The Economic Benefits and Impacts of Sustaining the Global Ocean

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Fisheries Economics Research Unit
Global Fisheries Cluster

Outline of lecture

- Our oceans:
  - How important are they to us?
  - Are our interactions with them sustainable?
  - What is the economic cost of unsustainability?
  - How do we move towards more sustainable oceans?

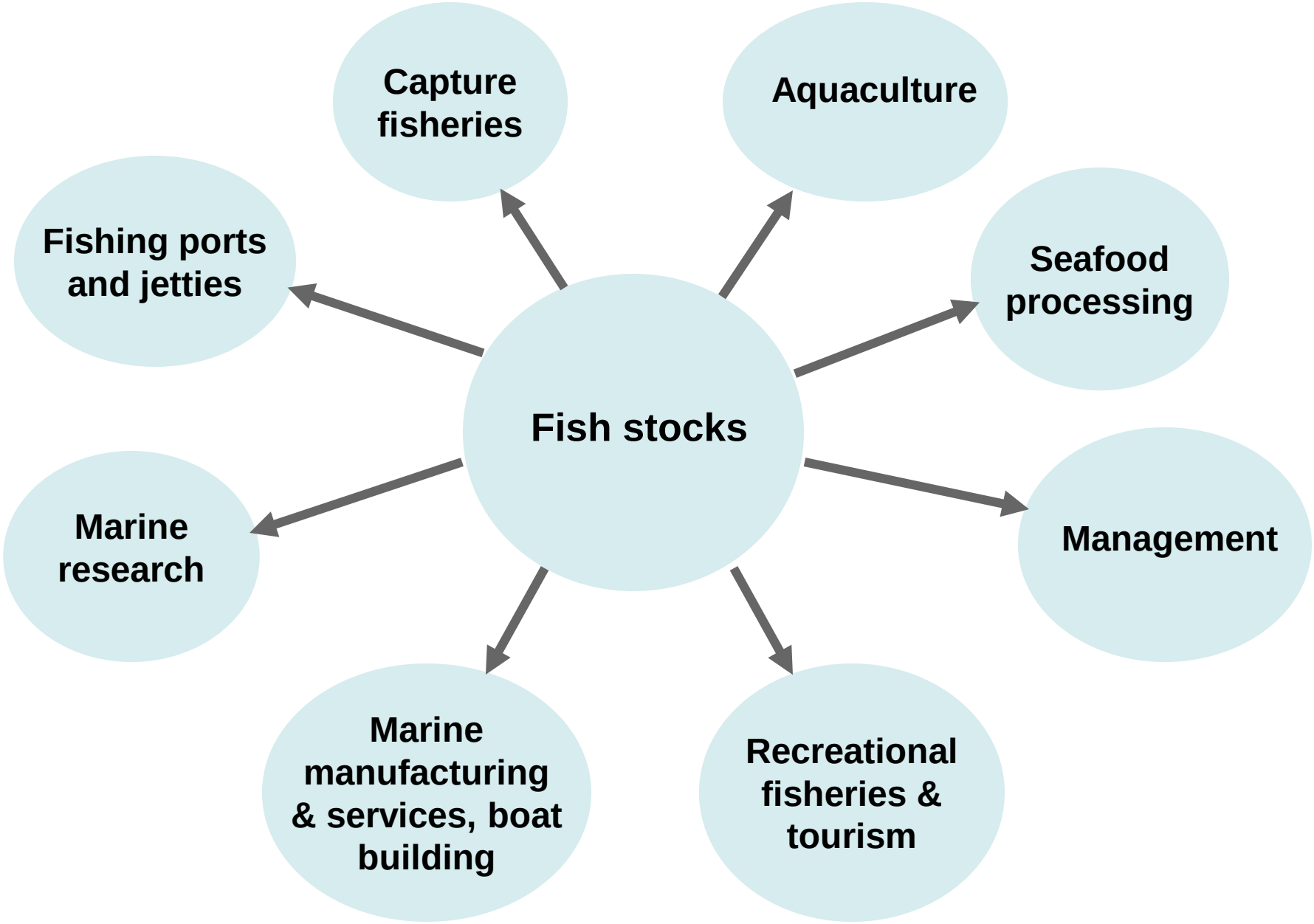
Our oceans are our lives

- 60% of the world's population lives within 60 km of the coast;
- 50% of the oxygen we breathe generated by the ocean;
- Regulation of earth's climate;
- Crucial for the Earth's environmental balance & survival.

Our oceans are our lives

- Cultural and spiritual values;
- Transport/shipping;
- Playing grounds for many of us;
- Support jobs; livelihoods & incomes;
- Source of animal protein for many.

Fish as base for many activities



Importance of fish to food security

- Annual ocean fish catch is ~130 million t;
- Fish is a good source of protein, micro-nutrients, minerals and essential fatty acids;
- Provides 3 billion people up to 15% of dietary animal protein;
- For low-income food-deficit countries, the contribution of fish to total animal intake is nearly 20%.

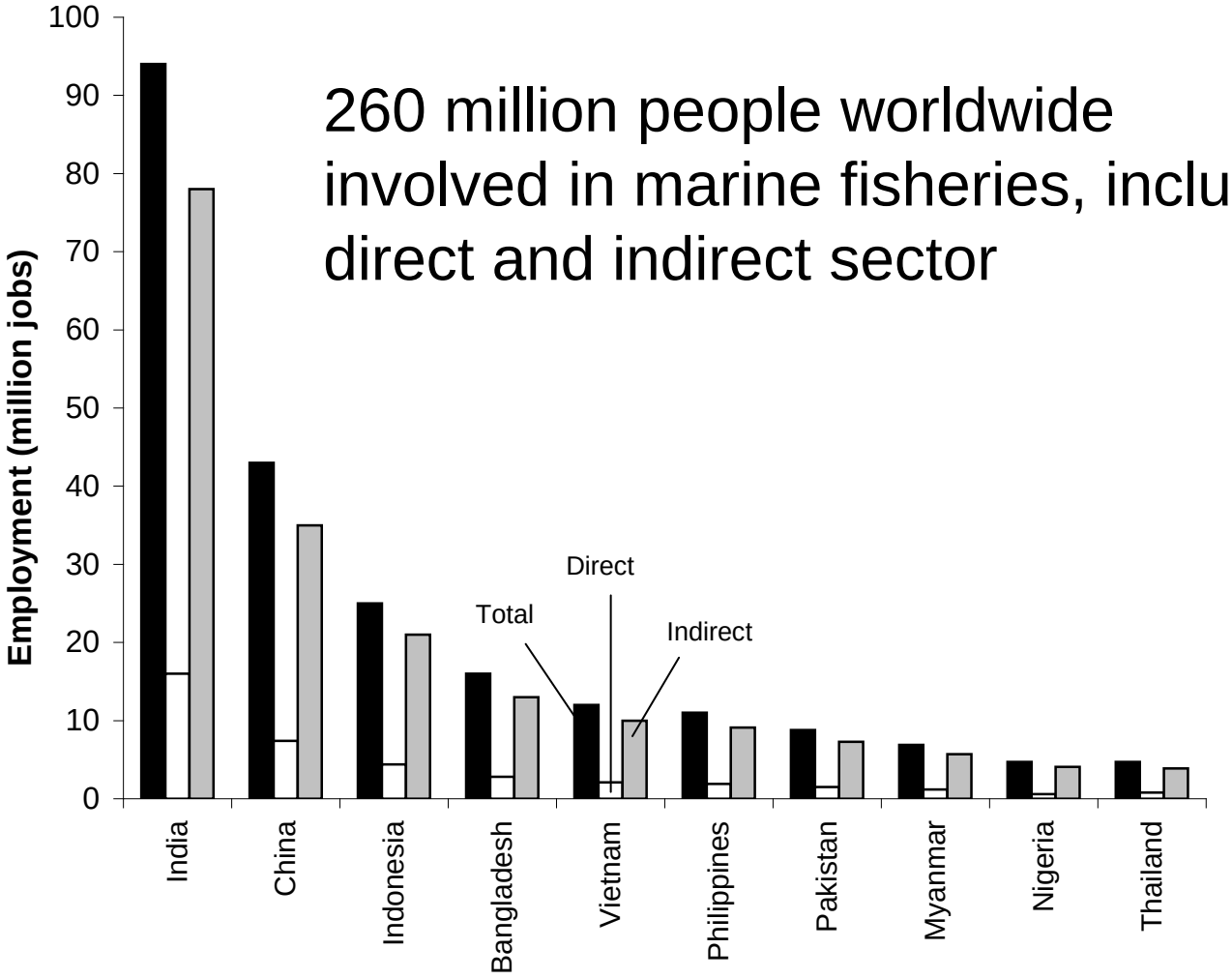
FAO (2009); Pauly and Zeller (2016)

Economic contributions of fisheries

Gross revenues from marine capture fisheries worldwide are estimated at between US$ 150 billion annually (Pauly & Zeller, 2016; Swartz et al. 2013);

Total impact throughout the global economy is between US$ 500 billion (Dyck & Sumaila, 2010).

Marine fisheries employment

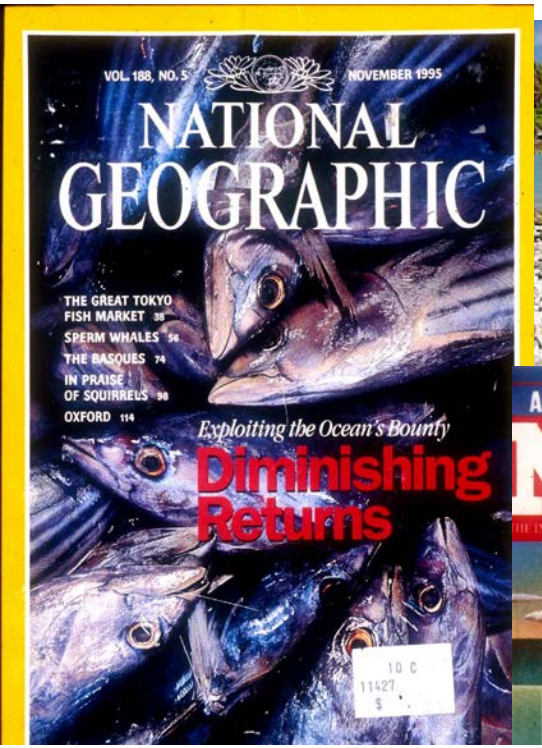


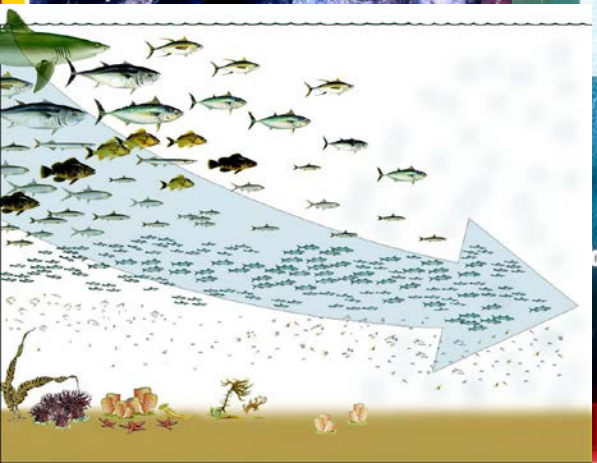
260 million people worldwide involved in marine fisheries, including direct and indirect sector

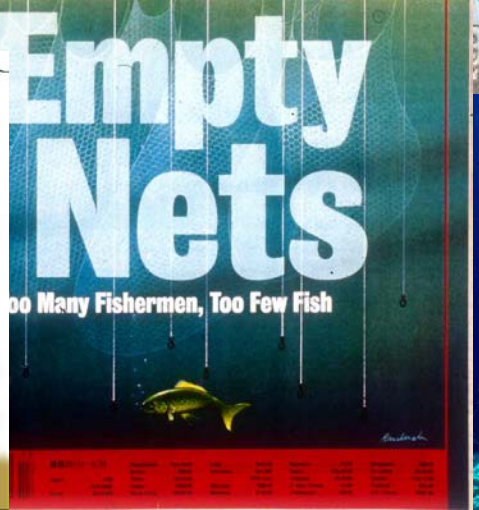
Top 10 countries providing marine employment

Teh and Sumaila (2013): *Fish and Fisheries*

Human-ocean interactions unsustainable







Examples of unsustainability

- About 20% of the original area of coral reefs lost (Wilkinson, 2008);
- Sea grasses are disappearing at a rate of 110km^2 yr^{-1} since 1980 (Waycott, 2009);
- Seaweeds in Zanzibar dying – climate change blamed; huge economic and social consequences for many on the island especially women;
- Habitat destruction from bottom trawling.

Climate change impacts

Physical/Chemical changes in the ocean

- ↑ Sea temperature;
- ↑ acidification;
- Δ ocean current pattern;
- Δ salinity;
- retreat of sea ice;
- ↑ coastal hypoxic & oxygen min. zone;
- ↑ sea level.

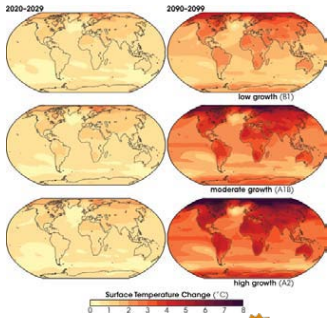
Biological / ecological changes in the ocean

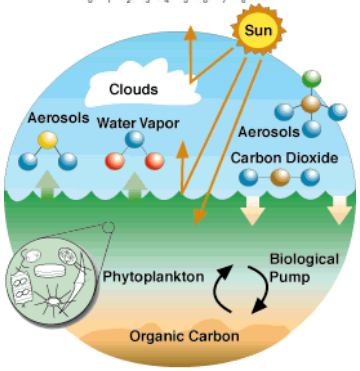
INDIVIDUAL
- Physiology;
- Growth; &
- Body size.

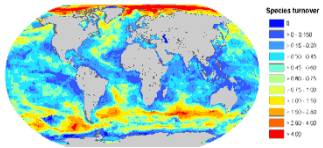
POPULATION
- Distribution;
- Abundance; &
- Recruitment.

COMMUNITY
- Species composition;
- Invasion/extinction.

ECOSYSTEM
- Productivity; &
- Species interaction.



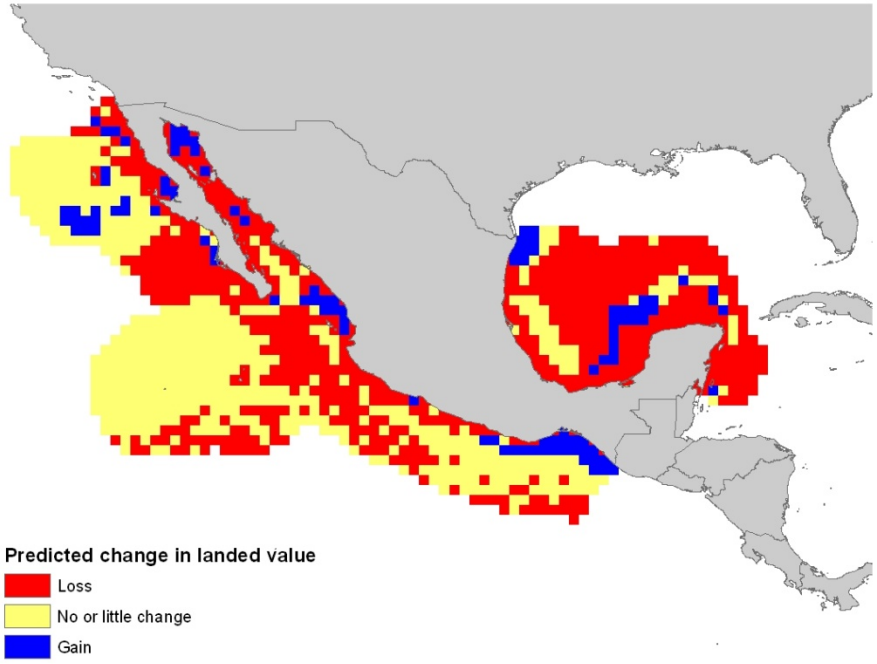




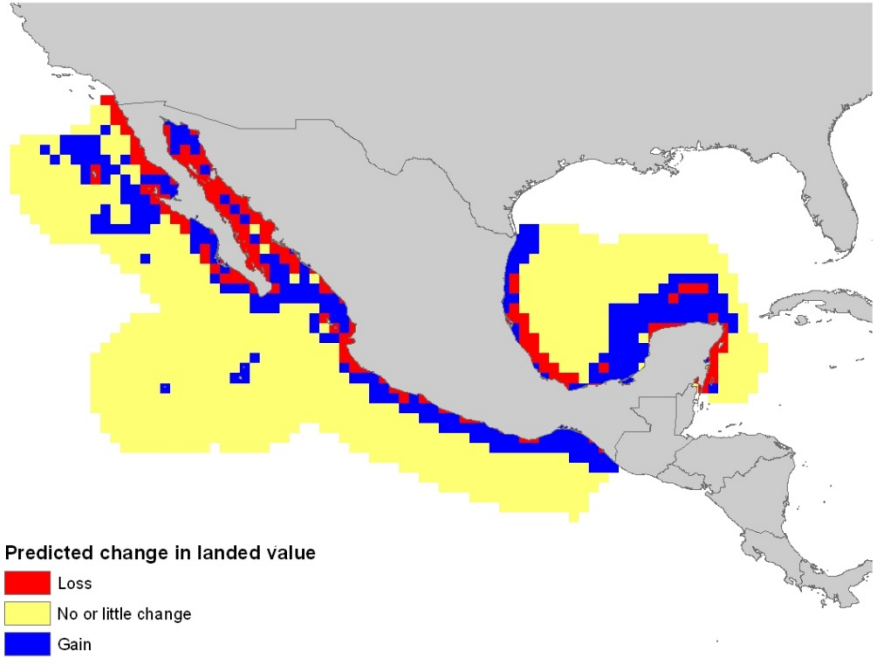
Cheung, Watson & Pauly (2012): *Nature*

Example: Change in landed values in Mexican EEZ

SEVERE climate change scenario

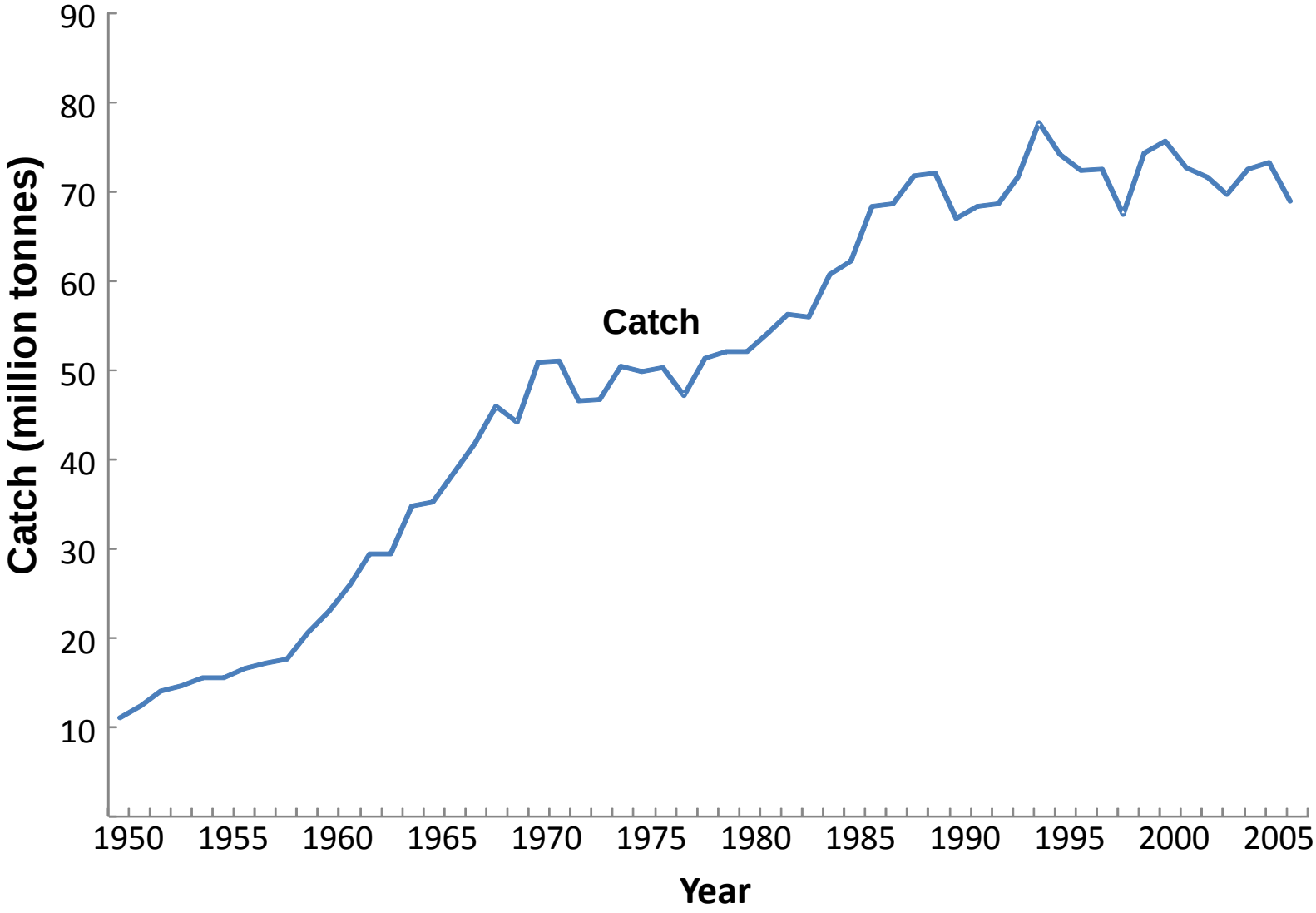


MILD climate change scenario

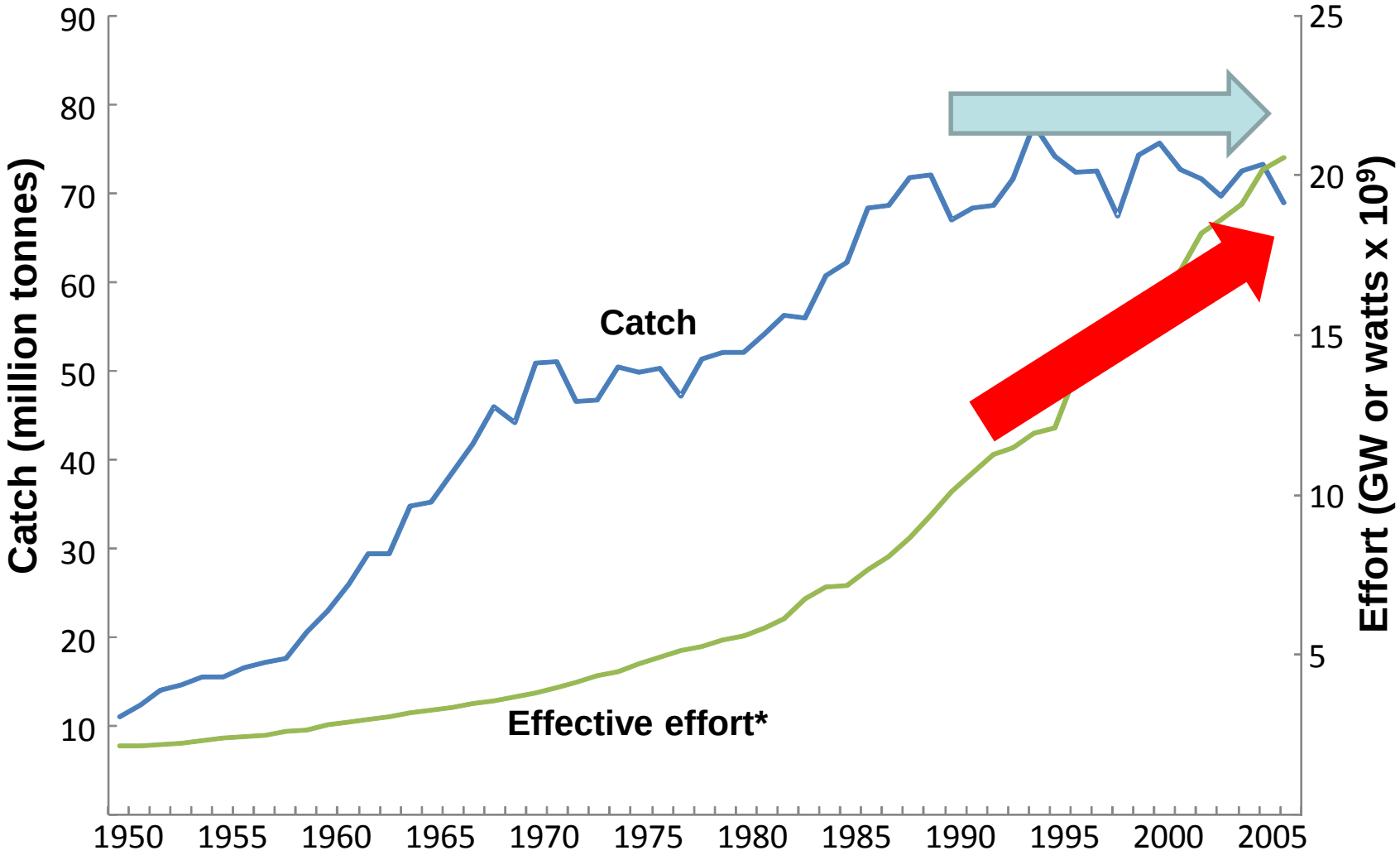


Sumaila, Lam & Cheung (2013)

Global fish catch and effort



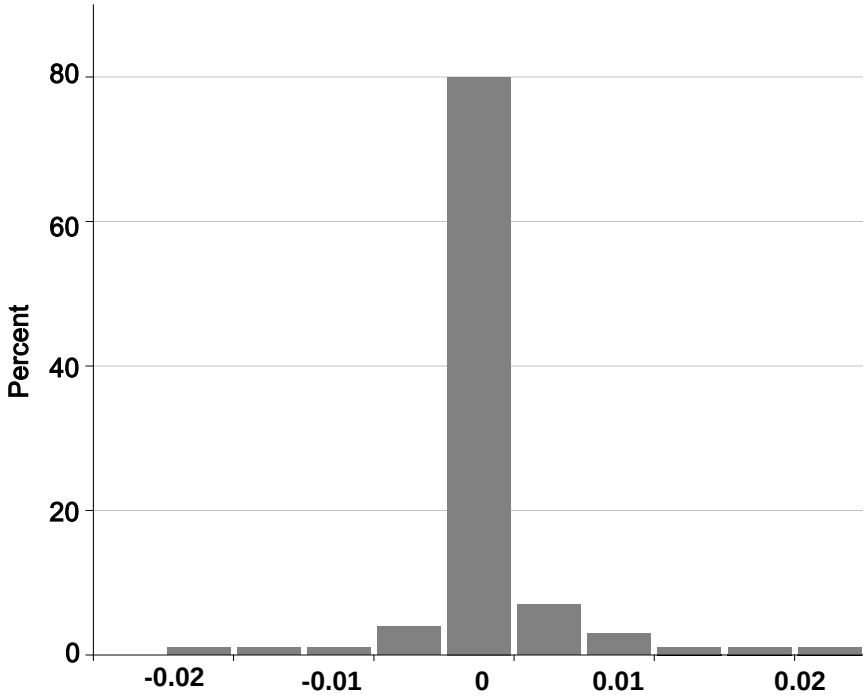
Global fish catch and effort



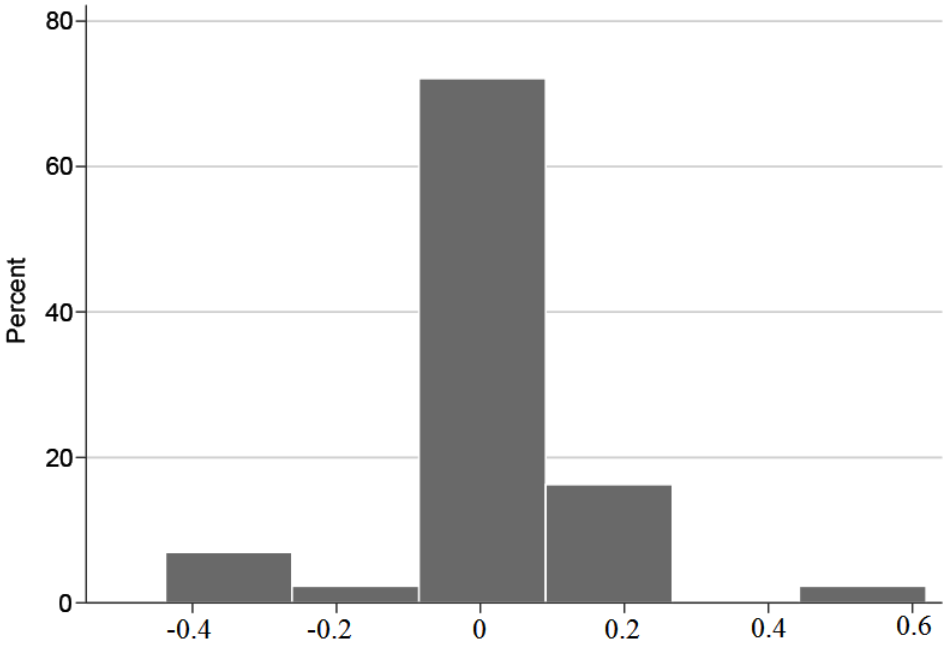
*Effective effort indexed on 2000 based on average 2.42% increase annually

Watson *et al*. (2012): *Fish and Fisheries*

Summary of pre-tax profit data



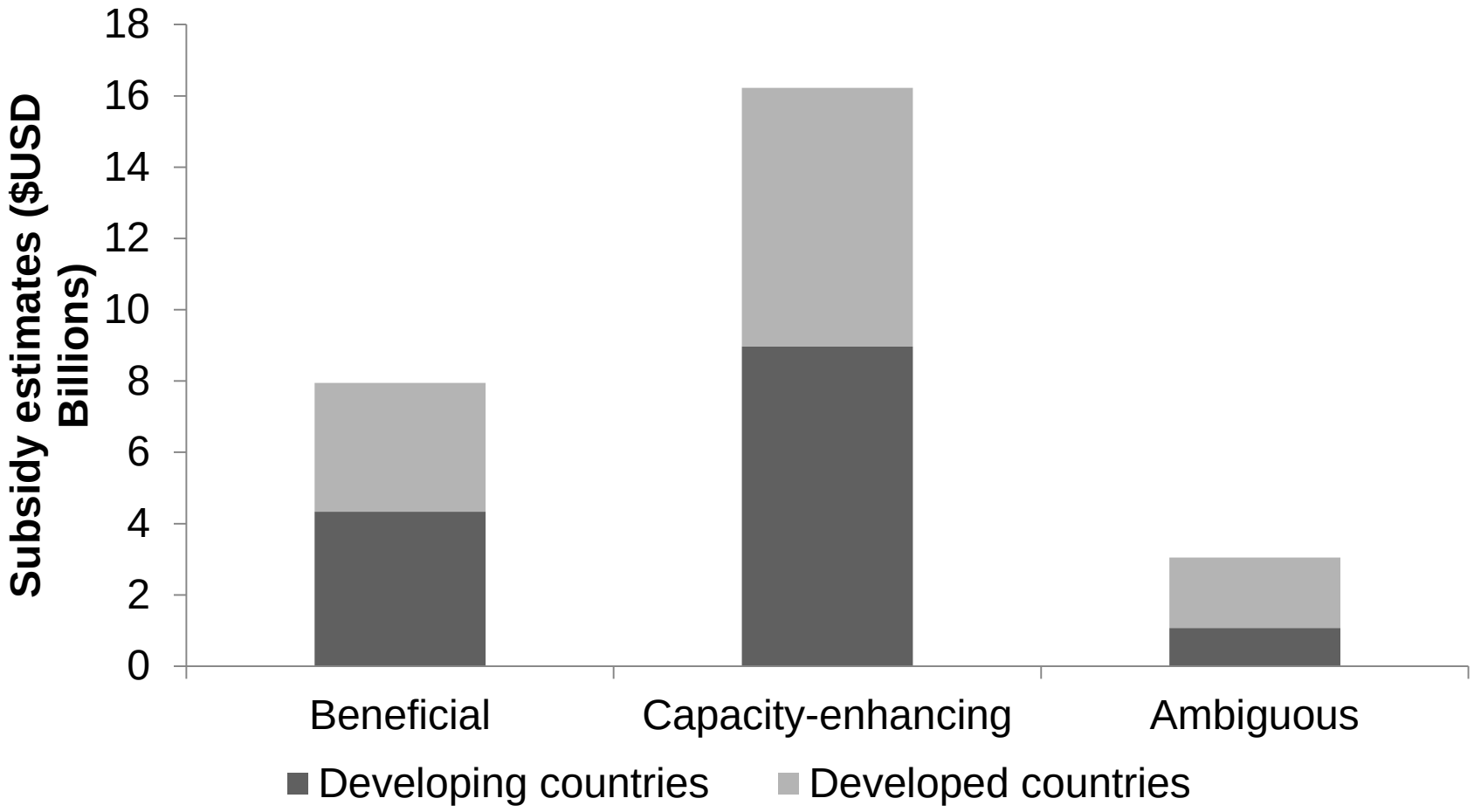
A: Pre-tax profit share of sales for 1000 fishing companies



B: Pre-tax profit share of sales for 43 fishing countries

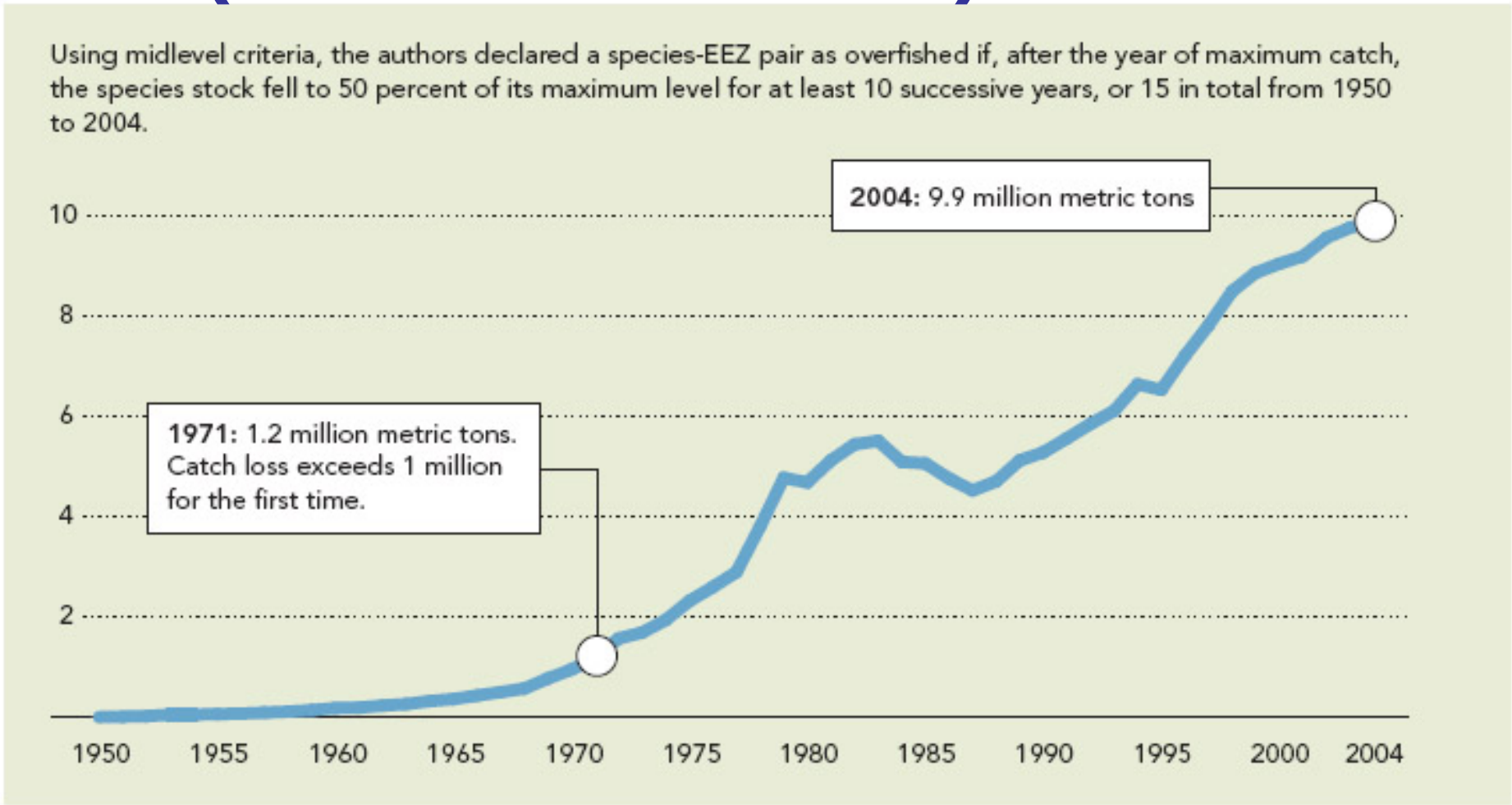
Sumaila *et al.* (2012): *PLoS One*

Global subsidy estimate



Sumaila *et al.* (2010): *J. Bioeconomics*

Global Potential Catch Loss (in million metric t)



Srinivasan *et al.* (2010): *J. Bioeconomics*

Food security implications

- Loss of million t of fish per year due to overfishing and other impacts has huge food security implications;
- It is estimated that more effective management of global fish stocks could create food to avert undernourishment for about 19 million people worldwide.

Srinivasan *et al.* (2010): *J. Bioeconomics*

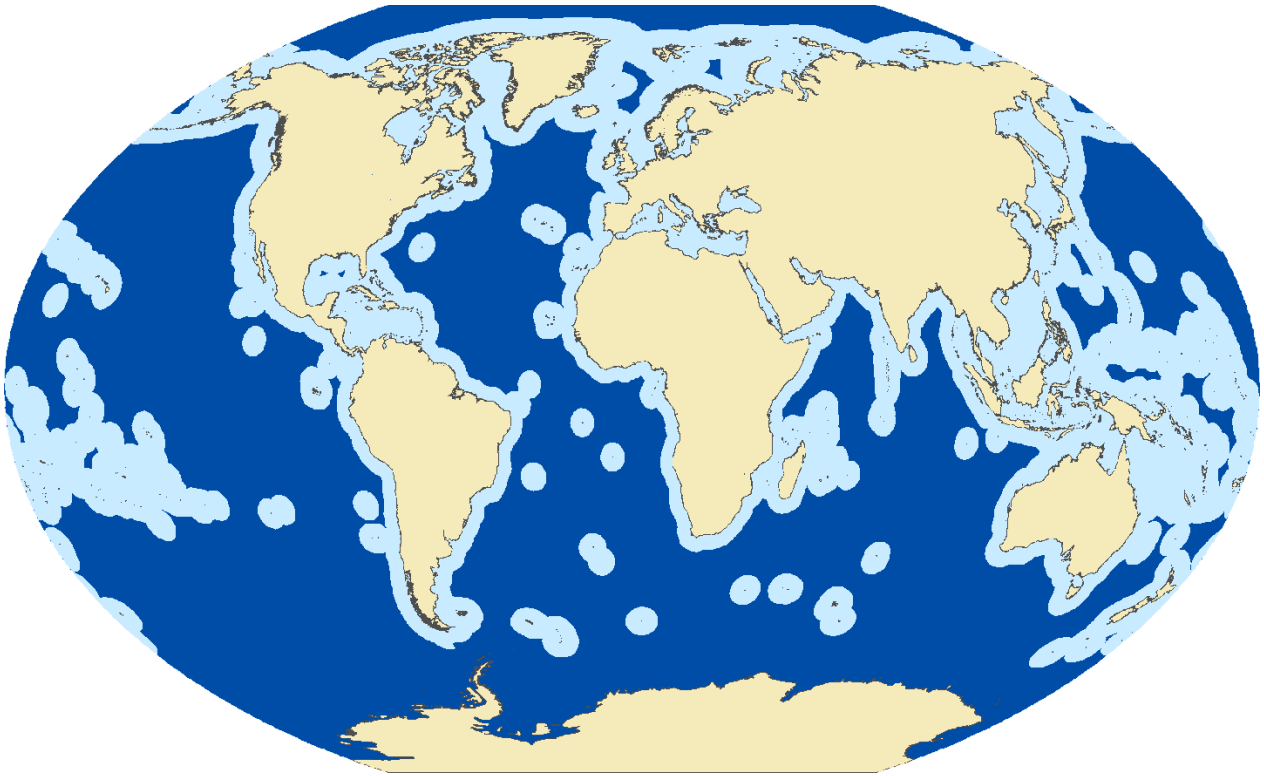
Improving ocean sustainability

Strong connection between the ocean & human wellbeing

Marine Environment

Fish Economy

There is one global ocean



Exclusive economic zones (light blue) and high seas (dark blue)

PLOS | BIOLOGY

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OPEN ACCESS

PERSPECTIVE

Close the High Seas to Fishing?

Crow White, Christopher Costello

Published: March 25, 2014 • DOI: 10.1371/journal.pbio.1001826

White & Costello (2014)

SCIENTIFIC REPORTS

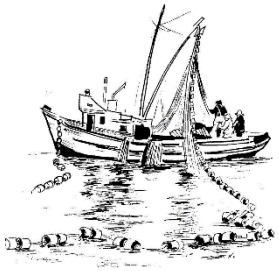
OPEN

SUBJECT AREAS:
CONSERVATION BIOLOGY
ENVIRONMENTAL ECONOMICS

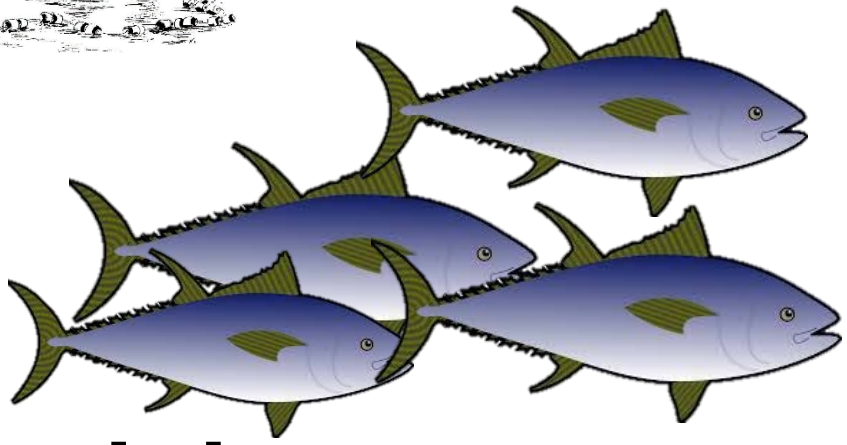
Winners and losers in a world where the high seas is closed to fishing

U. Rashid Sumaila[1], Vicky W. Y. Lam[2], Dana D. Miller[1], Louise Teh[1], Reg A. Watson[3], Dirk Zeller[2], William W. L. Cheung[4], Isabelle M. Côté[5], Alex D. Rogers[6], Callum Roberts[7], Enric Sala[8] & Daniel Pauly[2]

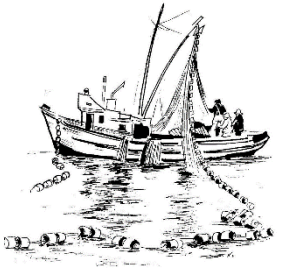
Sumaila *et al*. (2015)

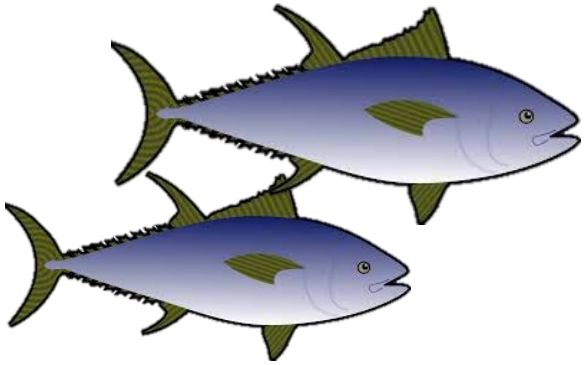


GOOD MANAGEMENT



High seas





EEZ

Rebuild depleted stocks

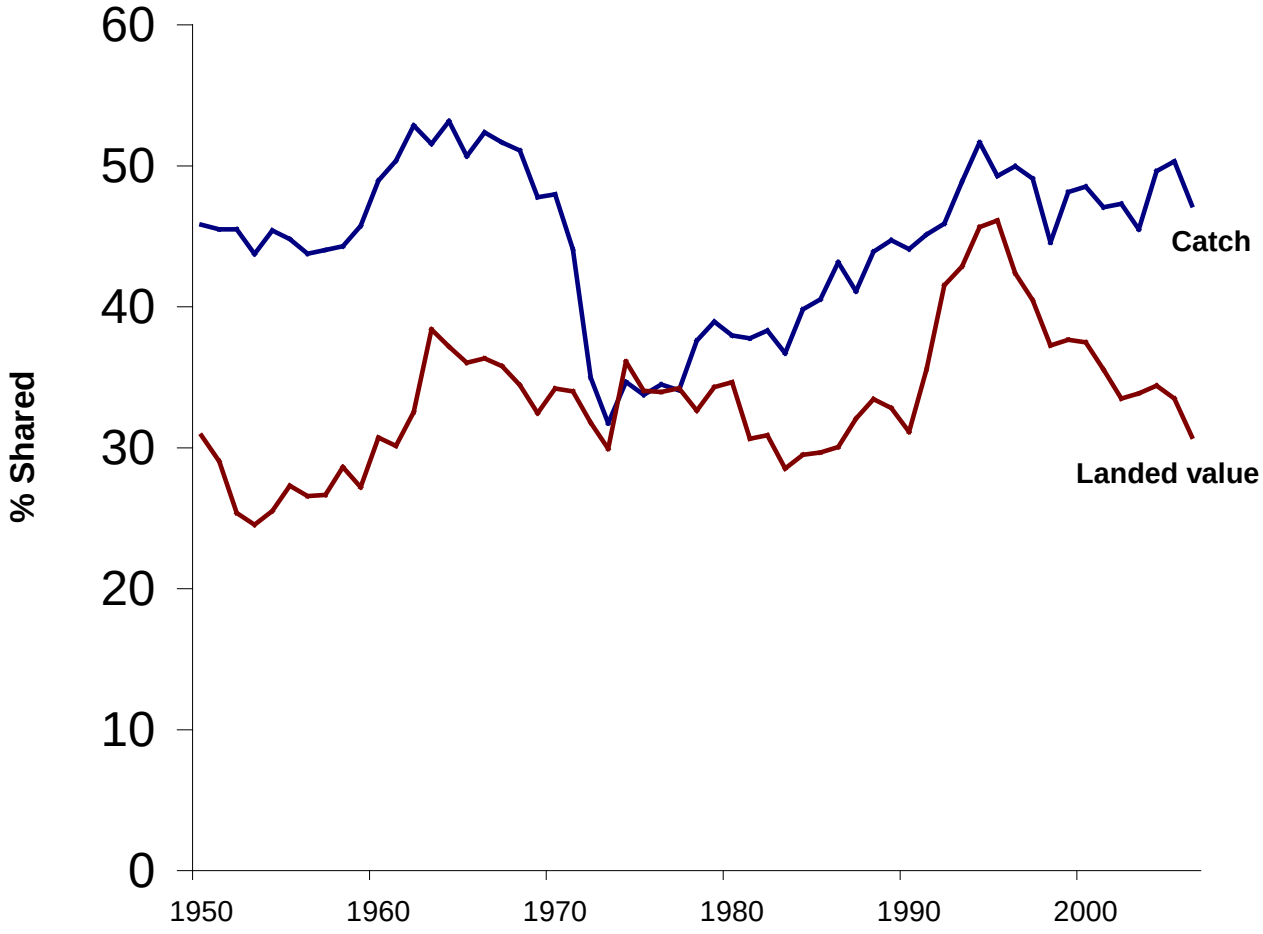
- Benefits > costs: Why no massive rebuilding?
  - The politics of fishing effort reduction;
  - Waiting time for fish stocks to rebuild;
  - The distribution of costs and benefits of rebuilding.

Sumaila *et al.* (2012): *PLoS One*

Make illegal fishing & other destructive actions uneconomic

Miller, Sumaila *et al.* (2016): Frontiers in Environmental …

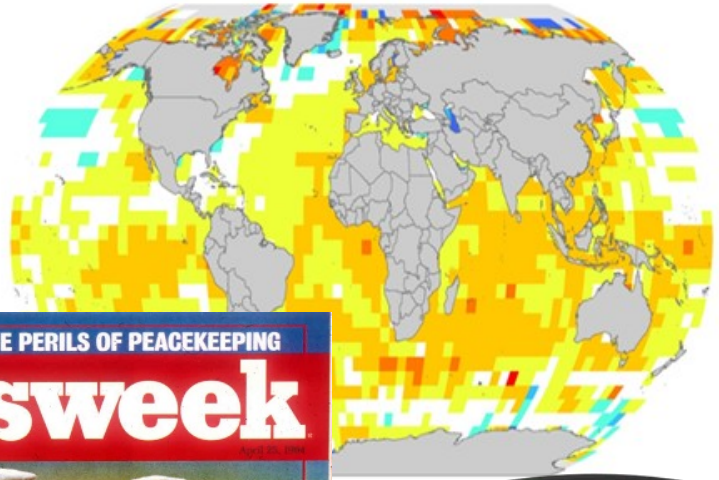
Work together, cooperate



Annual shared fisheries catch and landed value across all countries 1950-2006 (Teh & Sumaila, *in prep*.)

Munro (1979): *Canadian J. Economics*; Sumaila (2013): Book

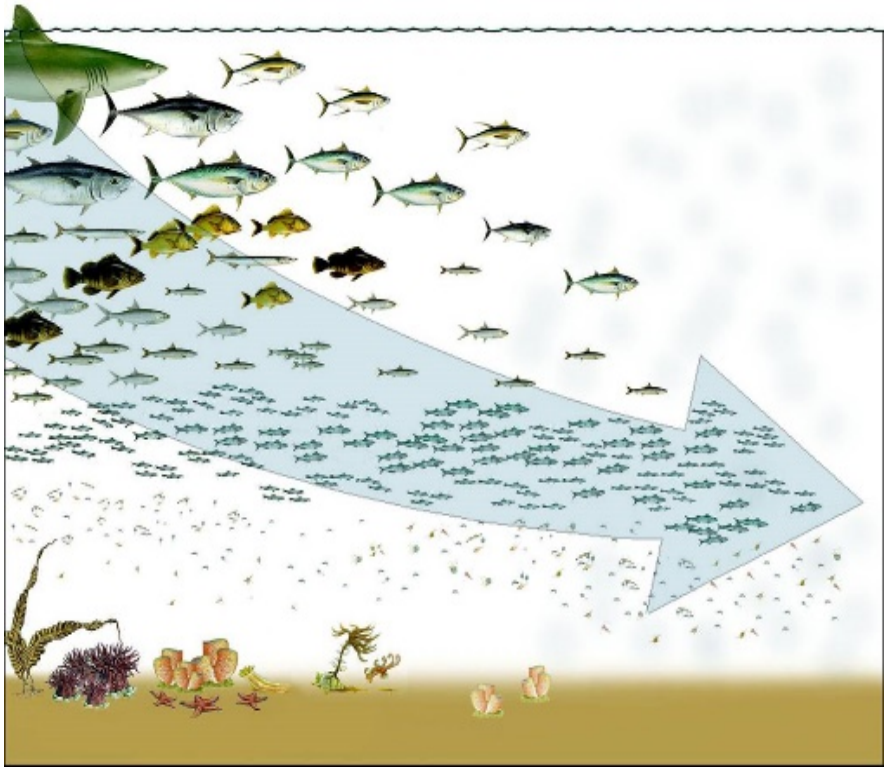
Buy insurance through the establishment of MPAs

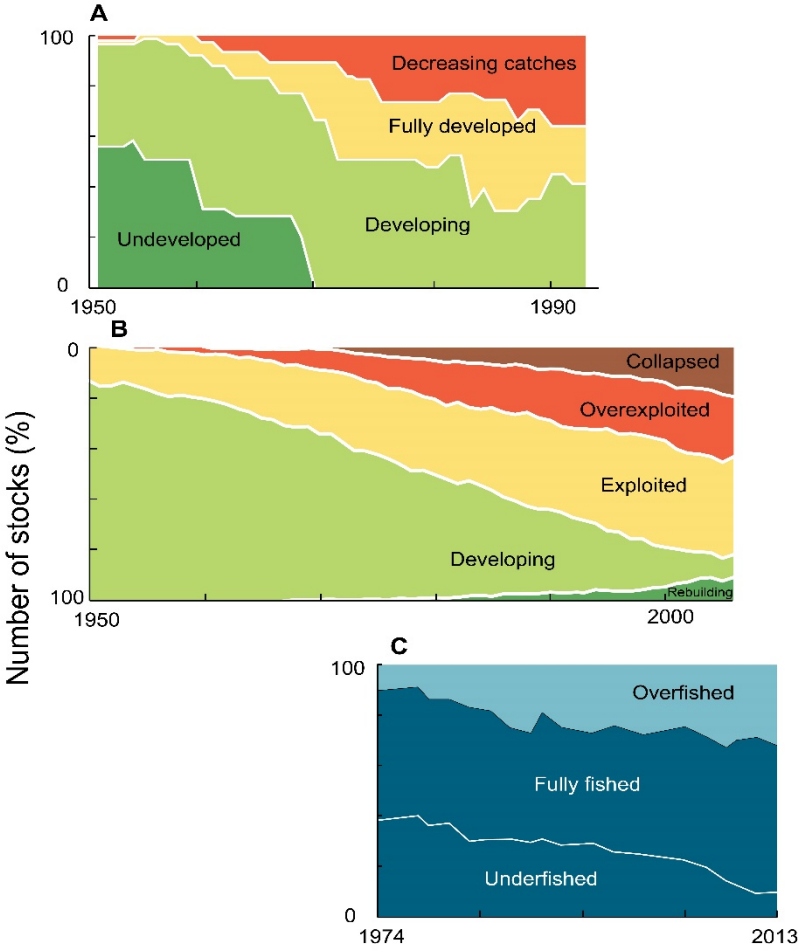


Make fishing attractive to young passionate & sustainability minded fishers

- Should be profitable & provide decent incomes;
- Fisheries should be smart, modern & cool;
- Future prospects for fishers should be good.

Don’t lose the fish





Thanks for your attention

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