PML | Plymouth Marine Laboratory

W5 - Moving towards climate-ready fishery systems: Regional comparisons of climate adaptation in marine fisheries

Combining Cause and Effect: Impacts of Climate Change on global fisheries and consequences for dependent communities

Manuel Barange, Plymouth Marine Laboratory, UK
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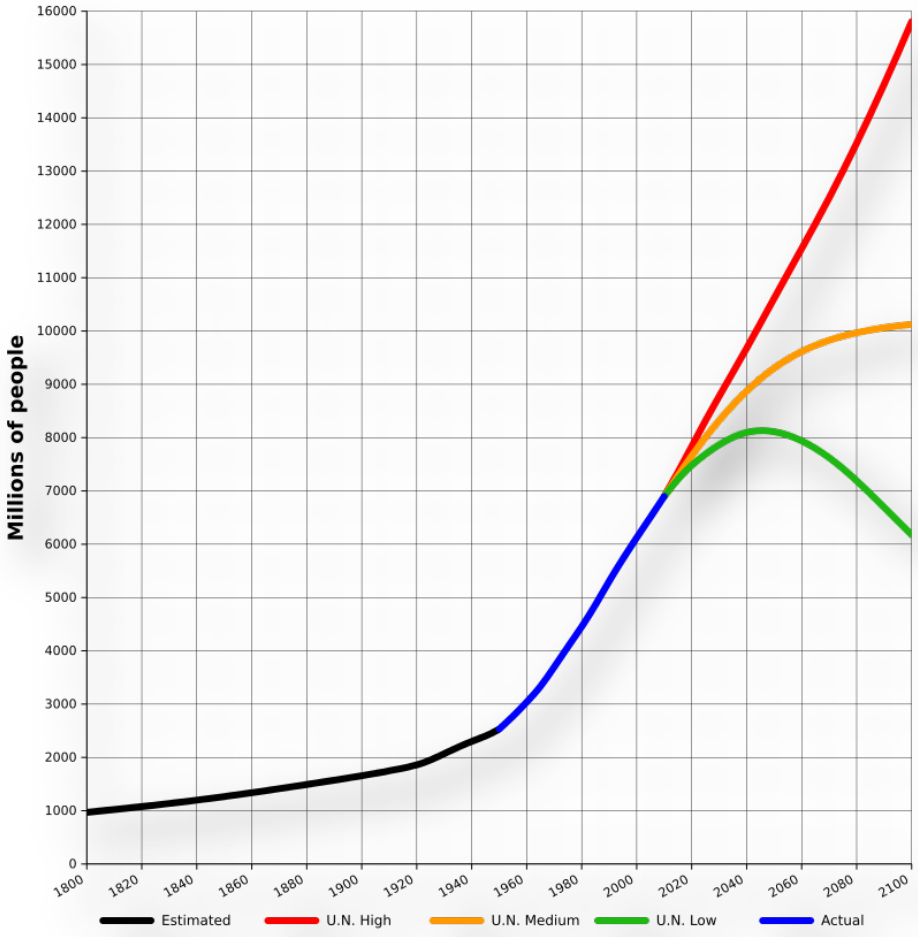
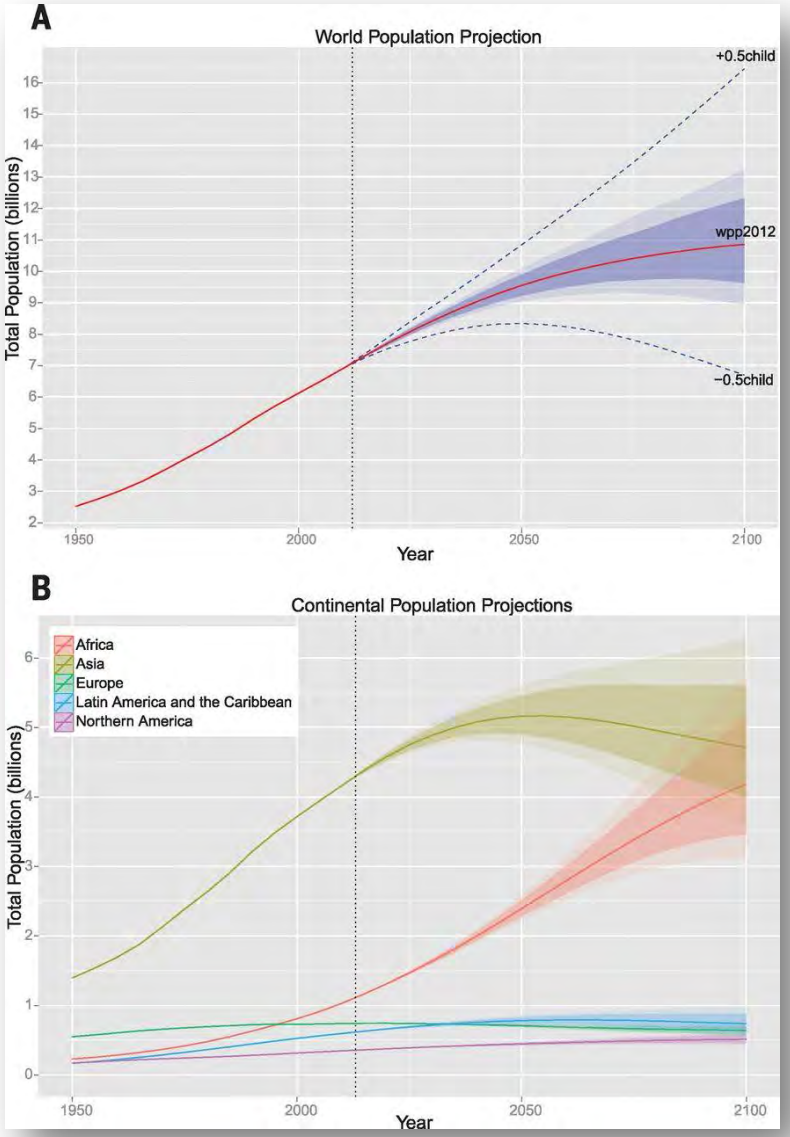
and J. Scholtens, E.H. Allison, G. Merino, J.L. Blanchard, J. Harle, J.I. Allen, J. Holt, S. Jennings, J. Fernandes, C. Mullon, S. Kay, W.W.L. Cheung, M. Ahmed, M. Hossain…



UN 2010 projections



Gerland et al 2014. Science 346: 234-237

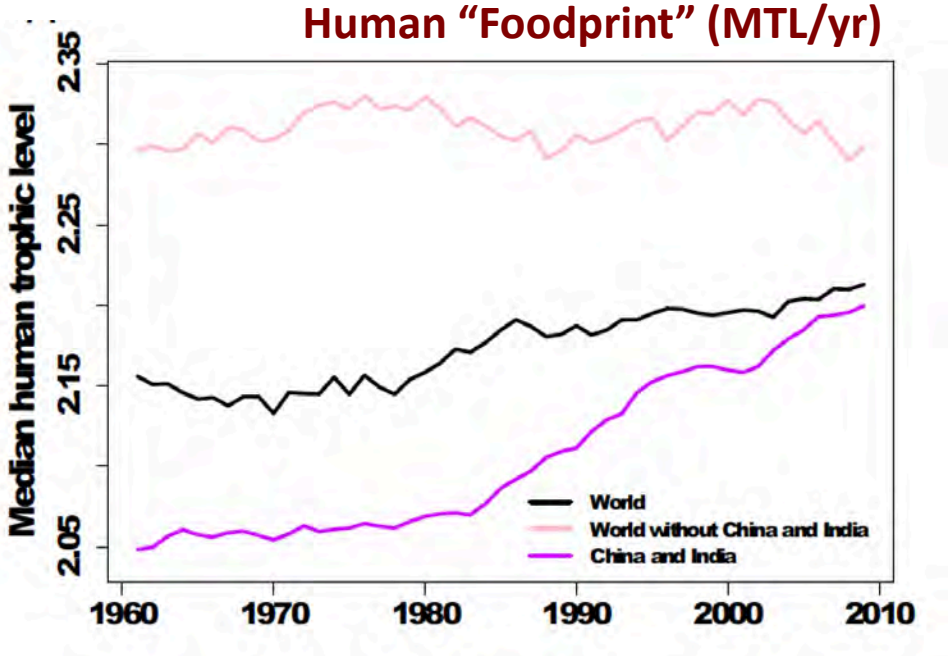
…a world driven by demand rather than supply

Global protein supply (kg/cap/yr)

	1969	1979	1989	1999	2009
Meat (kg/cap)	26.6	30.1	33.1	38.1	41.8
Fish (kg/cap)	10.7	11.4	13.4	15.6	18.2
Total (kg/cap)	37.3	41.5	46.5	53.7	60

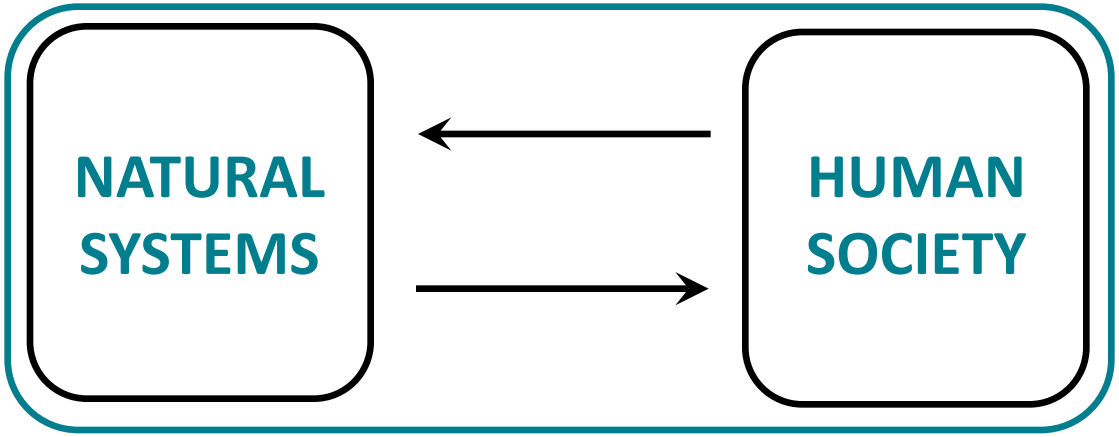
Bene et al. 2015. Food Security (in press)

Human "Foodprint" (MTL/yr)



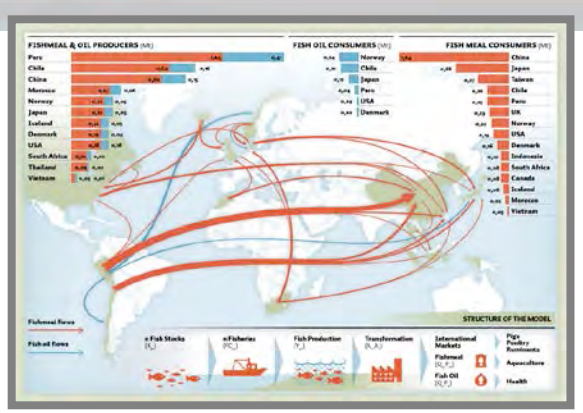
Bonhomeau et al. 2013. PNAS

The future of Climate Change Research

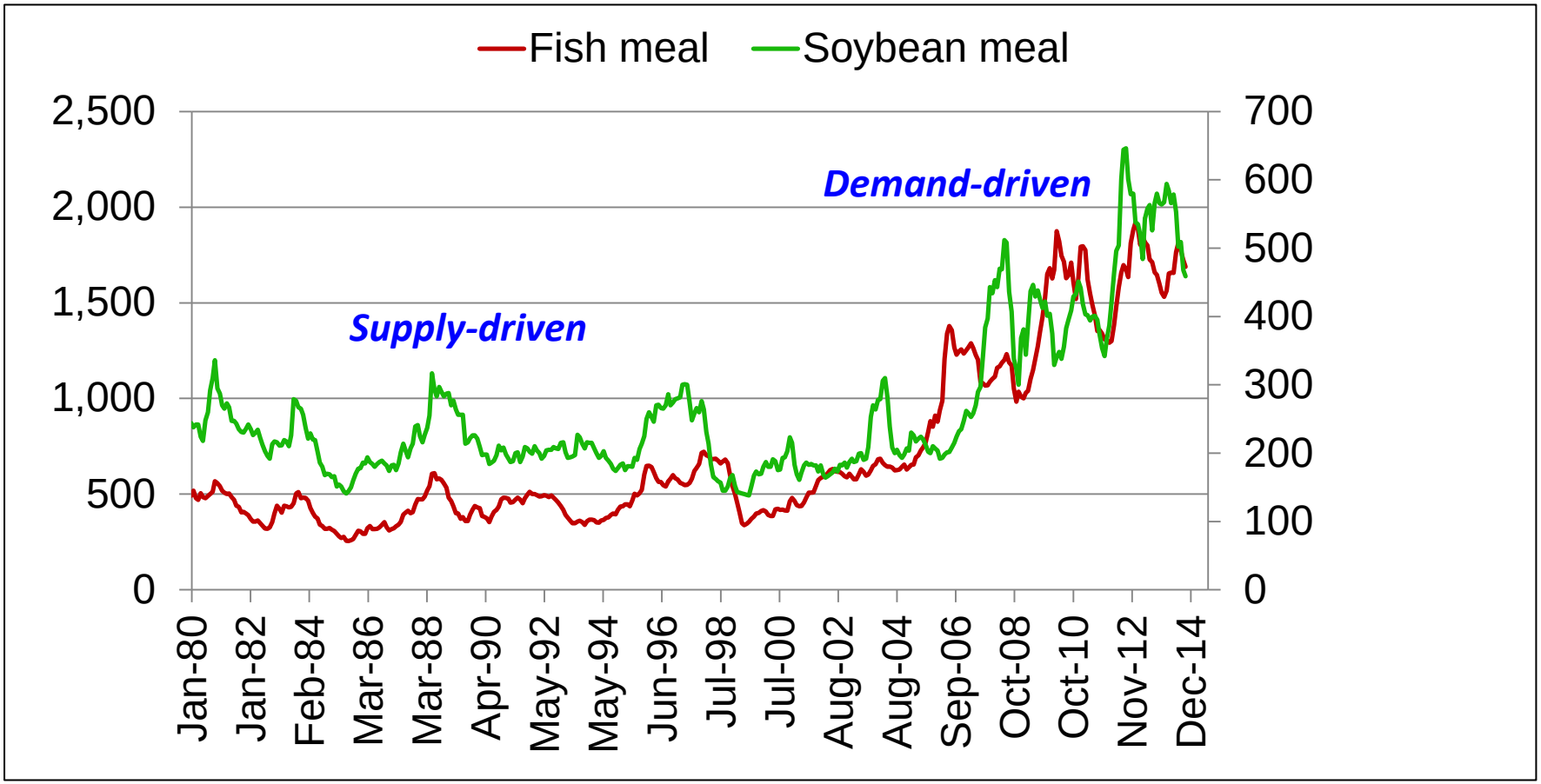


Solutions for a world driven by demand rather than supply

…a world driven by demand rather than supply

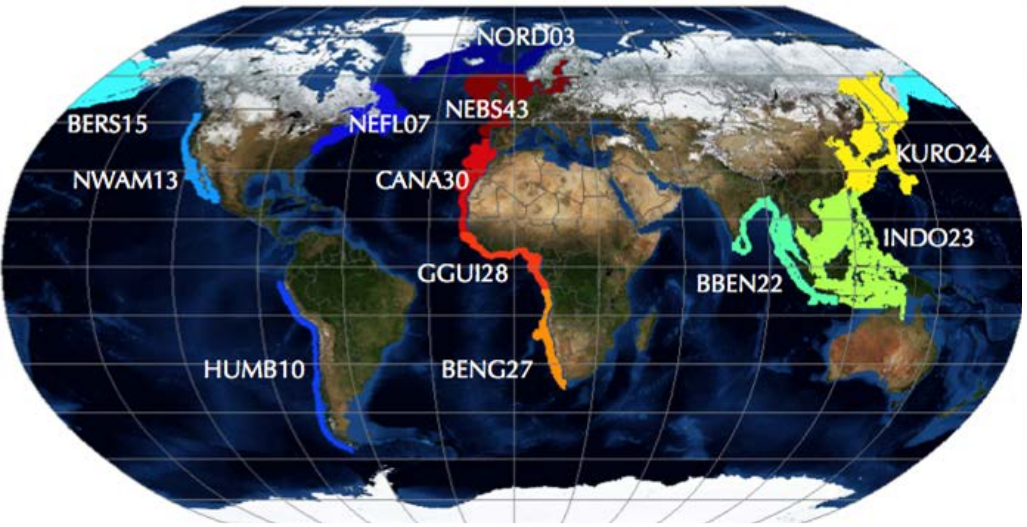


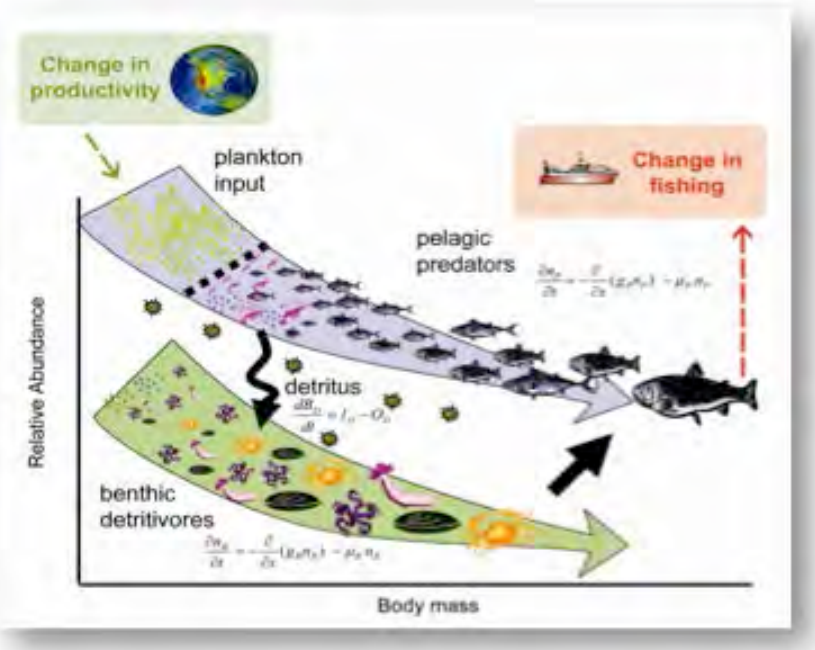
Market price (US$/t)



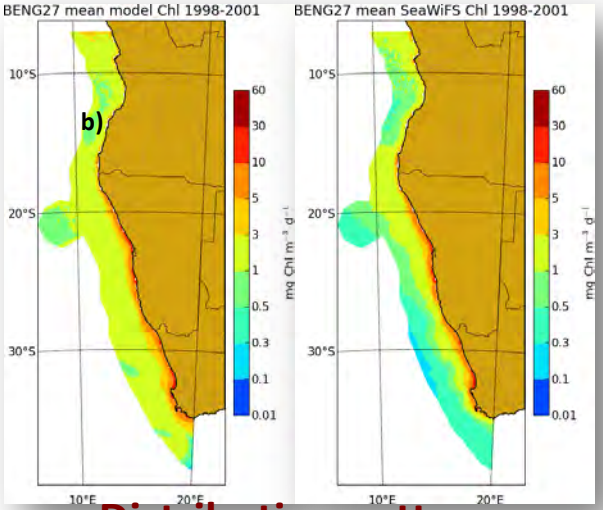
QUEST-Fish

Combining Cause and Effect: Impacts of Climate Change on global fisheries and consequences for dependent communities (*at sub-global level*)

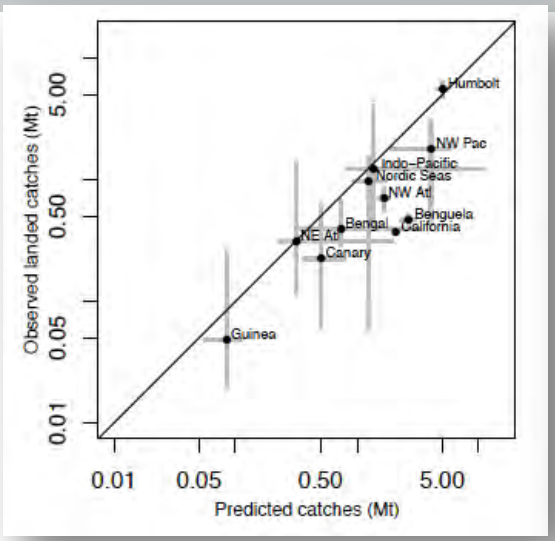




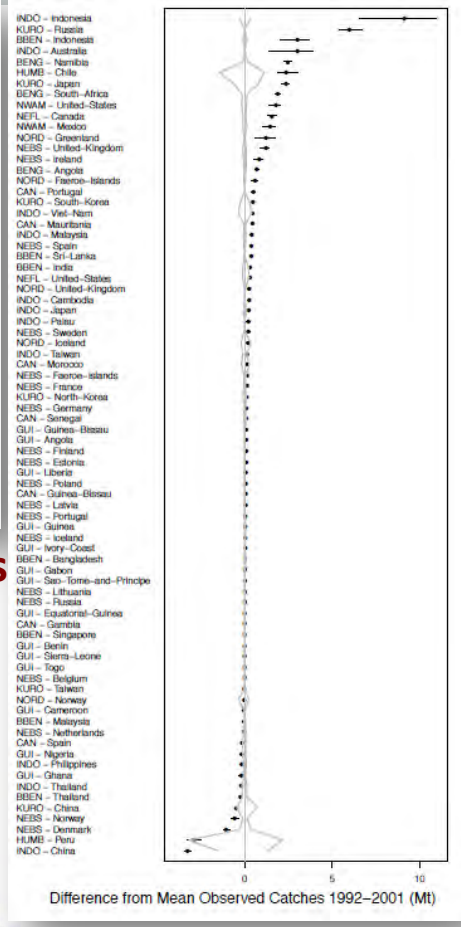
- IPSL-CM4 with SRESA1B
- 4 Time slices from pre-industrial (1870) to 2100: 3yr spin-up+ 10year runs
- 1/10° resolution
- Includes important shelf processes: Tides, upwelling, Benthic/pelagic recycling

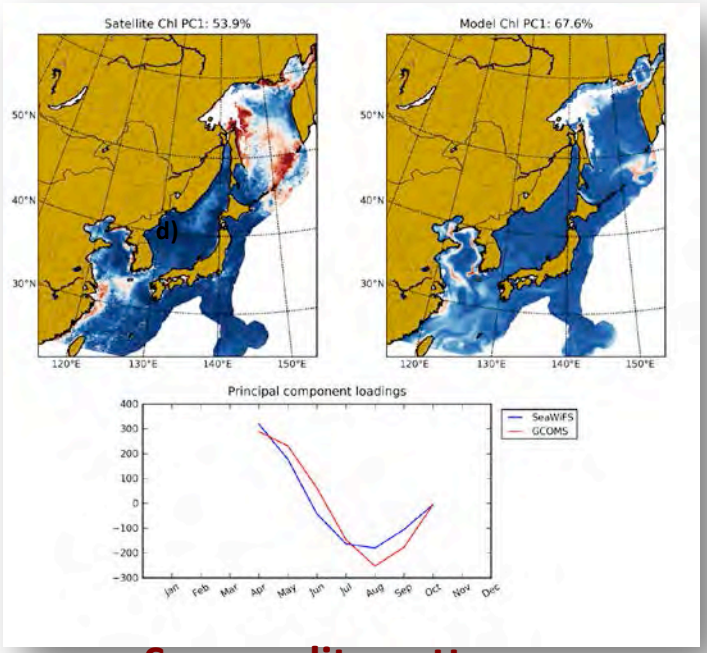


Distribution patterns

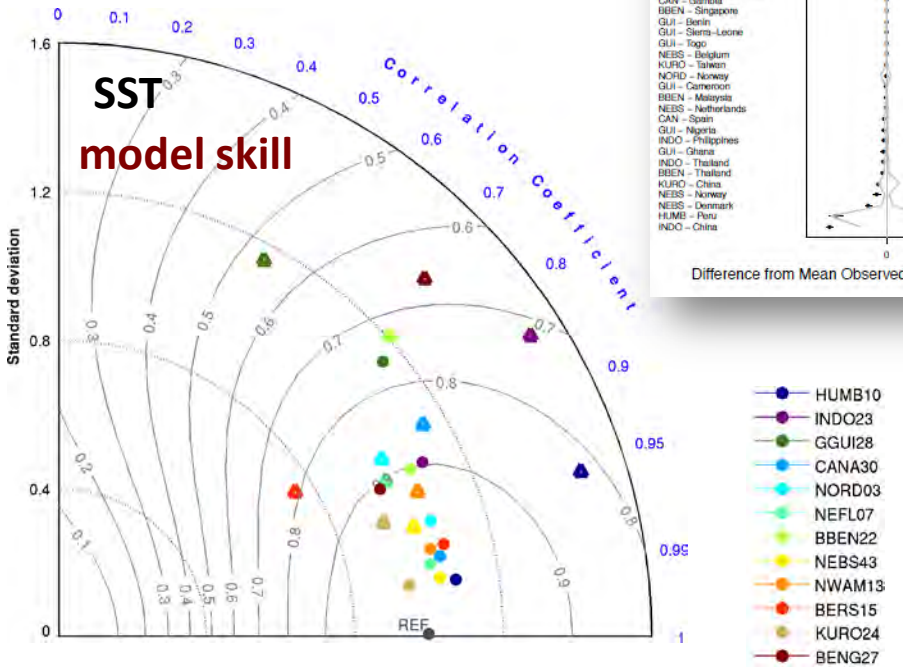


Catch vs Predictions





Seasonality patterns



PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY B BIOLOGICAL SCIENCES

Potential consequences of climate change for primary production and fish production in large marine ecosystems

Julia L. Blanchard, Simon Jennings, Robert Holmes, James Harle, Gorka Merino, J. Icarus Allen, Jason Holt, Nicholas K. Dulvy and Manuel Barange

Phil. Trans. R. Soc. B 2012 **367**, 2979-2989
doi: 10.1098/rstb.2012.0231

Contents lists available at SciVerse ScienceDirect

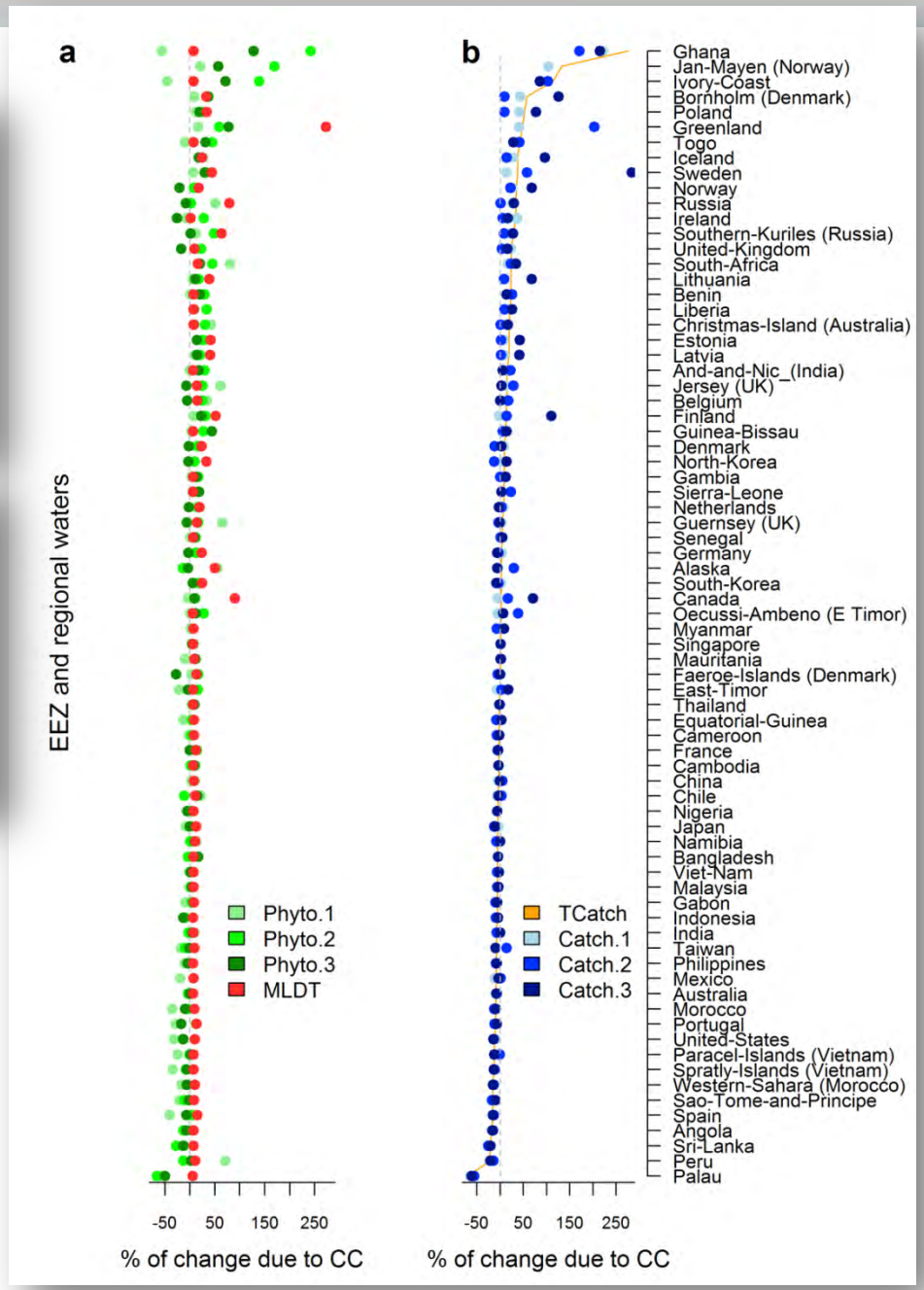
Global Environmental Change

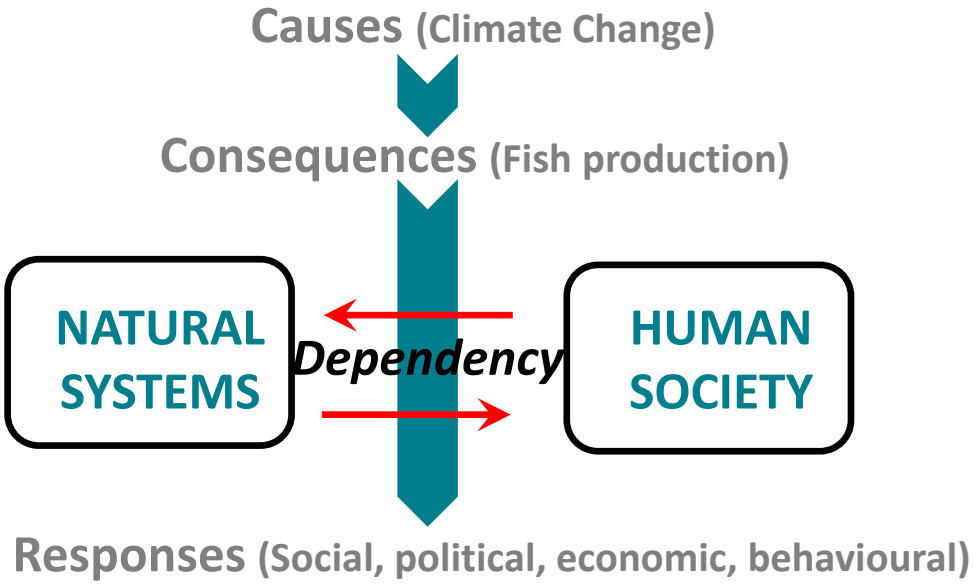
journal homepage: www.elsevier.com/locate/gloenvcha

ELSEVIER

Can marine fisheries and aquaculture meet fish demand from a growing human population in a changing climate?

Gorka Merino[a,*], Manuel Barange[a], Julia L. Blanchard[b], James Harle[c], Robert Holmes[a], Icarus Allen[a], Edward H. Allison[d], Marie Caroline Badjeck[d], Nicholas K. Dulvy[e], Jason Holt[c], Simon Jennings[f,g], Christian Mullon[h], Lynda D. Rodwell[i]





nature climate change
LETTERS
PUBLISHED ONLINE: 23 FEBRUARY 2014 | DOI: 10.1038/NCLIMATE2119

Impacts of climate change on marine ecosystem production in societies dependent on fisheries

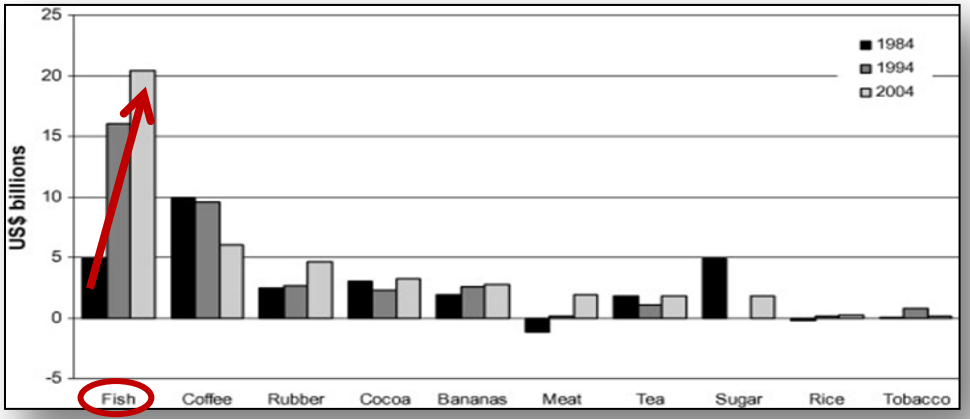
M. Barange[1*], G. Merino[1,2], J. L. Blanchard[3], J. Scholtens[4], J. Harle[5], E. H. Allison[6], J. I. Allen[1], J. Holt[5] and S. Jennings[7,8]

HUMAN DEPENDENCY ON FISHERIES

EMPLOYMENT

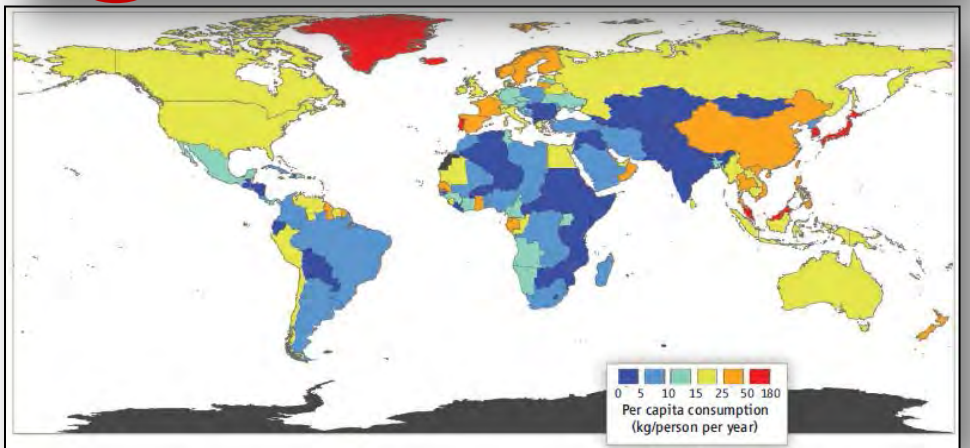
Africa Asia Europe Latin America/ Caribbean N America Oceania

TRADE

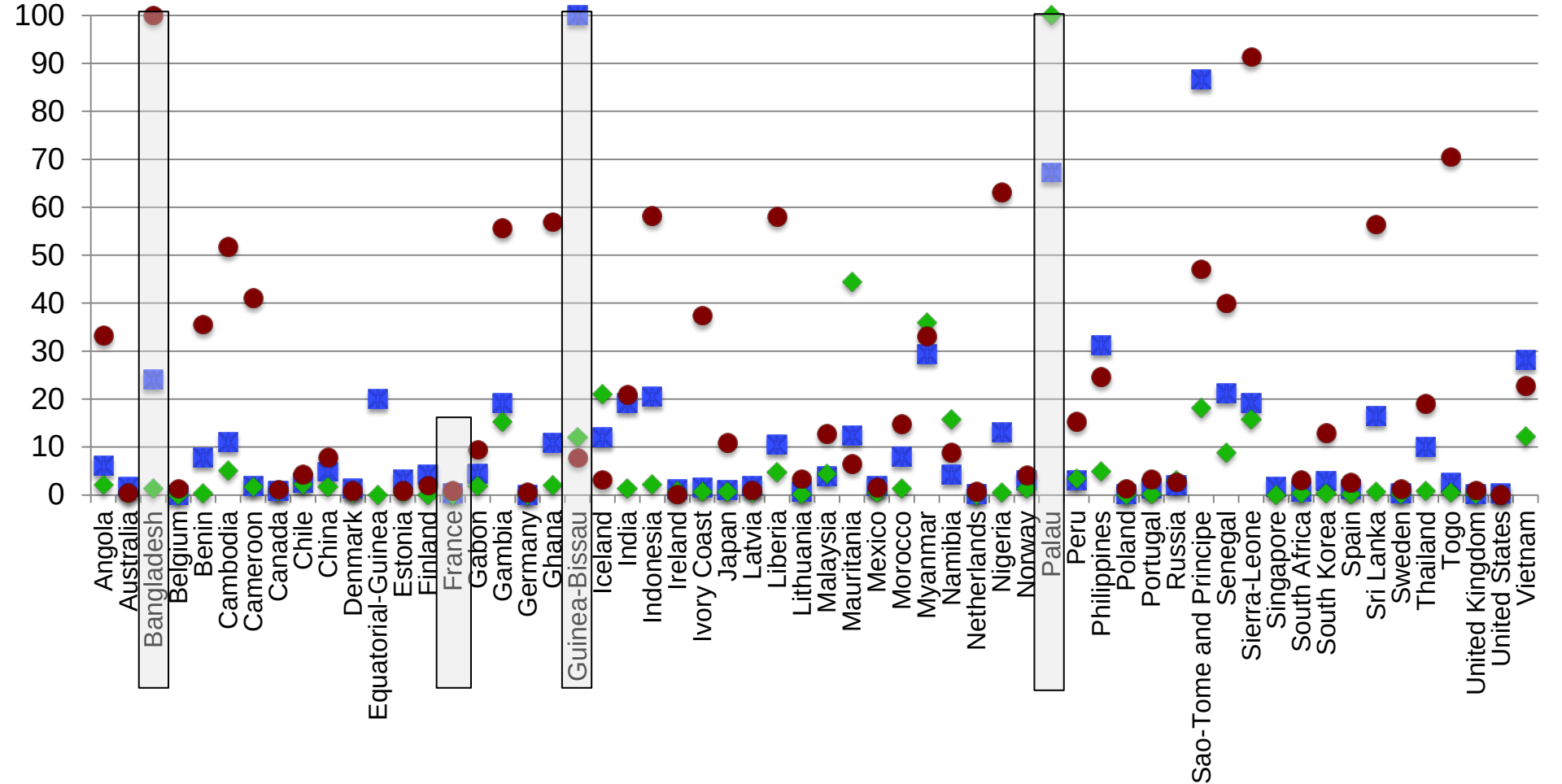


Bene et al.2010. World Development 38: 933 - 954

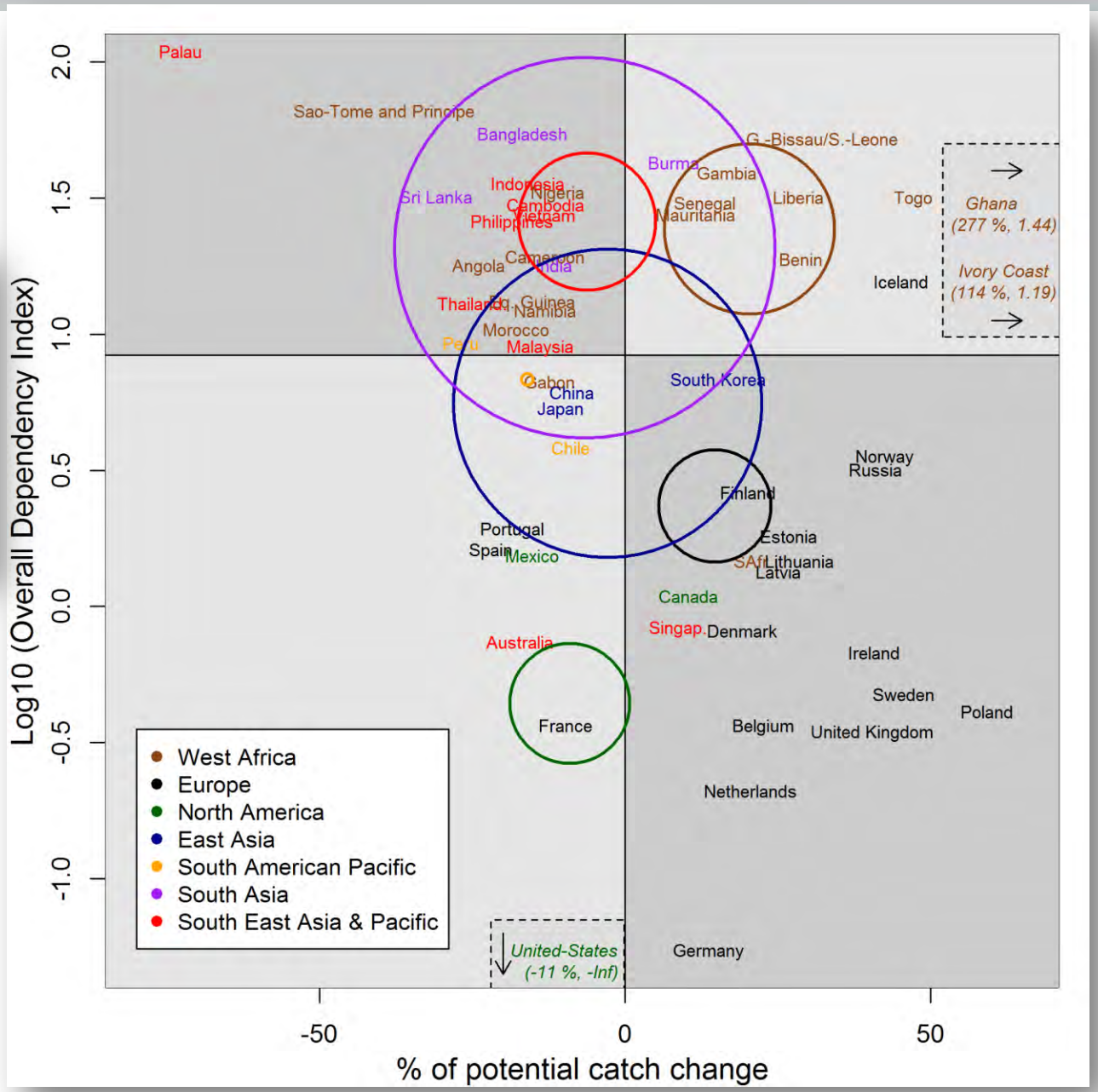
FOOD

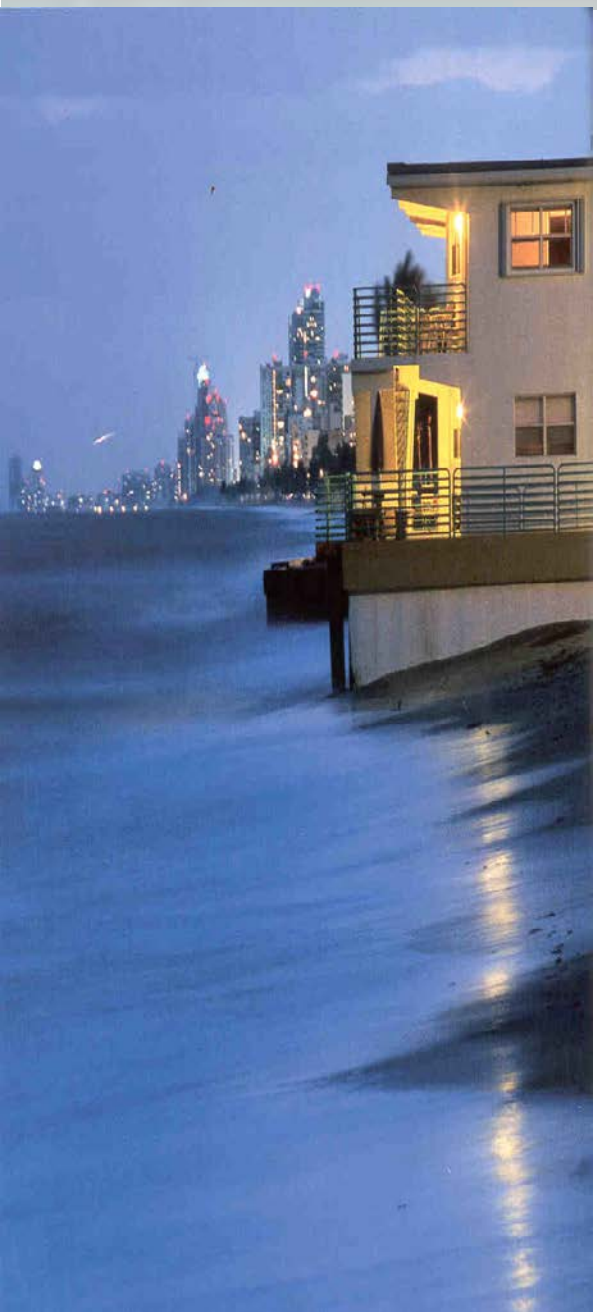


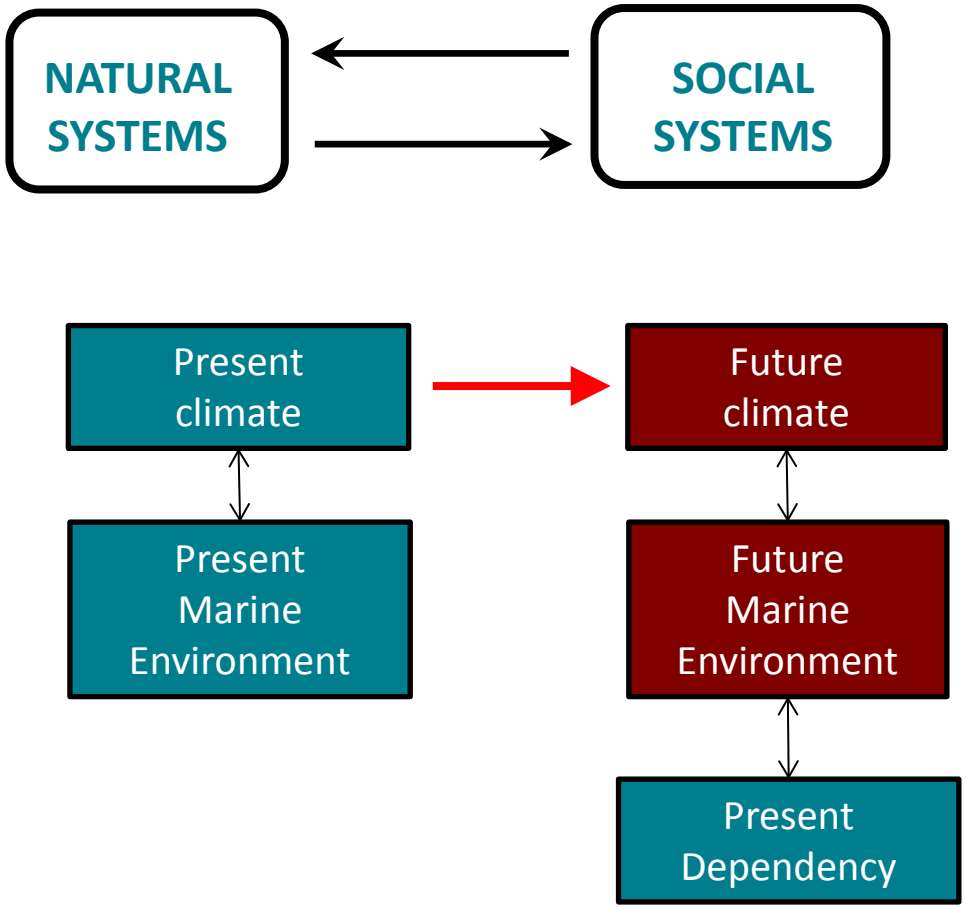
Smith et al. 2010 Science 327: 784-786


Importance to Employment
Importance to Economy
Importance of all fish to food security
100
90
80
70
60
50
40
30
20
10
0
Angola
Australia
Bangladesh
Belgium
Benin
Cambodia
Cameroon
Canada
Chile
China
Denmark
Equatorial-Guinea
Estonia
Finland
France
Gabon
Gambia
Germany
Ghana
Guinea-Bissau
Iceland
India
Indonesia
Ireland
Ivory Coast
Japan
Latvia
Liberia
Lithuania
Malaysia
Mauritania
Mexico
Morocco
Myanmar
Namibia
Netherlands
Nigeria
Norway
Palau
Peru
Philippines
Poland
Portugal
Russia
Sao-Tome and Principe
Senegal
Sierra-Leone
Singapore
South Africa
South Korea
Spain
Sri Lanka
Sweden
Thailand
Togo
United Kingdom
United States
Vietnam

Responses (Social, political, economic, behavioural)







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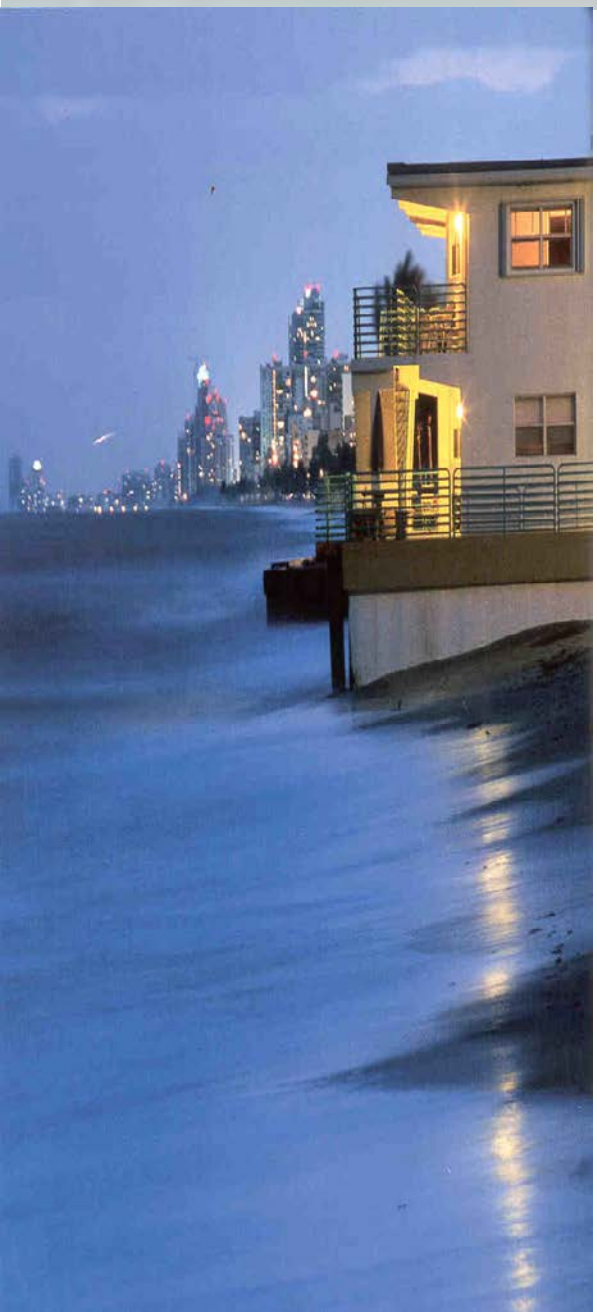
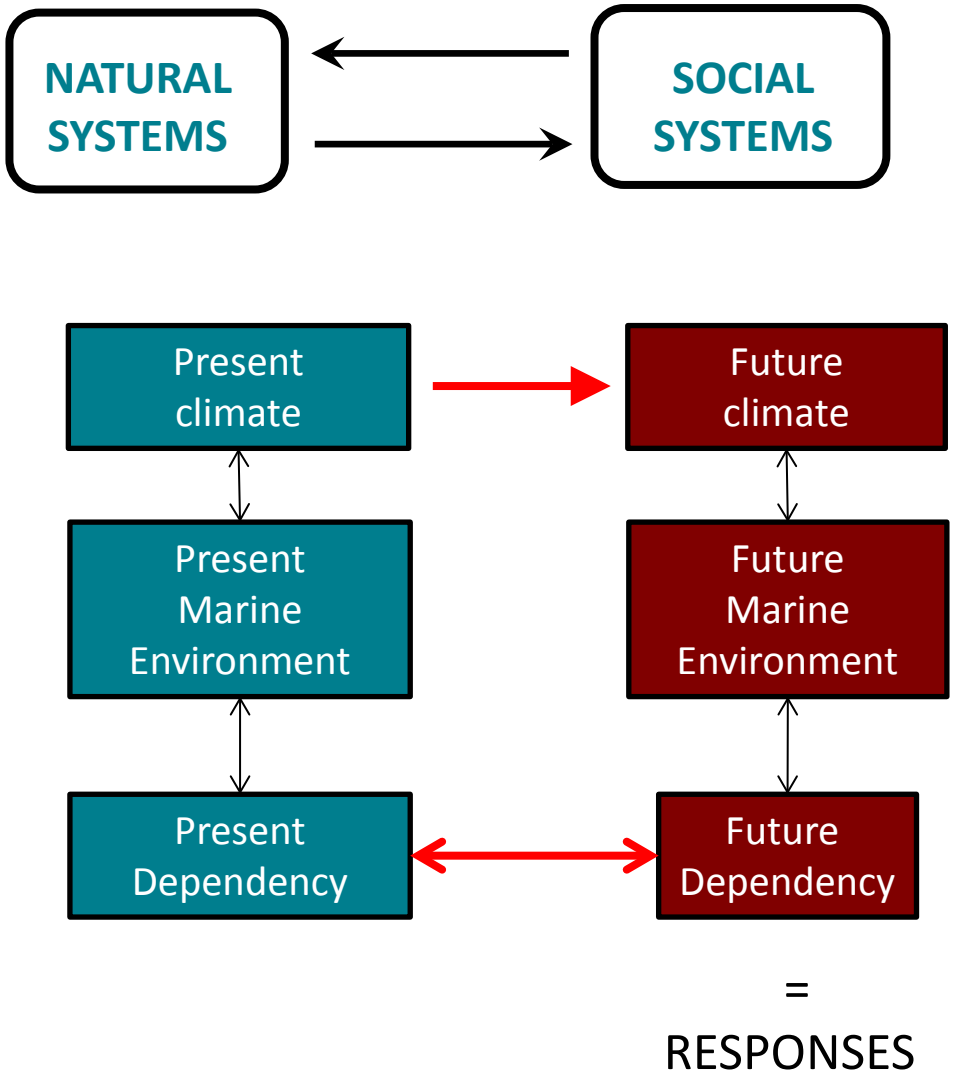
FUTURE RESPONSES



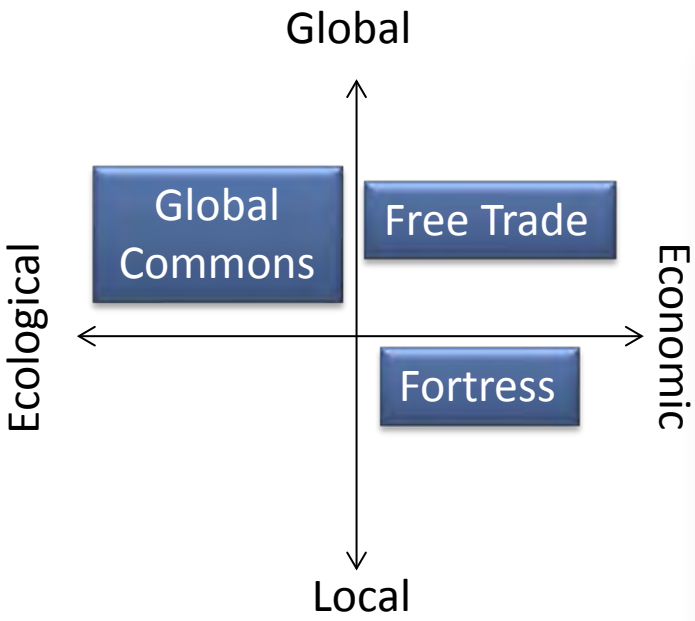

NATURAL SYSTEMS
SOCIAL SYSTEMS
Present climate
Future climate
Present Marine Environment
Future Marine Environment
Present Dependency
Future Dependency
=
RESPONSES

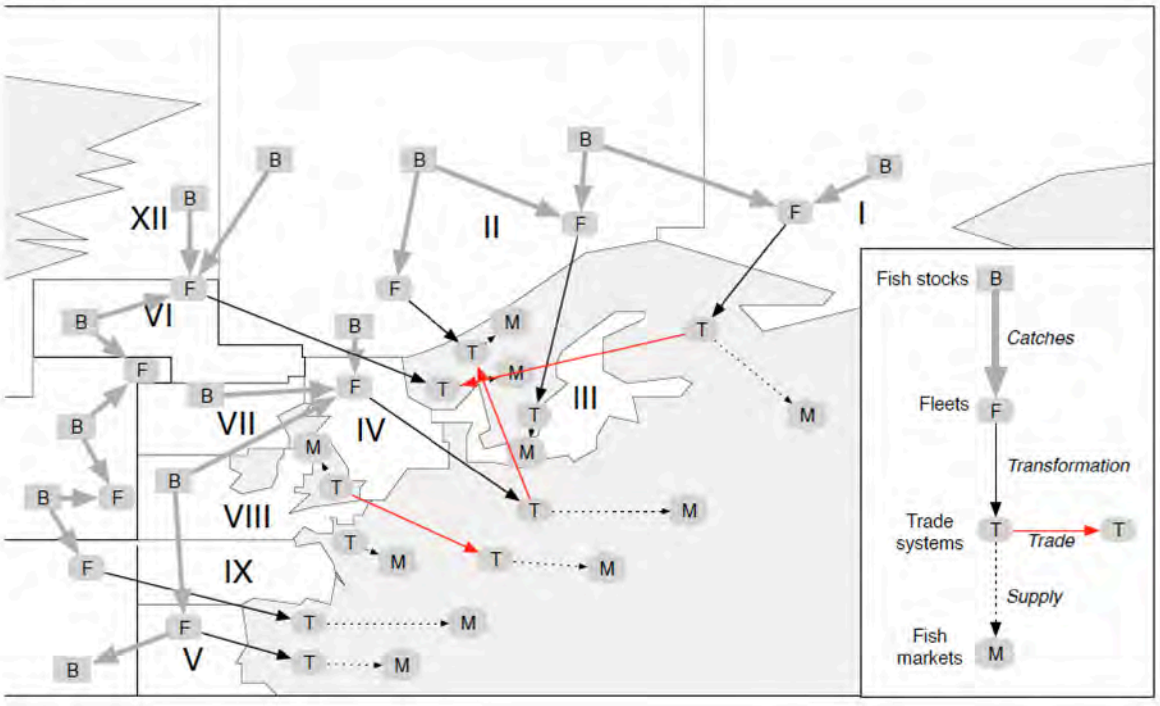
Present Dependency ⟷ Future Dependency

- Normative scenarios
- Data-driven scenarios

EURO-BASIN
BASIN SCALE ANALYSIS, SYNTHESIS AND INTEGRATION

Workshop 1 – Sunday 22, 12:00 "Dealing with uncertainty when developing socio-economic scenarios for North Atlantic fisheries futures"

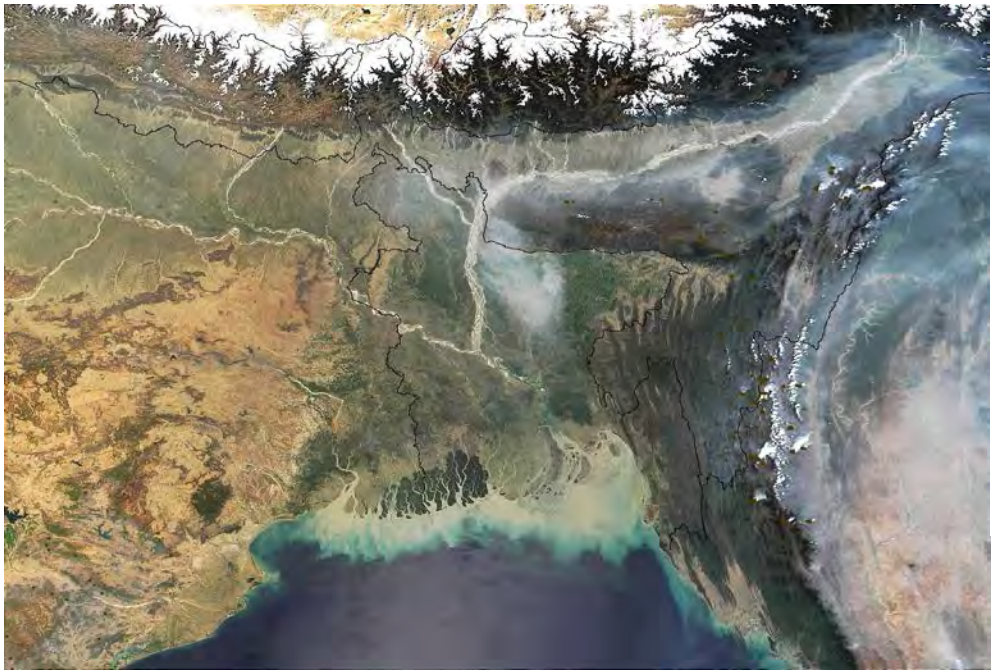




Present Dependency ⟷ Future Dependency

- Normative scenarios
- Data-driven scenarios

espa Deltas
ecosystem services for poverty alleviation



SURVEY FOR ASSESSING HEALTH, LIVELIHOODS, ECOSYSTEM SERVICES AND POVERTY ALLEVIATION IN POPULOUS DELTAS

Contents

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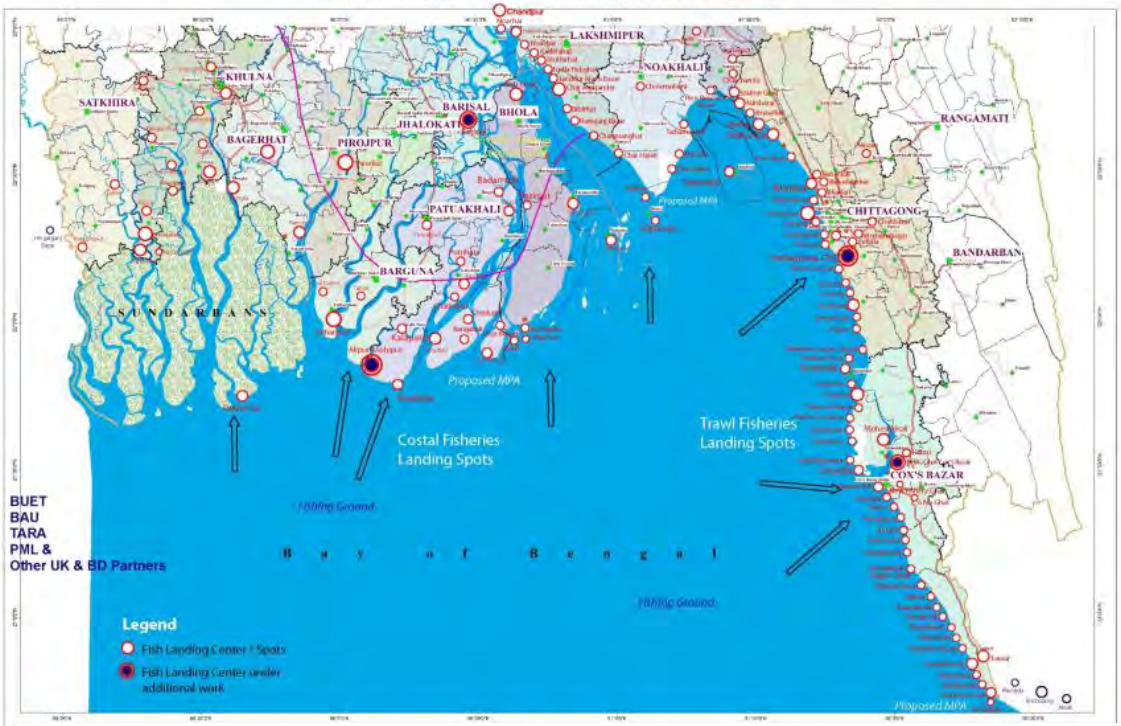
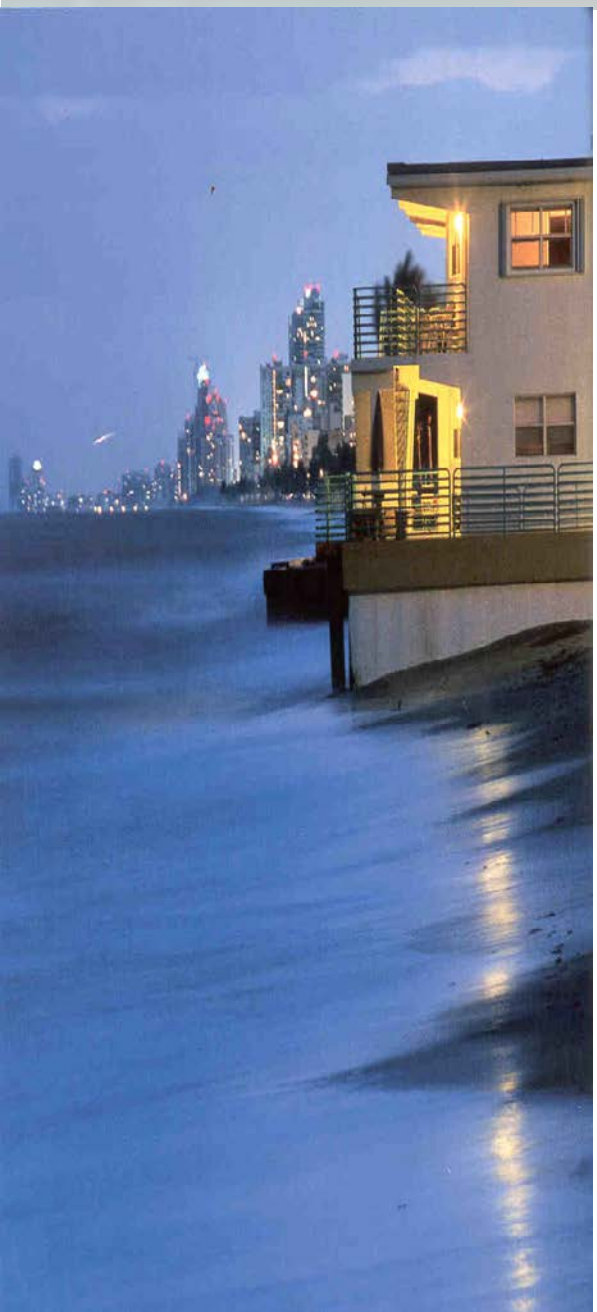
espa Deltas ecosystem services for poverty alleviation

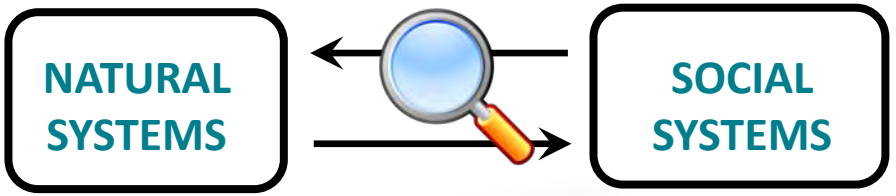
Assessing Health, Livelihoods, Ecosystem Services and Poverty Alleviation in Populous Deltas

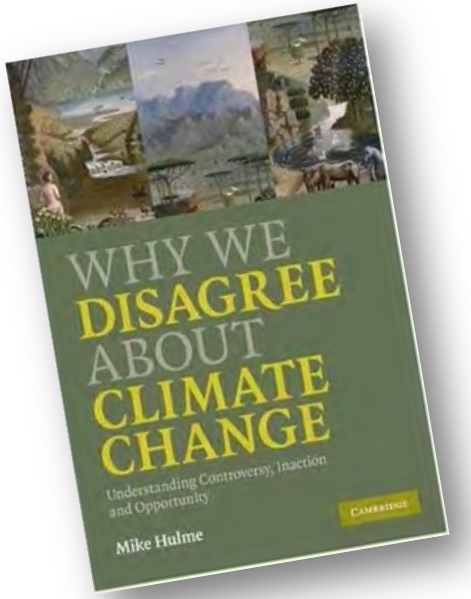
Work Package - 5 : Fish Landing Spots / Center



To Be Continued…Session 10 (Tue 24th 16:40, Fernandes et al)

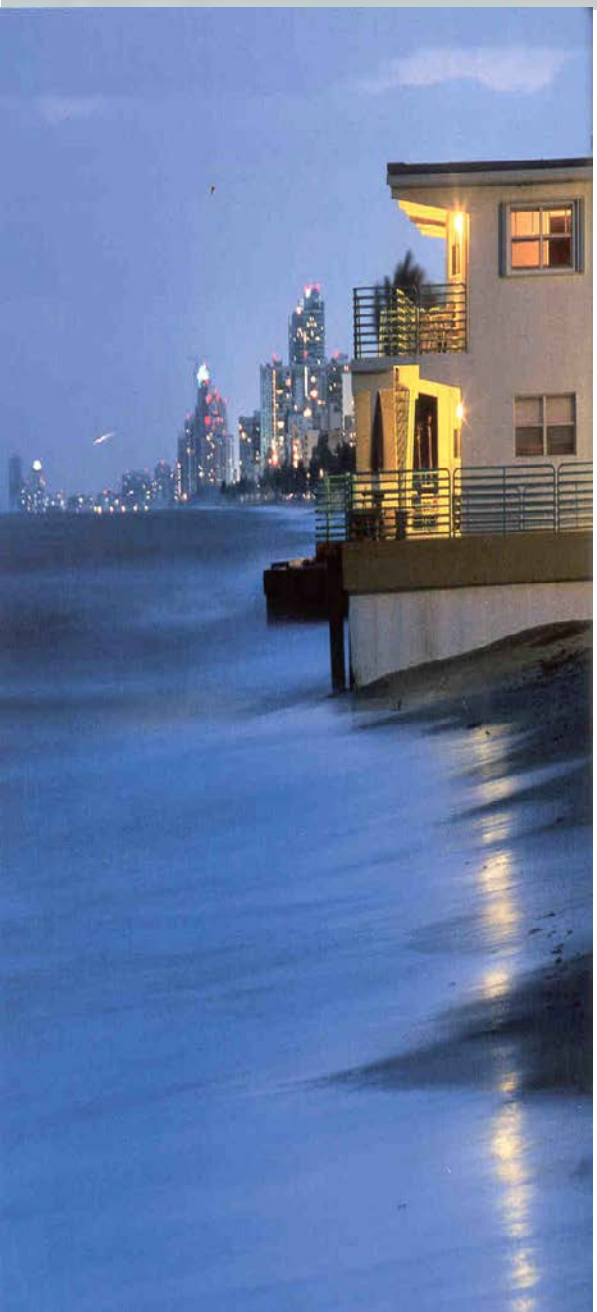


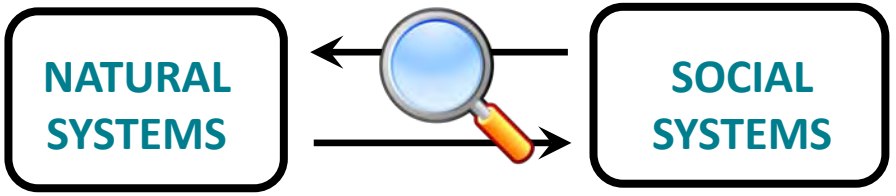


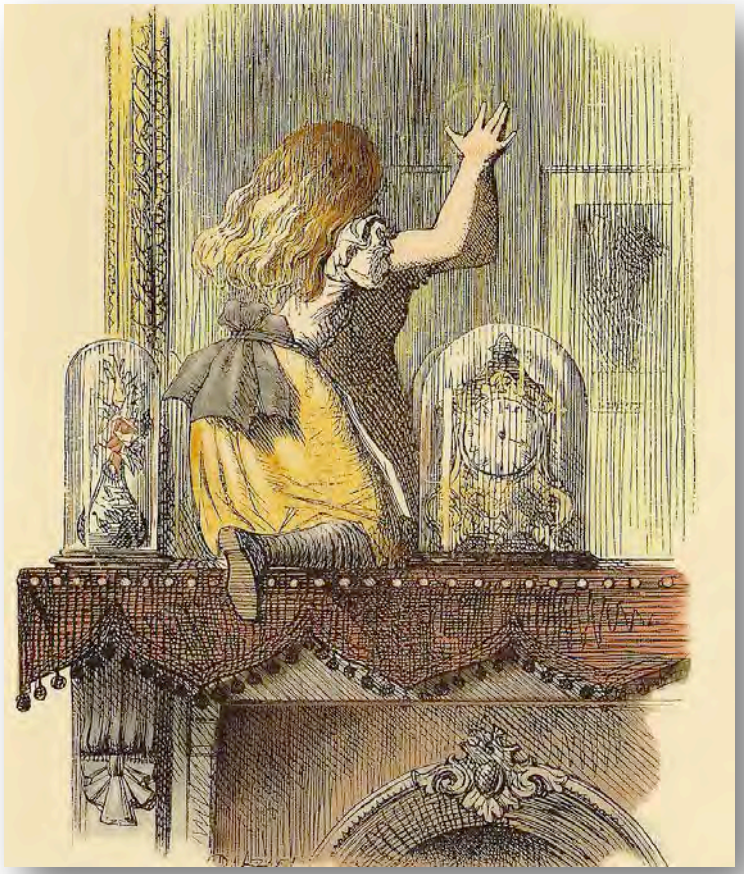


- "Climate change is not a problem waiting for a solution any more than clashes of political ideologies or religious disputes are problems waiting to be solved"

- "Climate change must be used as a magnifying glass and a mirror" to understand our relationship with the natural environment







W5: Regional comparisons of climate adaptation in marine fisheries