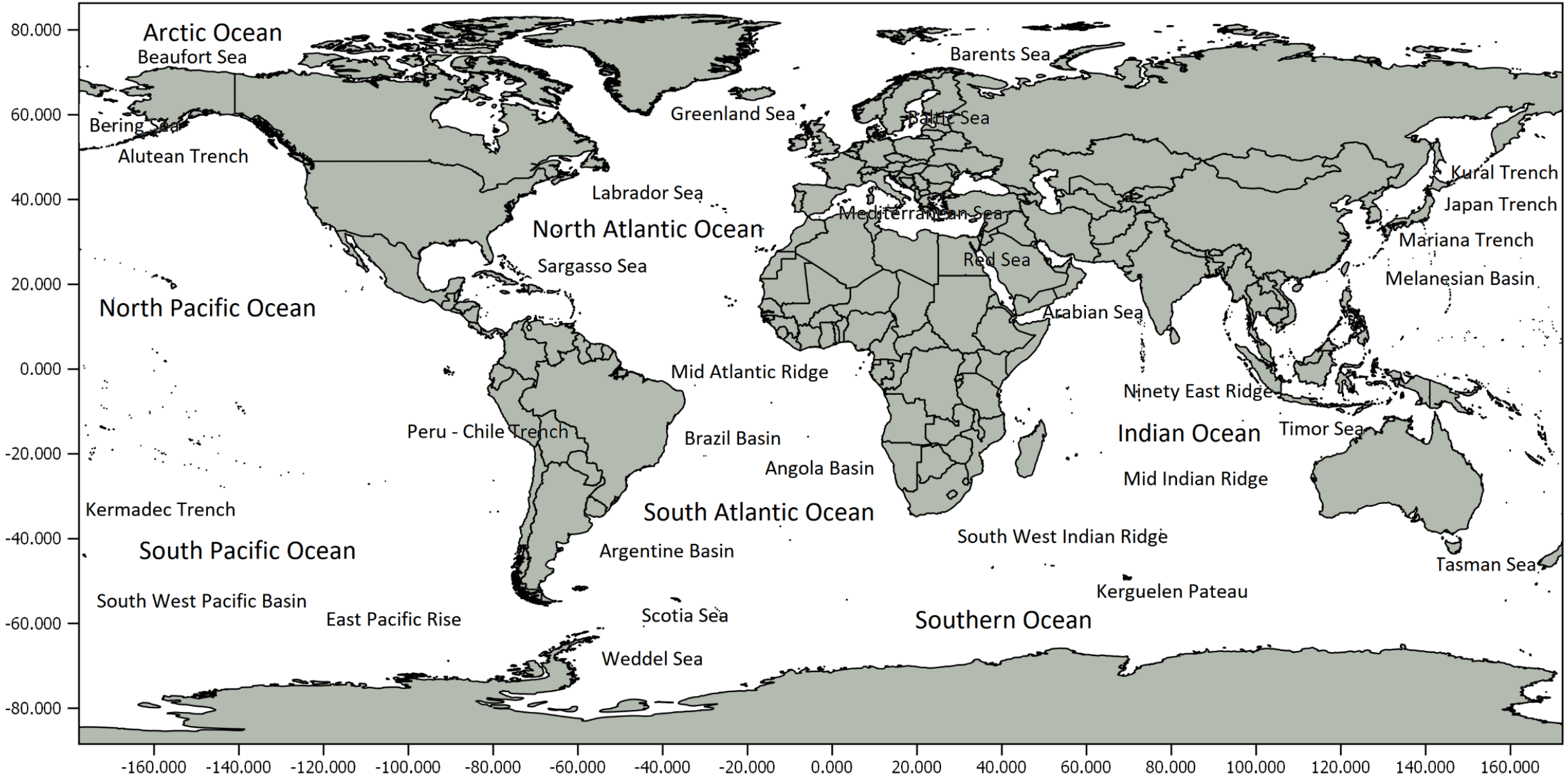
Ocean Accounting - A Novel Approach to Ocean Governance

Ken Findlay
CPUT Research Chair: Oceans Economy
Centre for Sustainable Oceans
Cape Peninsula University of Technology

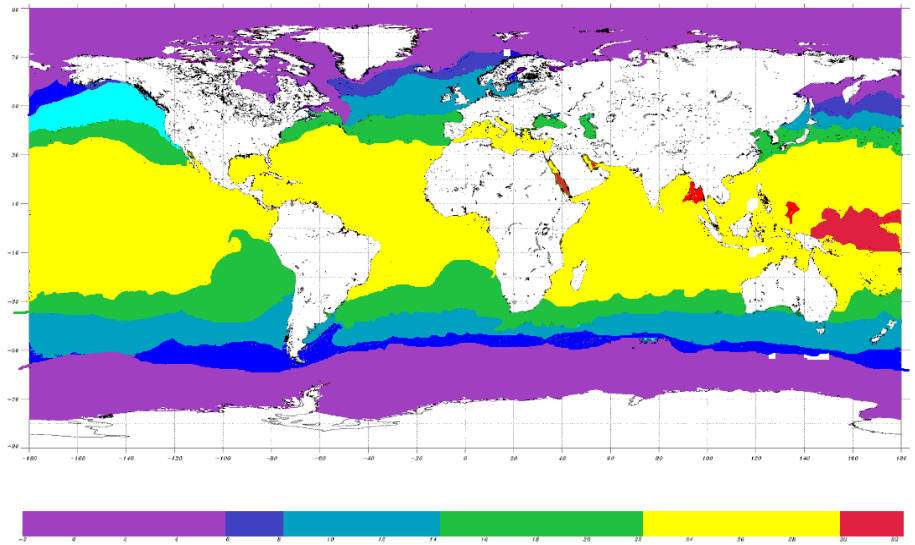
Cape Peninsula University of Technology

OCEANS ARE NOT UNIFORM - OCEANS, SEAS, BASINS

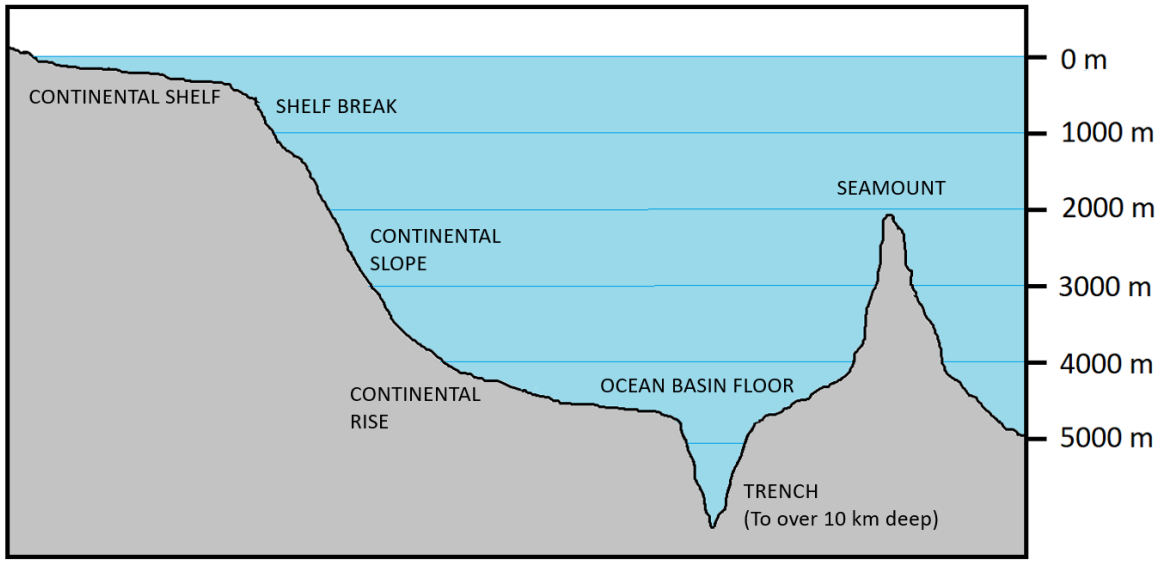


OCEANS ARE NOT UNIFORM

SEA SURFACE TEMPERATURE

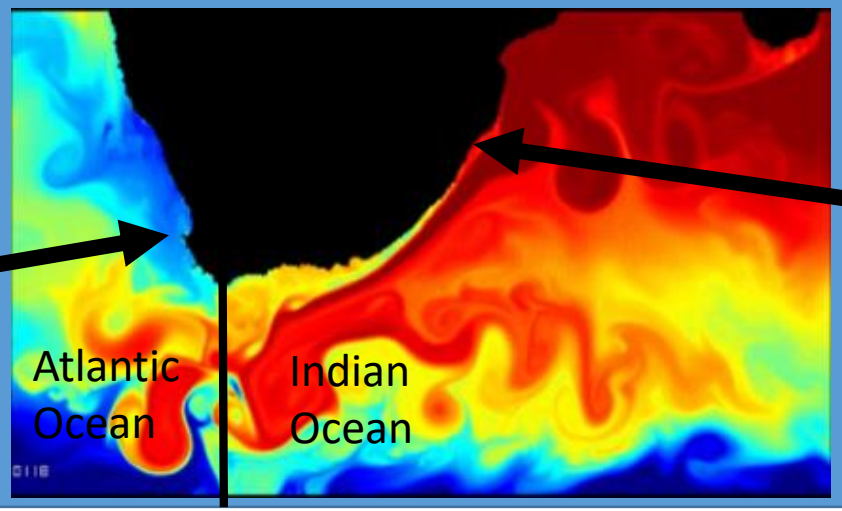


DEPTH (Light, Pressure, Temp, Nutrients, Productivity)



OCEAN CURRENTS

BENGUELA CURRENT



AGULHAS CURRENT

Oceans are dynamic, fluid, three dimensional and boundary-porous

Ocean characteristics are consequently fluid

SEACHANGE

1. Oceans are Changing - Natural or Anthropogenic Change
2. Ocean Measurement and Analyses are Changing – 4IR in ocean sciences
3. Human Resource Use of Oceans are Changing – Expanding ocean economies
4. Adaptive Ocean Governance needs to incorporate these Changes

Ocean Governance -

"the coordination of various uses of the ocean in conjunction with the protection of the marine environment" *Pyc (2016)*

"the foundation of rules, institutions, processes, agreements and arrangements based on which economic activities are undertaken" *World Ocean Council (2018)*

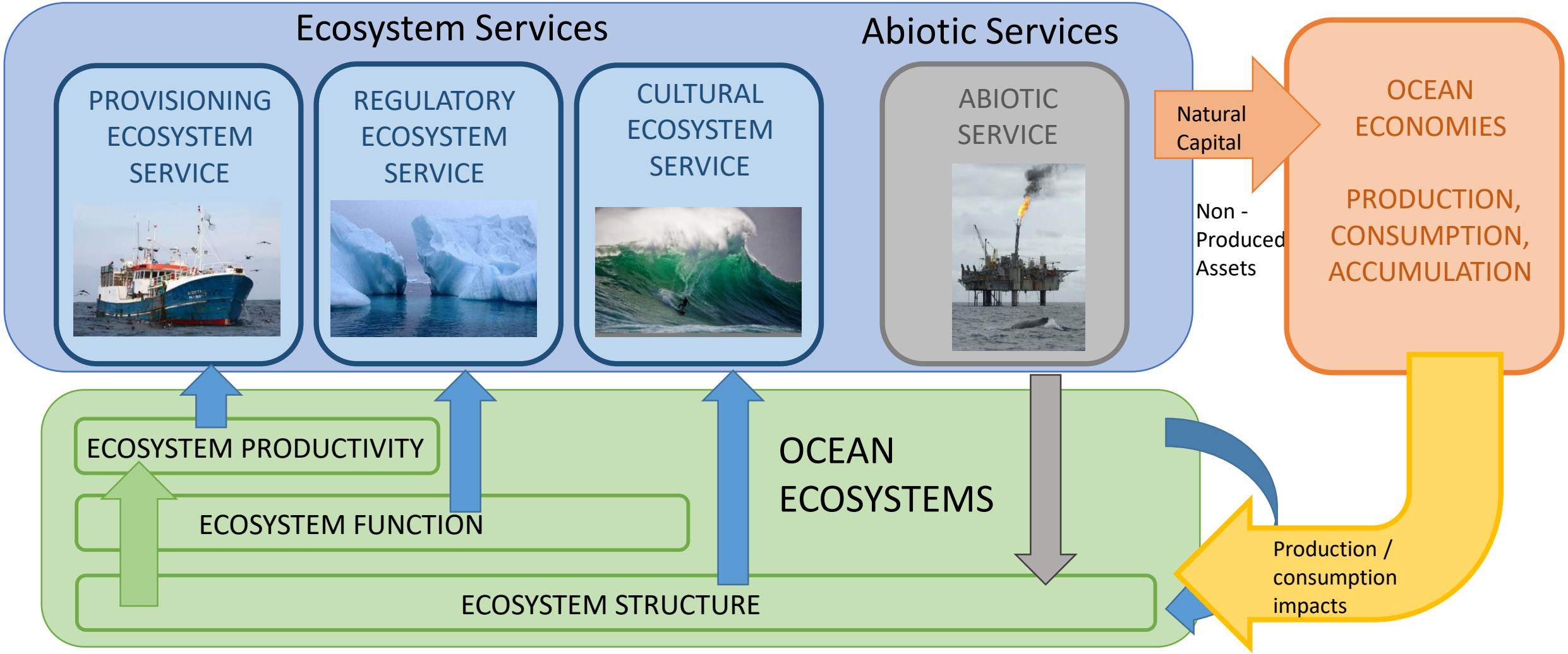
Governance of ocean resource use / human economies and the impacts thereof

Ecological Governance -

"*a process of **informed** decision-making that enables **trade-offs** between competing resource users so as to **balance** environmental protection with beneficial use in such a way as to mitigate conflict, enhance equity, ensure sustainability and allow accountability"*

Turton et al. (2007)

Humans derive numerous benefits from ocean systems through ecosystem and abiotic services. Both market and non-market flow values, and assets require accounting in the estimation of the contribution of oceans to societal well-being, as do the impacts of economies on the environment.



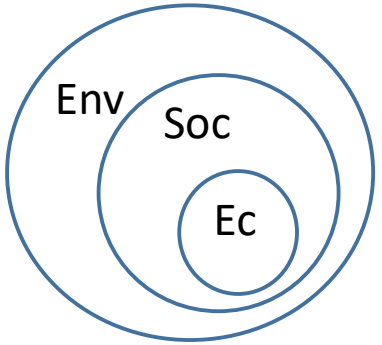
Require novel “blue economy” approaches to ocean governance to account for inclusivity and sustainability as well as non market values.

Global increases in Ocean Economies and Blue Economies* as nations or regions turn to new opportunities to foster economic growth and ensure food and energy security

* Blue Economy – Various Definitions. Here taken to mean inclusion of sustainability, equity and equitable access and inclusivity within ocean economy governance models and policy.

THERE IS A NEED FOR CLEAR INCLUSIVE DEFINITIONS OF OCEAN AND BLUE ECONOMY

Governance is often about Trade-Offs which require valuations (across nested environmental social and economic domains)

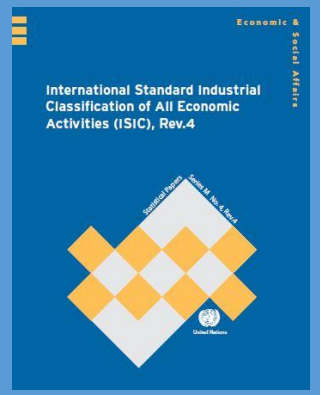


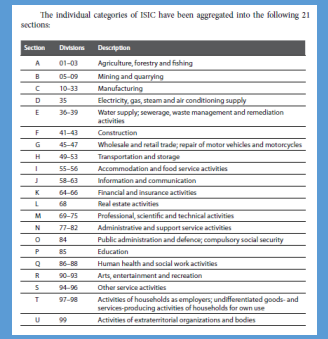
Manage what we measure…….. How then do we measure ocean *total resource use* value.

The values of ocean economies have in the past largely been estimated as the contribution of ocean economic sectors to GDP through gross value add along value chains.

This process requires :-

1. Choice of sectors to include / exclude ISIC five digit codes
2. Disaggregation of the values of the ocean contribution





The individual categories of ISIC have been aggregated into the following 21 sections:

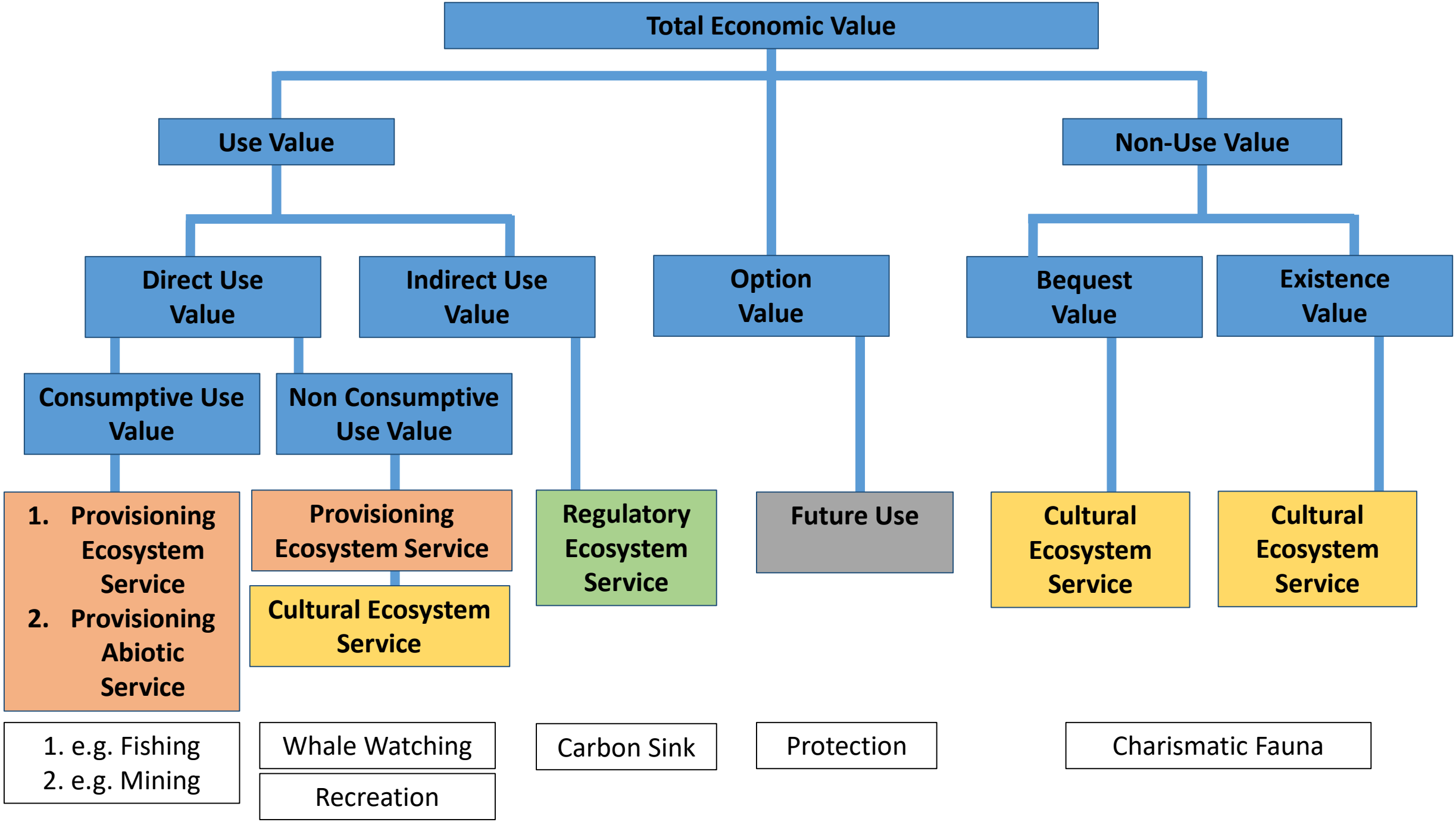
Section	Divisions	Description
A	01–03	Agriculture, forestry and fishing
B	05–09	Mining and quarrying
C	10–33	Manufacturing
D	35	Electricity, gas, steam and air conditioning supply
E	36–39	Water supply; sewerage, waste management and remediation activities
F	41–43	Construction
G	45–47	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	49–53	Transportation and storage
I	55–56	Accommodation and food service activities
J	58–63	Information and communication
K	64–66	Financial and insurance activities
L	68	Real estate activities
M	69–75	Professional, scientific and technical activities
N	77–82	Administrative and support service activities
O	84	Public administration and defence; compulsory social security
P	85	Education
Q	86–88	Human health and social work activities
R	90–93	Arts, entertainment and recreation
S	94–96	Other service activities
T	97–98	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
U	99	Activities of extraterritorial organizations and bodies

Challenges

1. Seldom standardised metrics across nations or regions
2. No accounting of Natural Capital Assets and Sustainability
3. No accounting of Inclusivity
4. Monetarised and market values only

Going Forward

Require a more inclusive blue economy approach that incorporates Sustainability, Inclusivity and Ocean Wealth that include non-market values


Total Economic Value
Use Value
Non-Use Value
Direct Use Value
Indirect Use Value
Option Value
Bequest Value
Existence Value
Consumptive Use Value
Non Consumptive Use Value
1. Provisioning Ecosystem Service
2. Provisioning Abiotic Service
Provisioning Ecosystem Service
Cultural Ecosystem Service
Regulatory Ecosystem Service
Future Use
Cultural Ecosystem Service
Cultural Ecosystem Service
1. e.g. Fishing
2. e.g. Mining
Whale Watching
Recreation
Carbon Sink
Protection
Charismatic Fauna

GOVERNMENT

Rule Making
Rule Implementation
Rule Adjudication

POLICY

GOVERNANCE

SOCIETY

Economy
Social Foundation
Environment

MODELS & SCENARIOS

KNOWLEDGE OF A CHANGING OCEAN

NOVEL OCEAN SCIENCE DATA (4IR)

Ocean Robotics
Remote Sensing
Big Data
Analyses & Modelling
Machine Learning
Automated Analytics

Oceanography

Biotopes, Habitats, Ecosystems

Biodiversity

Ecosystem Service & Abiotic Service Resource Use

Social Sciences

Economic Sciences

CHANGES IN OCEAN RESOURCE USE

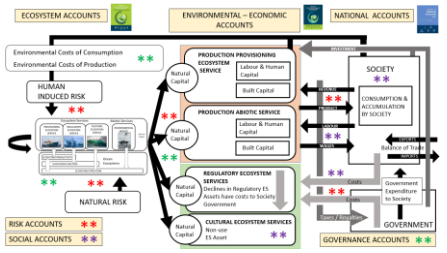
Ecosystem Accounts
Environmental Economic Accounts
National Accounts
Risk Accounts
Social Accounts
Governance Accounts

Input Resource Flows To

OCEAN ECONOMY

Output Impact Flows From

FRAMEWORK



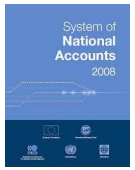
OCEAN ACCOUNTS FRAMEWORKS

SPATIAL ANALYSES / GIS APPLICATIONS

ECOSYSTEM ACCOUNTS

ENVIRONMENTAL – ECONOMIC ACCOUNTS

NATIONAL ACCOUNTS



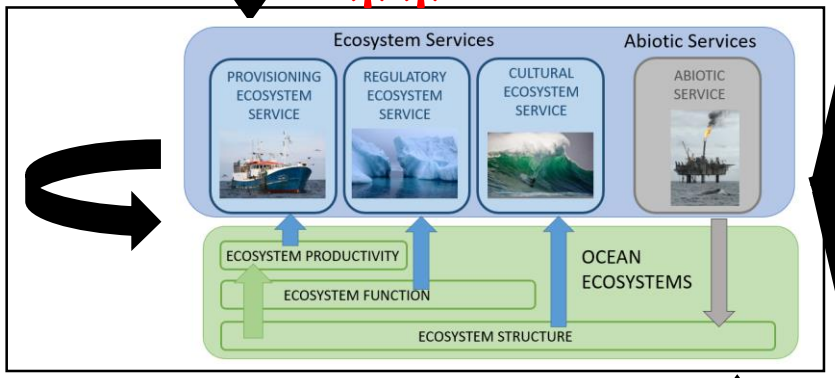
Environmental Costs of Consumption

Environmental Costs of Production

**

HUMAN INDUCED RISK

**



**

**

NATURAL RISK

RISK ACCOUNTS **

SOCIAL ACCOUNTS **

GOVERNANCE ACCOUNTS **

Natural Capital

DIRECT USE - PRODUCTION PROVISION. ECOSYSTEM SERVICE

Labour & Human Capital

Built Capital

**

Natural Capital

DIRECT USE - PRODUCTION ABIOTIC SERVICE

Labour & Human Capital

Built Capital

**

Natural Capital

INDIRECT USE - REGULATORY ECOSYSTEM SERVICES

Declines in Regulatory ES Assets have costs to Society & Government

Natural Capital

CULTURAL ECOSYSTEM SERVICES

Non-use ES Asset

**

INVESTMENT

REVENUE

**

PRODUCT

LABOUR

**

WAGES

SOCIETY

**

CONSUMPTION & ACCUMULATION BY SOCIETY

EXPORTS

Balance of Trade

IMPORTS

**

Costs

**

Costs

Taxes / Royalties

Government Expenditure to Society

GOVERNMENT

SEEA-EEA ACCOUNTS – EXPERIMENTAL ECOSYSTEM ACCOUNTING

1. Ecosystem Tables - Identification of Ecosystems (Biotopes, Habitats, Ecosystems),
2. Ecosystem Extent / Condition Tables – Area / Condition (How to measure ecosystem condition? Structure, Process, Productivity)
3. Ecosystem Flow Tables – Ecosystem Service & Abiotic Service Identification & Supply to Economies as Natural Capital
4. Ecosystem Service Asset (Availability) Tables – Natural Capital Stocks

SEEA – SECTORAL ENVIRONMENTAL ECONOMIC ACCOUNTS (SEEA – CENTRAL FRAMEWORK) FOR EACH SECTOR

1. Ecosystem Service & Abiotic Service Input (Supply) Tables to Sectors – Natural Capital Flows to Economy
2. Output (Residual) Tables of Impacts of Sectors (Production & Consumption) on Ecosystems & Services - Big Five Impacts and Spatial Competition

SYSTEM OF NATIONAL ACCOUNTS – FOR EACH SECTOR

1. ISIC Tables for identification of inclusion as Sectors
2. Partial / Full Allocation of Sectors & Adequate Disaggregation
3. Gross Value Add (Value Chain) (Input / Output) Tables
4. Resource Rent Tables

RISK ACCOUNTS

1. Hazards of Production & Consumption on Ecosystems Services
2. System Resilience to Hazards - Vulnerability
3. Declines in Ecosystem Services and cost thereof to Society & Government
5. Disaster Risk Reduction
6. Implications

SOCIAL ACCOUNTS – FOR EACH SECTOR

1. Employment Tables
2. Societal Benefit / Costs of Ecosystem and Abiotic Services Tables
3. Resource Accessibility and Social Inclusion Tables
Contribution of Oceans to Health, Poverty, Social Intervention
4. Gender Access and inclusion

GOVERNANCE ACCOUNTS

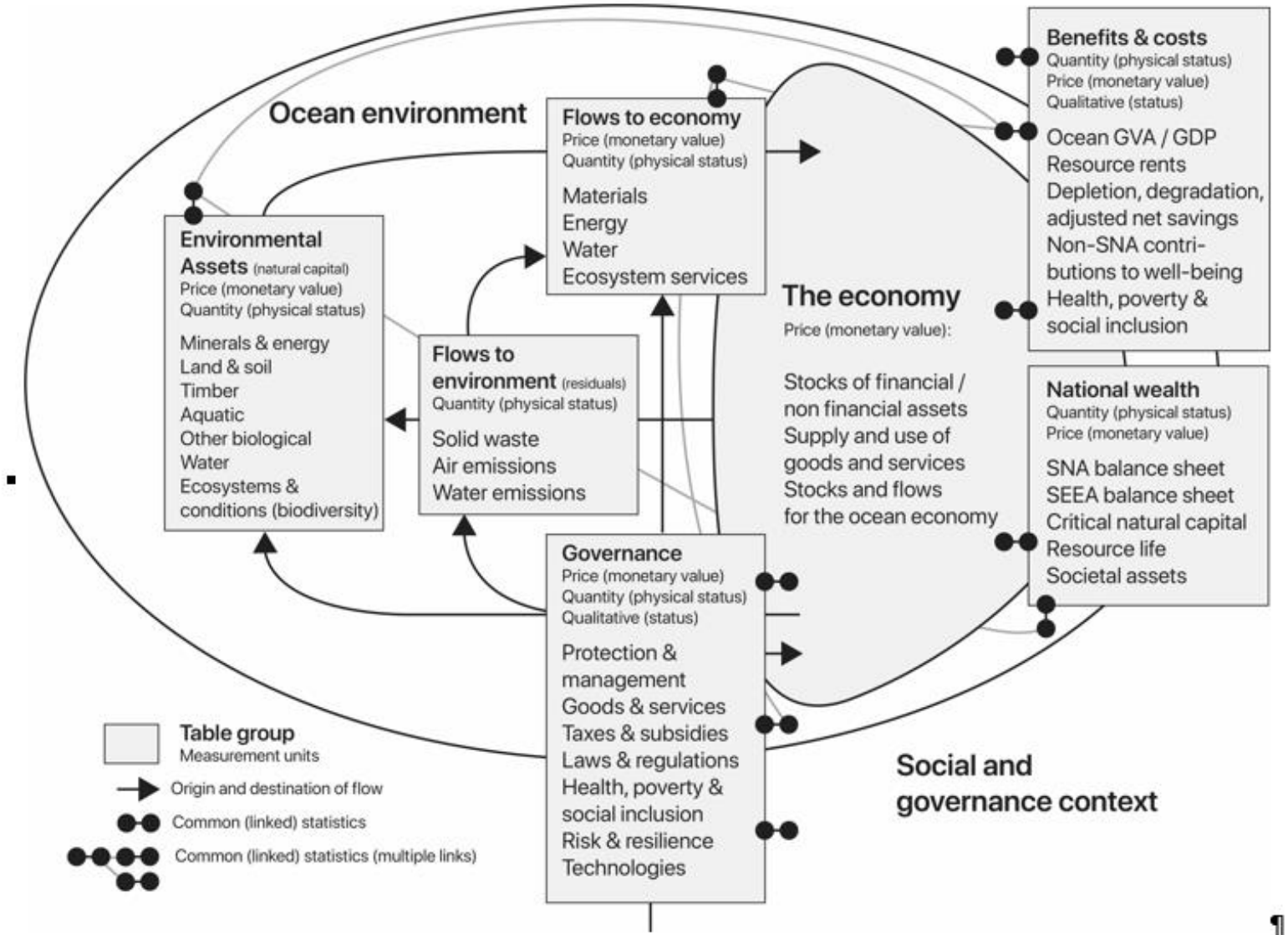
1. State Governance Tables
Costs & Efficacy of Governance & Management
Research, Technology & Innovation to underpin Management
Compliance Monitoring & Enforcement of Laws & Regulations
Taxes, Royalties, Subsidies
2. Corporate Governance Tables

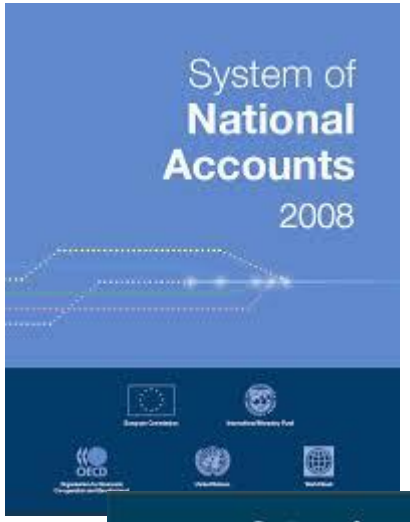
COMBINE TO NATIONAL WEALTH ACCOUNT THAT ALLOWS MONITORING OF THREE CRITICAL TRENDS:

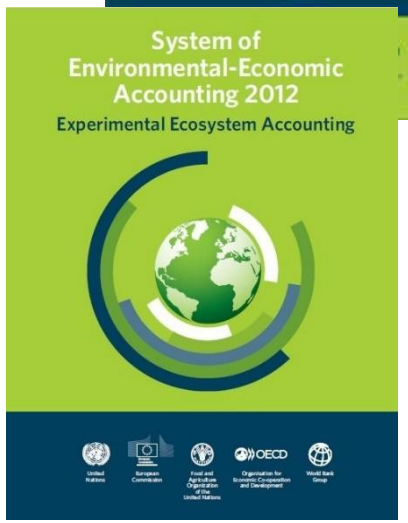
(1) CHANGES IN OCEAN WEALTH, INCLUDING OF “NON-PRODUCED” ECOSYSTEM ASSETS;
(2) OCEAN-RELATED INCOME AND WELFARE FOR DIFFERENT GROUPS OF PEOPLE;
(3) OCEAN-BASED ECONOMIC PRODUCTION.

Technical Guidance on Ocean Accounting for Sustainable Development

Global Ocean Accounts Partnership







Global Ocean Accounts Partnership

Common Technical Guidance

Technical Guidance on Ocean Accounting for Sustainable Development

Version 0.3, 31 May 2019

+ Governance Accounts
+ Risk Accounts
+ Social Accounts
+ Wealth Accounts

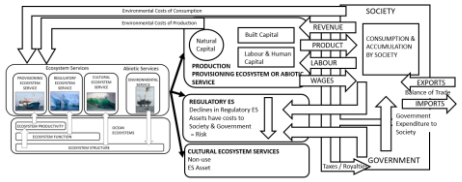
United Nations Economic and Social Commission for Asia and the Pacific

United Nations Environment

In collaboration with institutional members of the Global Ocean Accounts Partnership

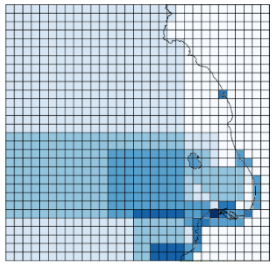
Correspondence: info@oceanaccounts.org

1. Sustainability Indicators



2. Sectoral Evaluation, Finance and Investment

3. Strategic Sectoral Development Planning



4. Spatial Management

5. Ocean Analyses, Monitoring and Assessment

THE NEED FOR OCEAN ACCOUNTS IN AFRICA

Seventy percent (38) of Africa's 54 sovereign states are coastal.

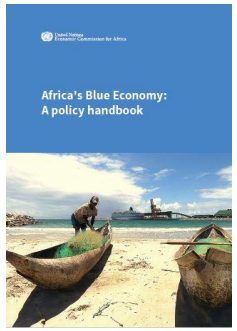
Africa has a coastline of some 30,500 to 40,000 km.

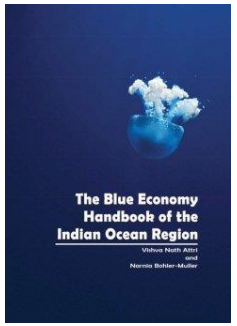
Africa's oceans and inland water areas are three times the size of its landmass. Maritime zones under Africa's jurisdiction total about 13 million square kilometres and approximately 6.5 million square kilometres of relatively accessible continental shelf.

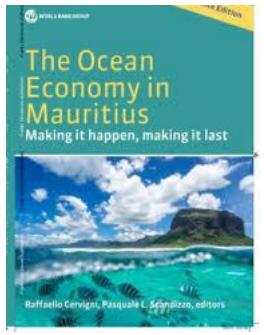
90 percent of Africa's imports and exports conducted by sea.

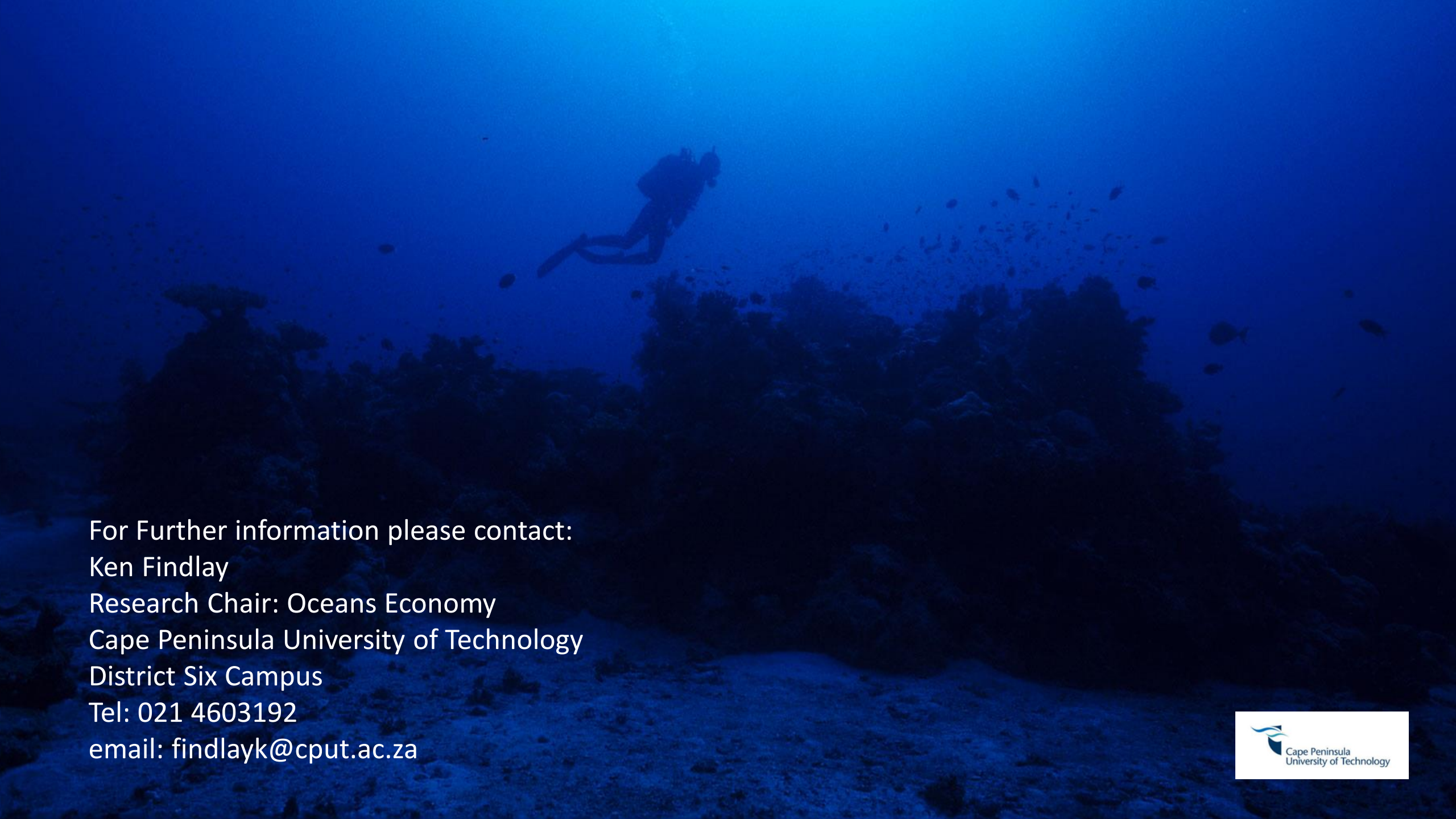
Freshwater and ocean fish provide important food and nutritional security of over 200 million Africans and provide income for over 10 million people.

Africa is currently under-represented in Ocean Accounting dialogue.









For Further information please contact:
Ken Findlay
Research Chair: Oceans Economy
Cape Peninsula University of Technology
District Six Campus
Tel: 021 4603192
email: findlayk@cput.ac.za

Cape Peninsula University of Technology