



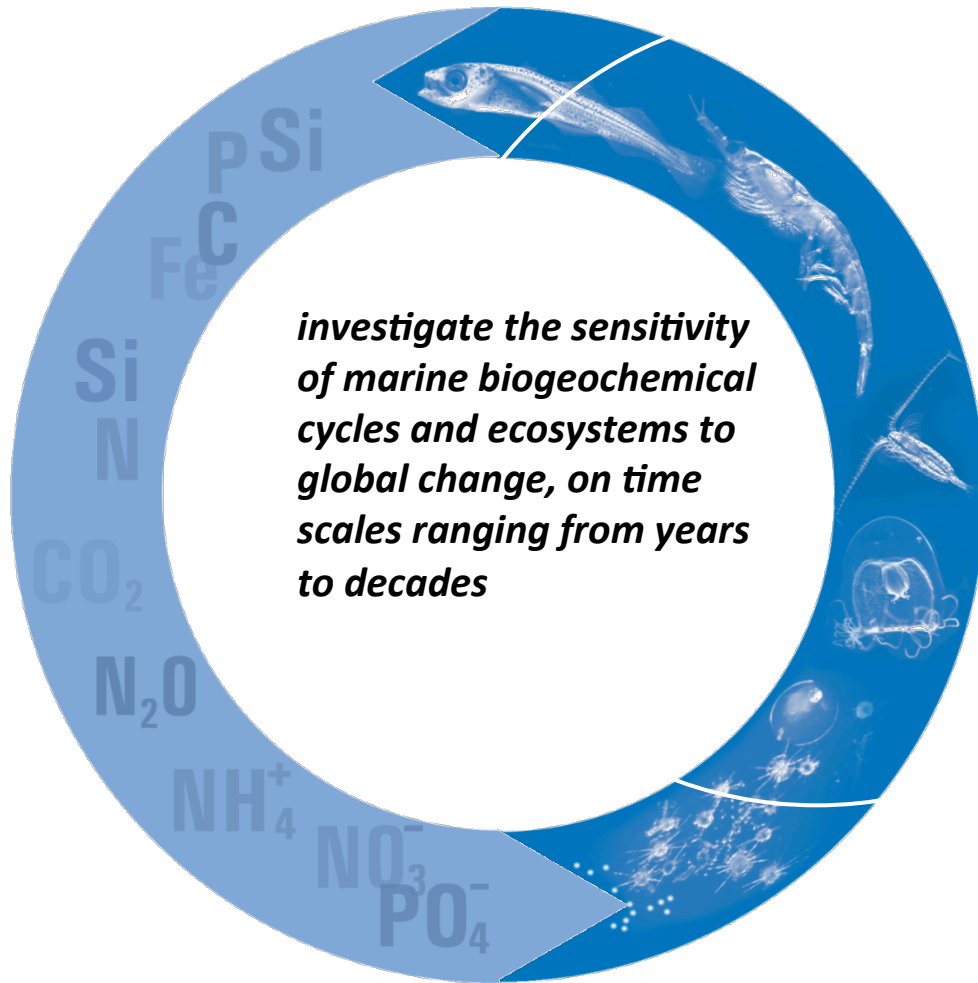
# IMBER HUMAN DIMENSION WORKING GROUP

Alida Bundy, Marie-Caroline Badjeck, Moenieba Isaacs, Ratana Chuenpagdee, Sarah Cooley, Omar Defeo, Bernhard Glaeser, Patrice Guillotreau, Mitsutaku Makino and Ian Perry



CLIVAR Session,  
9<sup>th</sup> IMBER SSC meeting,  
12-15 June 2012  
La Paz, Mexico

# IMBER RESEARCH FOCUS

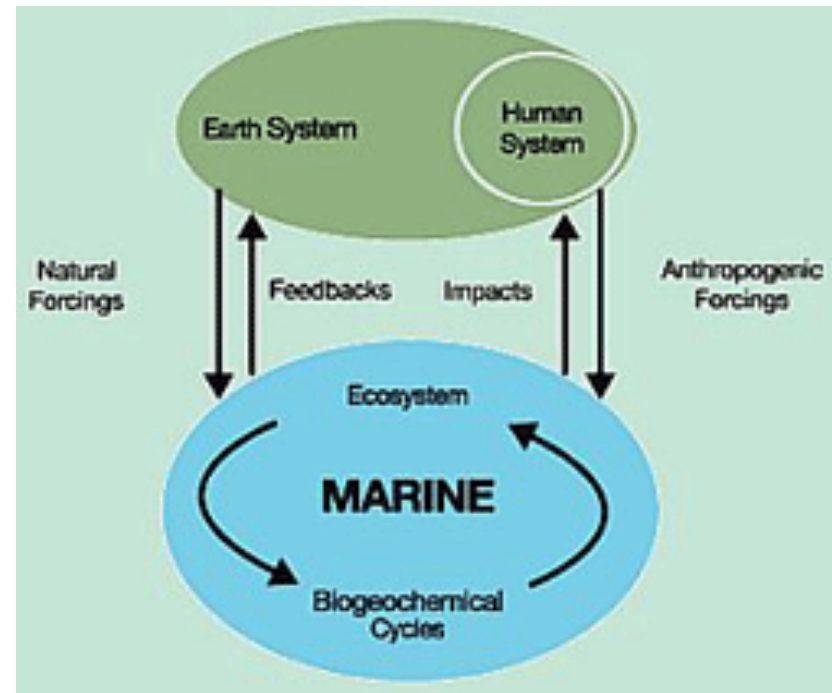


## FOUR RESEARCH THEMES

- Interactions between biogeochemical cycles and marine food webs
- Sensitivity to global change
- Feedbacks to the Earth System
- Responses of society

# Theme 4. Responses of Society

- Promote an understanding of the multiple feedbacks between human and ocean systems
- Clarify what human institutions can do, either to mitigate anthropogenic perturbations of the ocean system, or to adapt to such changes



1<sup>ST</sup> HDWG Meeting,  
UNESCO Paris,  
18-20th APRIL 2011



2nd HDWG  
Meeting, London,  
27 – 30 March 2012





# GLOBEC's Focus 4 Working Group

Co-Chairs: Ian Perry (“natural scientist”, Canada)  
Rosemary Ommer (“social scientist”, Canada)

The objectives of GLOBEC's Focus 4 Working Group were to:

1. Understand the interactions between marine coastal communities and global changes in marine ecosystems;
2. Understand the capacity of these communities (both natural and human) to adjust to these changes.
3. Understand the linked consequences of these adjustments for both the natural marine and human coastal communities.



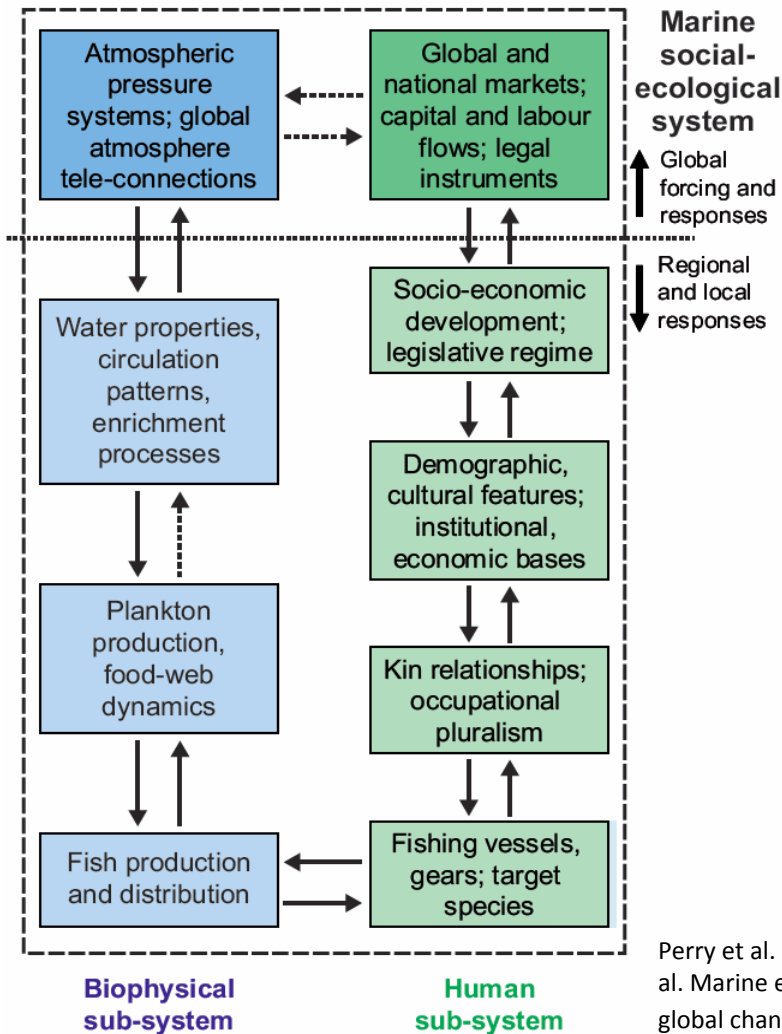
**GLOBEC**  
G L O B A L  
O C E A N  
E C O S Y S T E M  
D Y N A M I C S



GLOBAL  
I G B P  
CHANGE



# Coupled marine social-ecological systems



## Social-ecological systems:

- complex adaptive systems including social (human) and ecological (biophysical) sub-systems in two-way feedback relationships
- integrated concept of humans-in-nature
- delineation between social and ecological systems is unhelpful

Berkes. 2010. In: Ommer et al. Resilience of fisheries systems to global change: a social-ecological perspective. Wiley-Blackwell.

Perry et al. 2010. In: Barange et al. Marine ecosystems and global change.



# Drivers of change in biophysical marine systems

## Biophysical drivers:

- climate variability
- climate trends (change)
- acidification
- changes in oxygen concentration
- internal ecosystem dynamics (predator-prey; disease)

## Human drivers:

- fishing
- habitat degradation
- contaminants
- introductions of exotic species
- shipping
- mineral extraction



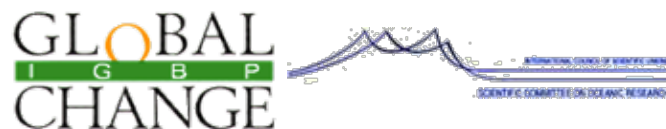
# Drivers of change in fishing-dependent human communities

## Local drivers:

- environmental changes
- resource changes
- demographic changes
- law and property relations
- policy changes
- gender/ethnic relationships

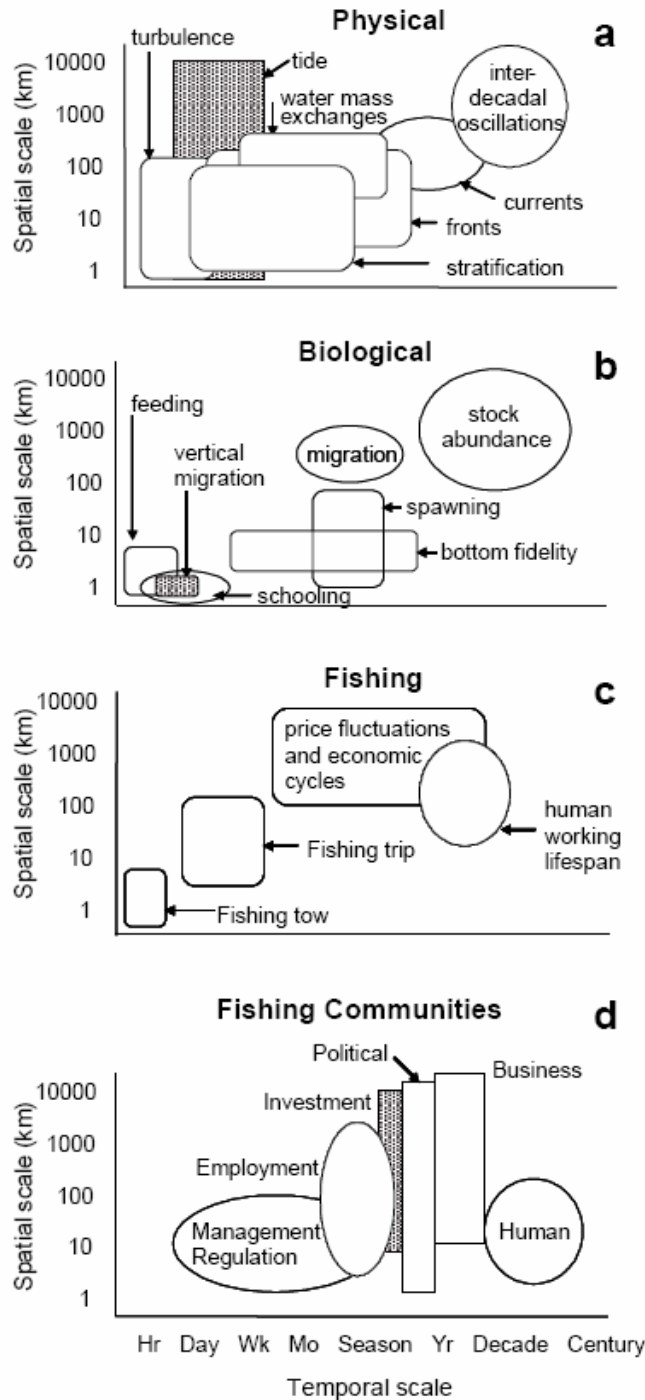
## Global drivers (Globalisation):

- economic changes
- market / trade changes
- infectious diseases
- shifting societal and international values,
  - e.g. FAO Code of Conduct for Responsible Fisheries;
  - UN Millennium Development Goals





# Drivers of change in biophysical and human sub-systems may differ at different spatial scales



- **local scale**: fishing for livelihoods
- **national scale**: fish products for high value export
- fisheries management is a cross-scale problem, reaching from local to global
- **integrate natural and social science** studies for:
  - cross-scale analyses – to learn about **pathways**
  - place-based studies to learn about **human motivation**

Perry and Ommer. 2003. Fish. Oceanogr.

# Scope

- Include all scales:
  - local, regional, national, international, N,S,E,W
    - Links with IMBER Regional Programmes
    - Links to other regional initiatives?
  - past, present, future
- Move beyond fishing and include the larger role of the ocean:
  - “the oxygen in every second breath you take is derived from the ocean”
  - Impacts of ocean acidification

# A broad comparative approach

- Provide frameworks to understand *and forecast* human-ocean-human interactions with respect to global change
- Use a comparative case-study approach at all scales to explore questions related to:
  - Adaptive capacities of SES (using appraisal/typology approach)
  - Governance / Food security/poverty reduction
  - Global markets/ Food security/poverty reduction
  - Define physical/BGC links to humans



# ADApT

## Assessment of responses based on Description, Appraisal and Typology

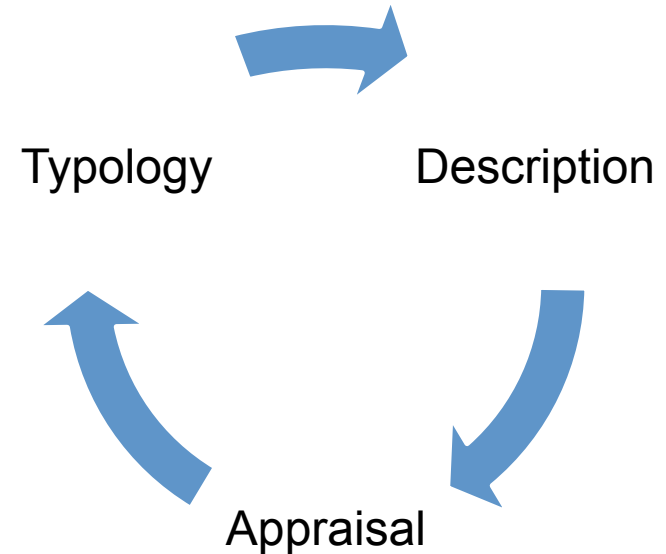
### IMBER Human Dimensions Working Group

Ratana Chuenpagdee, Alida Bundy, Marie-Caroline Badjeck, Moenieba Isaacs,  
Sarah Cooley, Omar Defeo, Bernhard Glaeser, Patrice Guillotreau,  
Mitsutaku Makino and Ian Perry

Understanding and Forecasting Human-Ocean-Human Interactions  
with Respect to Global Change

# What is ADApT and why?

- **ADApT** offers a ‘rapid’ assessment framework to assist decision-makers in exploring possible responses most suitable for their natural, social and governing systems
- Tool to explore ‘cause and effect’ of global change on human and ocean systems



**ADApT – Assessment of Responses based on Description, Appraisal and Typology**



# Four key elements of ADApT

## Description

- Systems (natural, social, governing)
- Stressors (natural, anthropogenic)
- Change (caused by stressors)
- Impact (consequence of change)

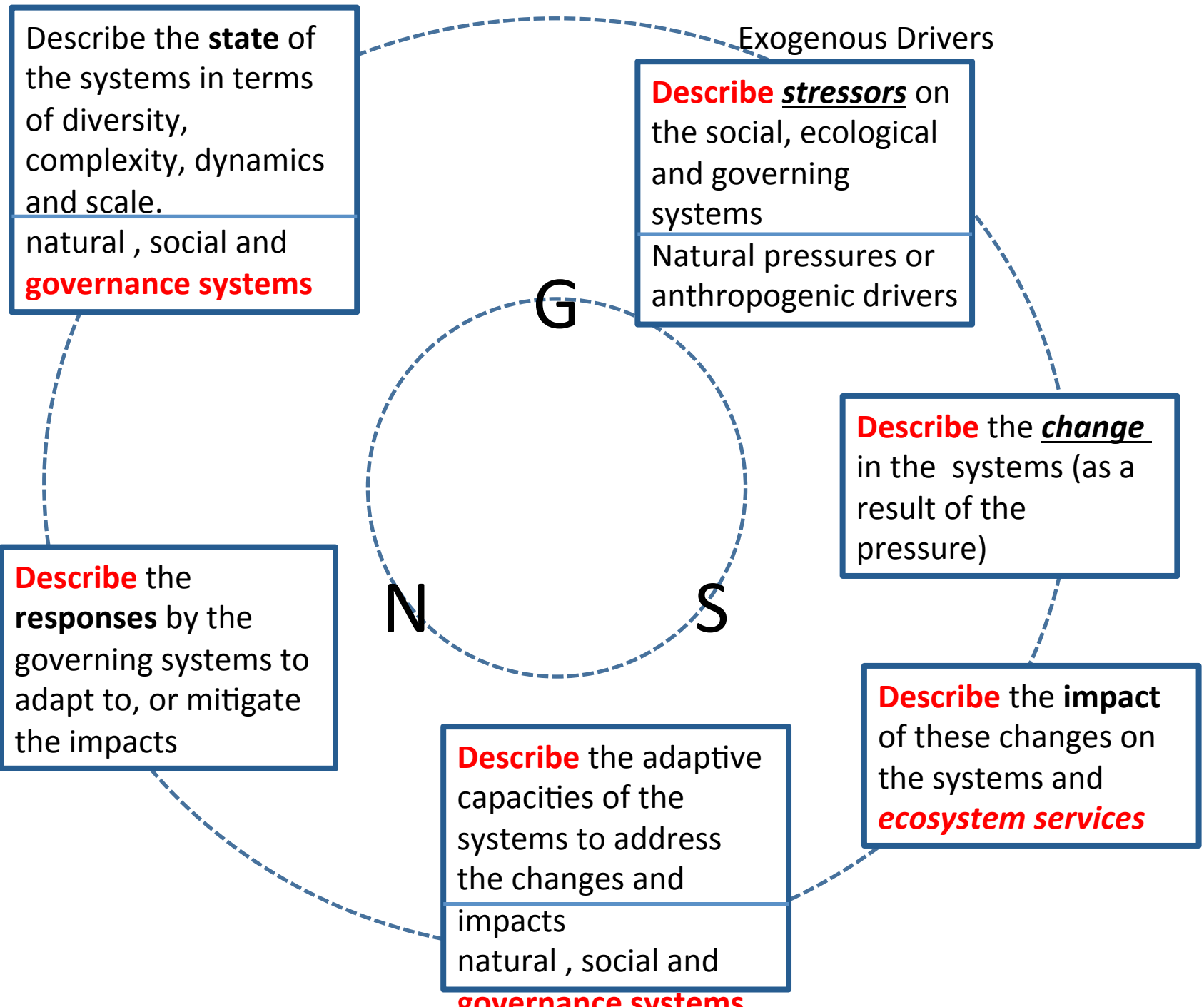
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- Outputs (objectives achieved?)
- Outcomes (issues addressed, side effects?)

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- Outputs (objectives achieved?)
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## Typology

- Tool for decision making and policy evaluation





**Alida Bundy**  
**Marine Ecosystem  
Science**  
**IMBER**



**Ratana Chuenpagdee**  
**Interdisciplinary – governance**  
**Too Big Too Ignore**



**Bernhard Glaeser**  
**Social Science**  
**LOICZ**



**Moeniba Issacs**  
**Social science**



**Patrice Guillotreau**  
**Economics**  
**CLIOTOP**



**Marie-Caroline Badjeck**  
**Geography - climate change**  
**NRCanada**



**Mitsutaku Makino**  
**Policy and Economics**  
**PICES SG Human Dimensions**



**Sarah Cooley**  
**Marine Chemistry &  
Geochemistry**  
**OBC**



**Omar Defeo**  
**Conservation of biological  
diversity**



**Ian Perry**  
**Fisheries Oceanography**  
**Globec Focus 4 WG**  
**PICES SG Human Dimensions**

# Some specific outcomes..

- Broad review of case studies
- Appraisal of the adaptive capacity of human-ocean-human interactions to global change using case-studies
- Develop a typology as a tool for policy makers
- Select small sub-set of case-studies to explore issue raised by the review and appraisal of human-ocean-human interactions
  - Using IMBER regional projects
  - Collaborate with other on-going projects

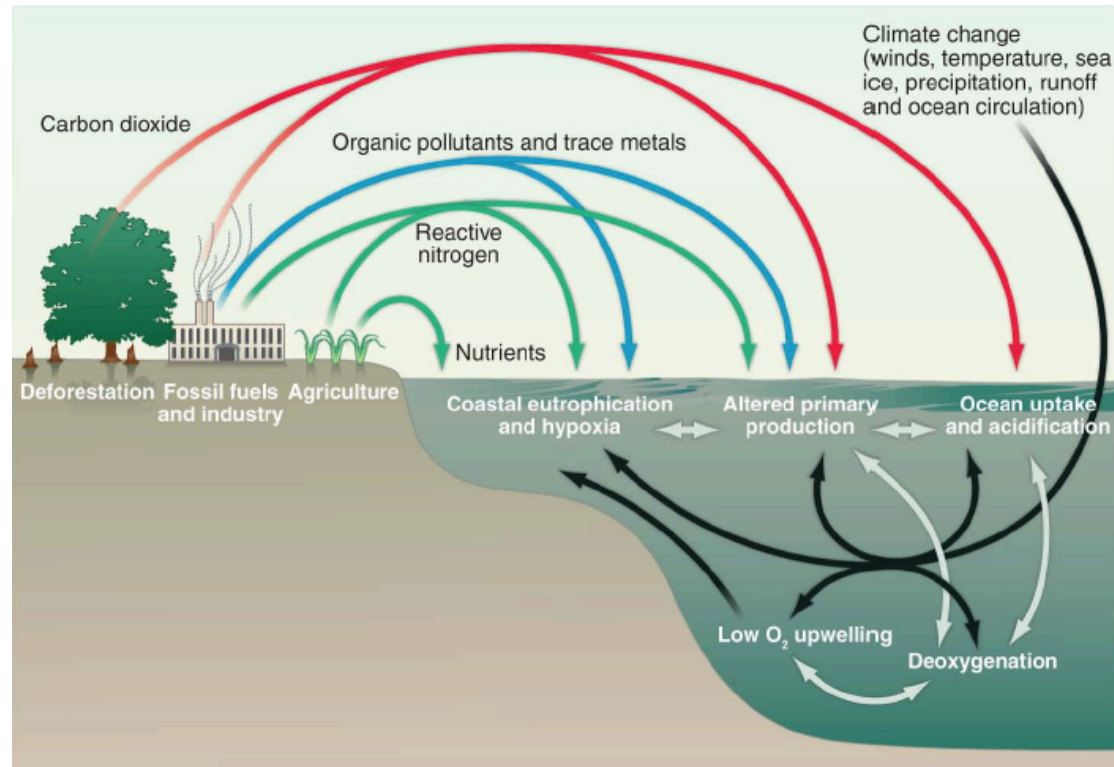


# Next Steps and Way Forward

- Use case studies to develop ADApT
  - Case studies covering representative systems, common issues and a range of responses
  - **IMBIZO III (Goa, India, Jan 2013)**: IMBER HDWG invites further case studies and convene expert consultation to further develop ADApT ([www.imber.info](http://www.imber.info))
- Apply, test and validate ADApT
- Offer policy insight and foster change using ADApT
- Create ADApT Knowledge Network for Marine Ecosystems

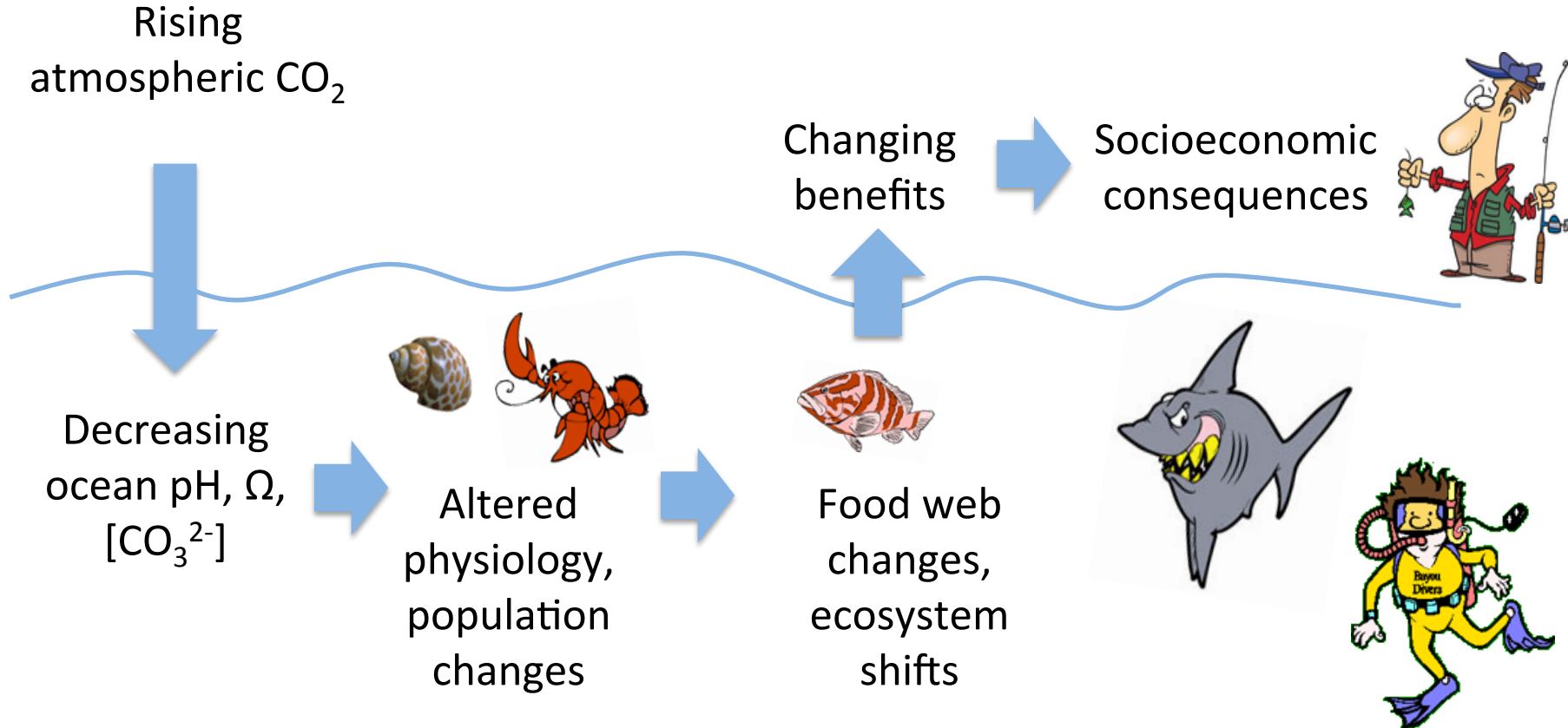
# Human biogeochemical impacts on coastal regions

- Climate change
- Pollution
- Eutrophication
- Hypoxia
- Ocean acidification



Anthropogenic impacts could be antagonistic or synergistic

# Uncertainty builds





# Marine social-ecological system responses to global changes

- with a “small” crisis, both coping and adapting strategies are available

- with a “large” crisis, coping strategies are not enough; only longer-term adapting strategies are available

Some coping strategies used by human communities and networks may prove detrimental to the biophysical system over a longer term

