

Seafood and Sustainability

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The Role of Seafood Consumption
in Child Growth and Development
April 6, 2023

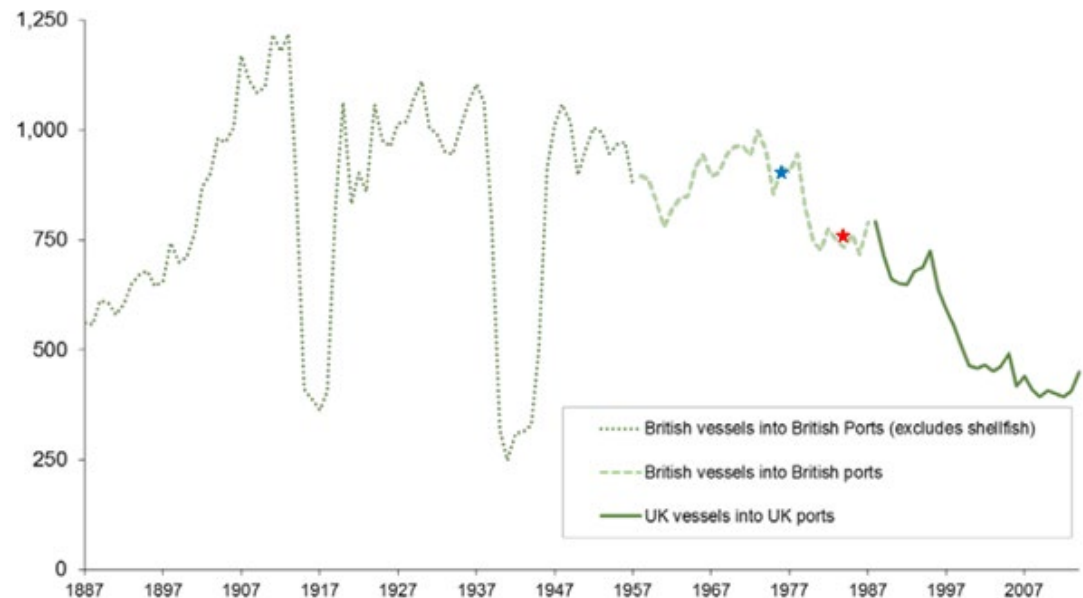
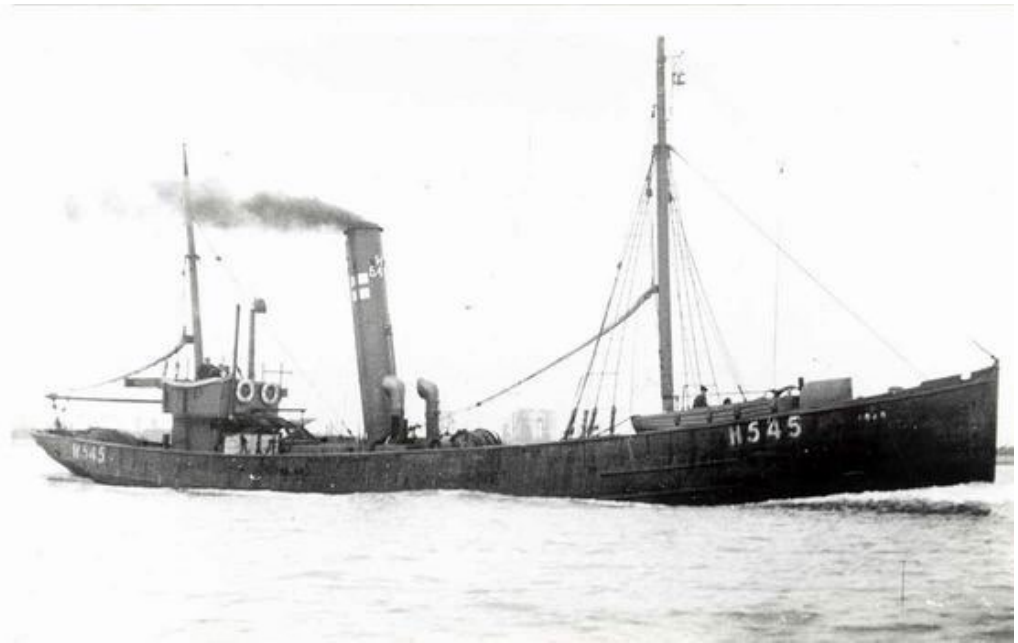


What are the major problems for life in the ocean, and the sustainability of fisheries?

I would argue that they are, in decreasing order of importance:

- 1) Ever-expanding marine fisheries, whose impacts on marine life are still widely underestimated;
- 2) Ocean warming and acidification, whose effects on fisheries have already kicked in;
- 3) Pollution, whose impacts on marine life were long overestimated, and which now begins to live to its reputation.

The deployment of steam-driven trawlers in the 1880s around the U.K. heralded a new form of fishing, i.e., **industrial** fishing, relying on fossil energy sources (coal, later petroleum), which was inherently unsustainable, and forced an expansion of fisheries which is still ongoing.

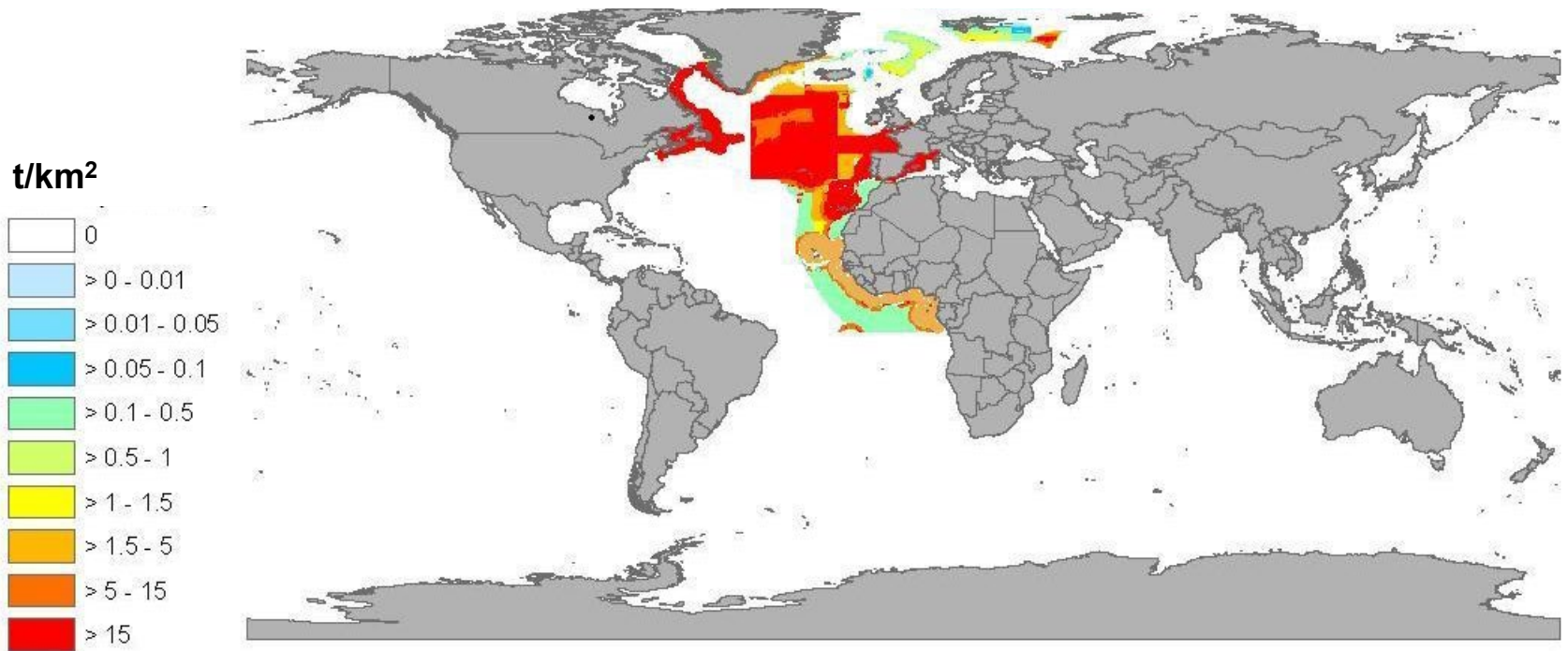


From wars between countries to the war on fish



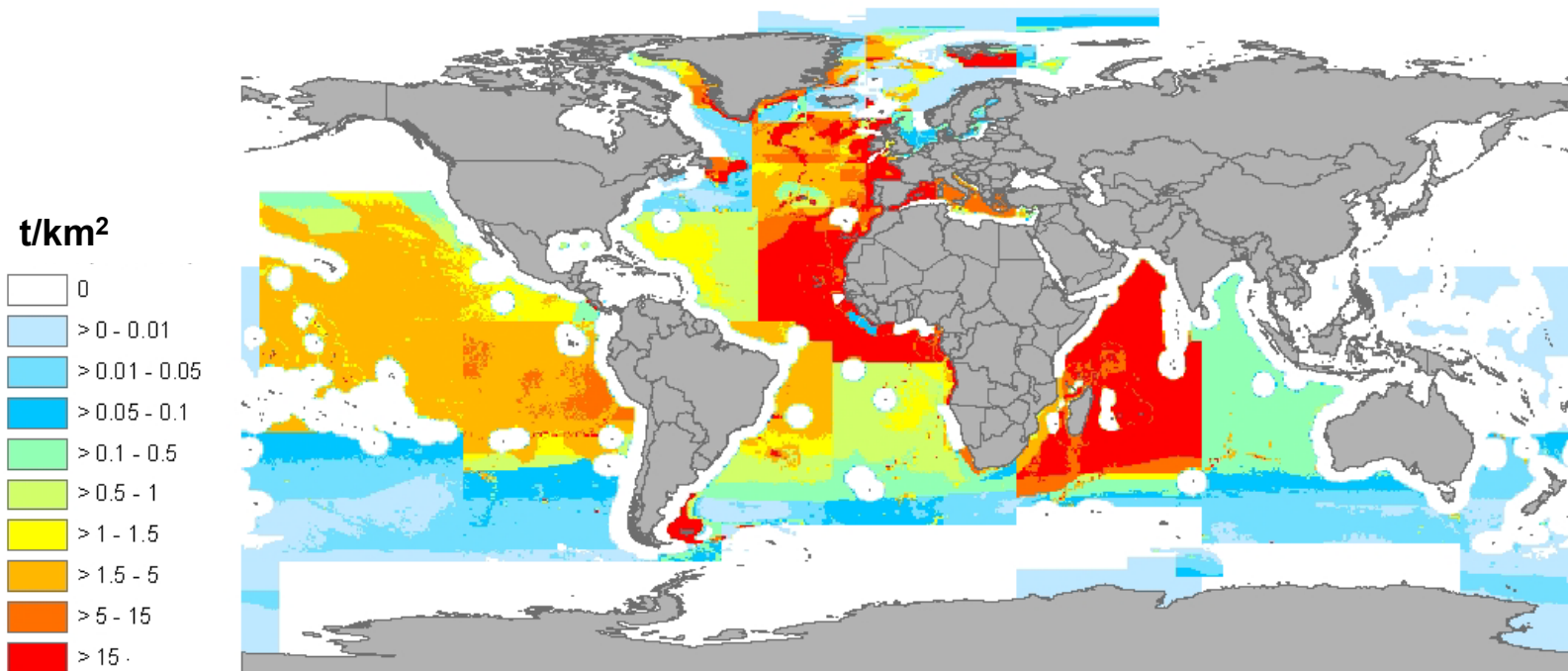
- 1880s: steam trawler
- post WWI: diesel engines;
- post WWII : radar, acoustic fish finders, sonar, spotter planes, on-board freezers, satellite navigation...

The response to local depletion in industrialized countries was expanding the reach of their fisheries, as illustrated by Spain in the 1950s...



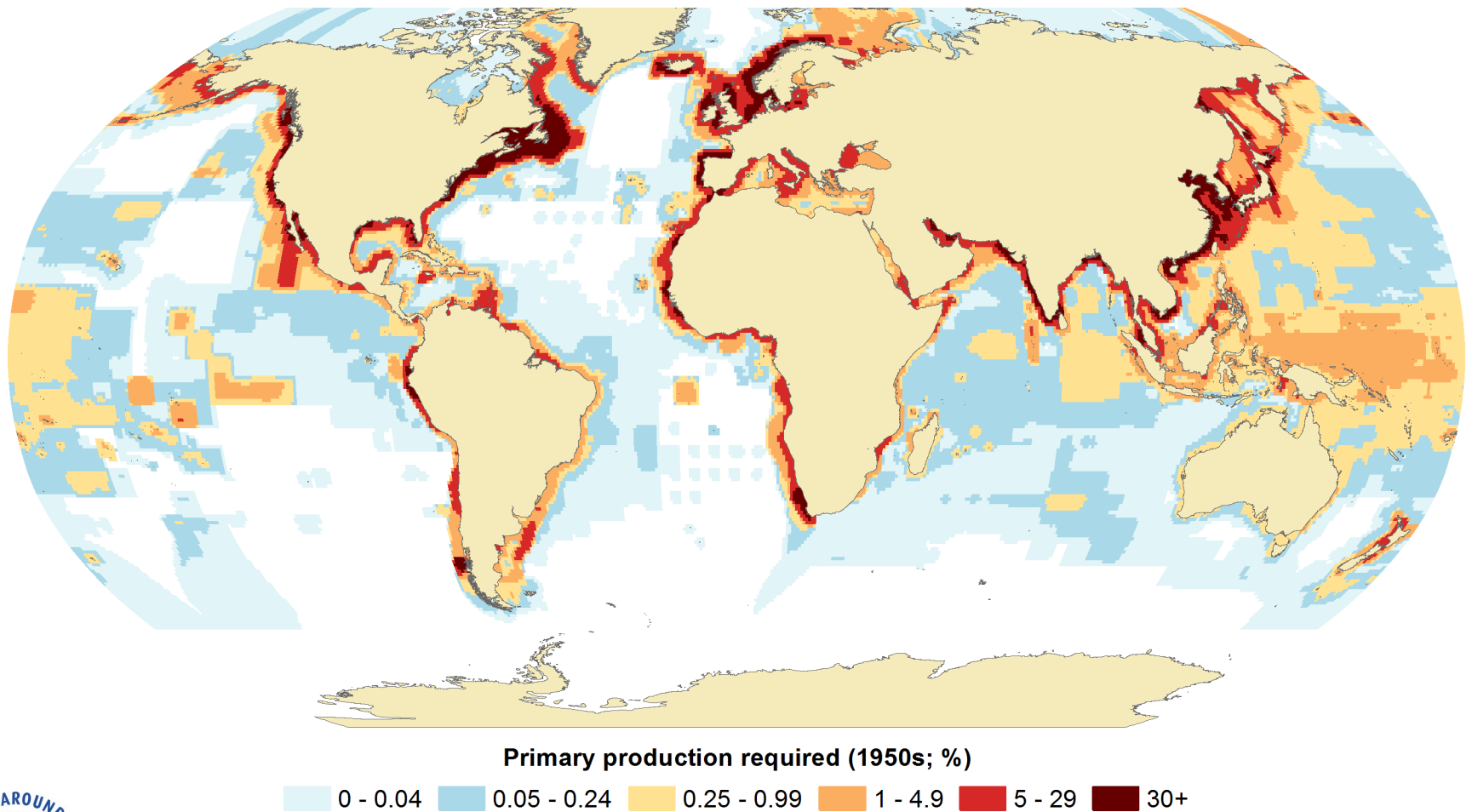
see www.seaaroundus.org

Now, Spain's fisheries cover the whole world
(as do the fisheries of France, Japan, etc.)



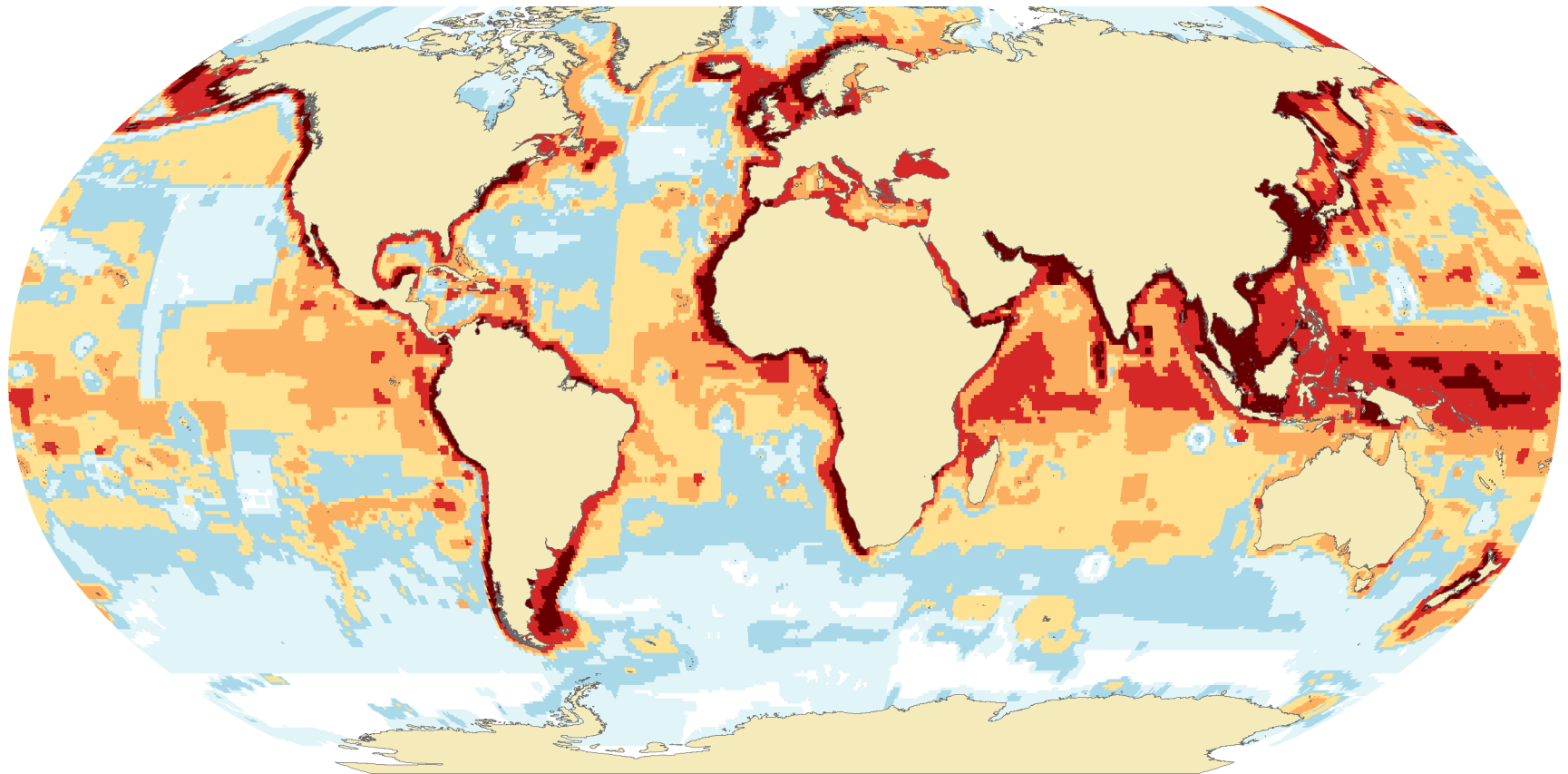
see www.seaaroundus.org

We can also map the footprint (or 'seafoodprint') of reconstructed catches, here for the 1950s...



see www.searoundus.org

...and in the 2000s...



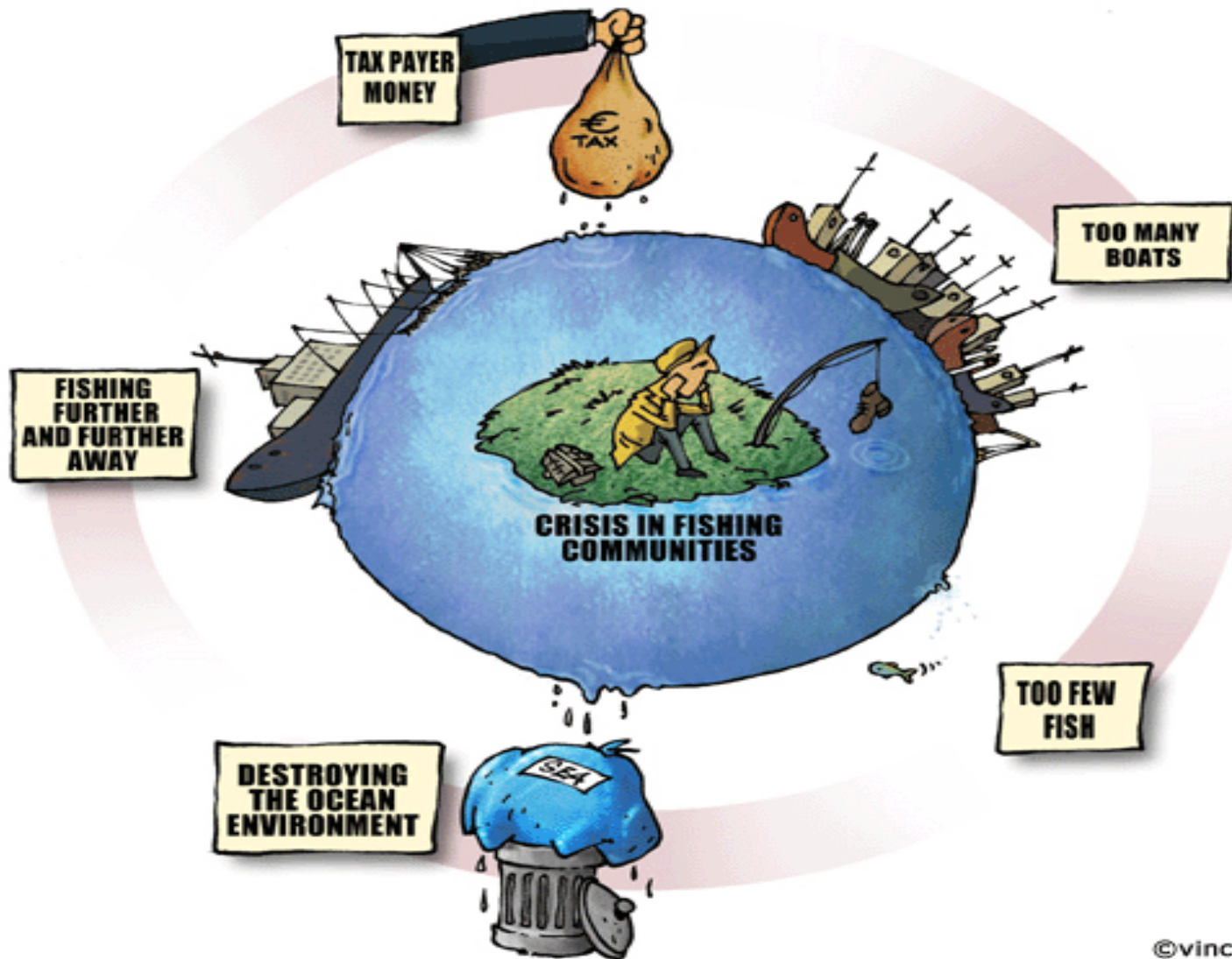
Primary production required (2000s; %)

0 - 0.04 0.05 - 0.24 0.25 - 0.99 1 - 4.9 5 - 29 30+



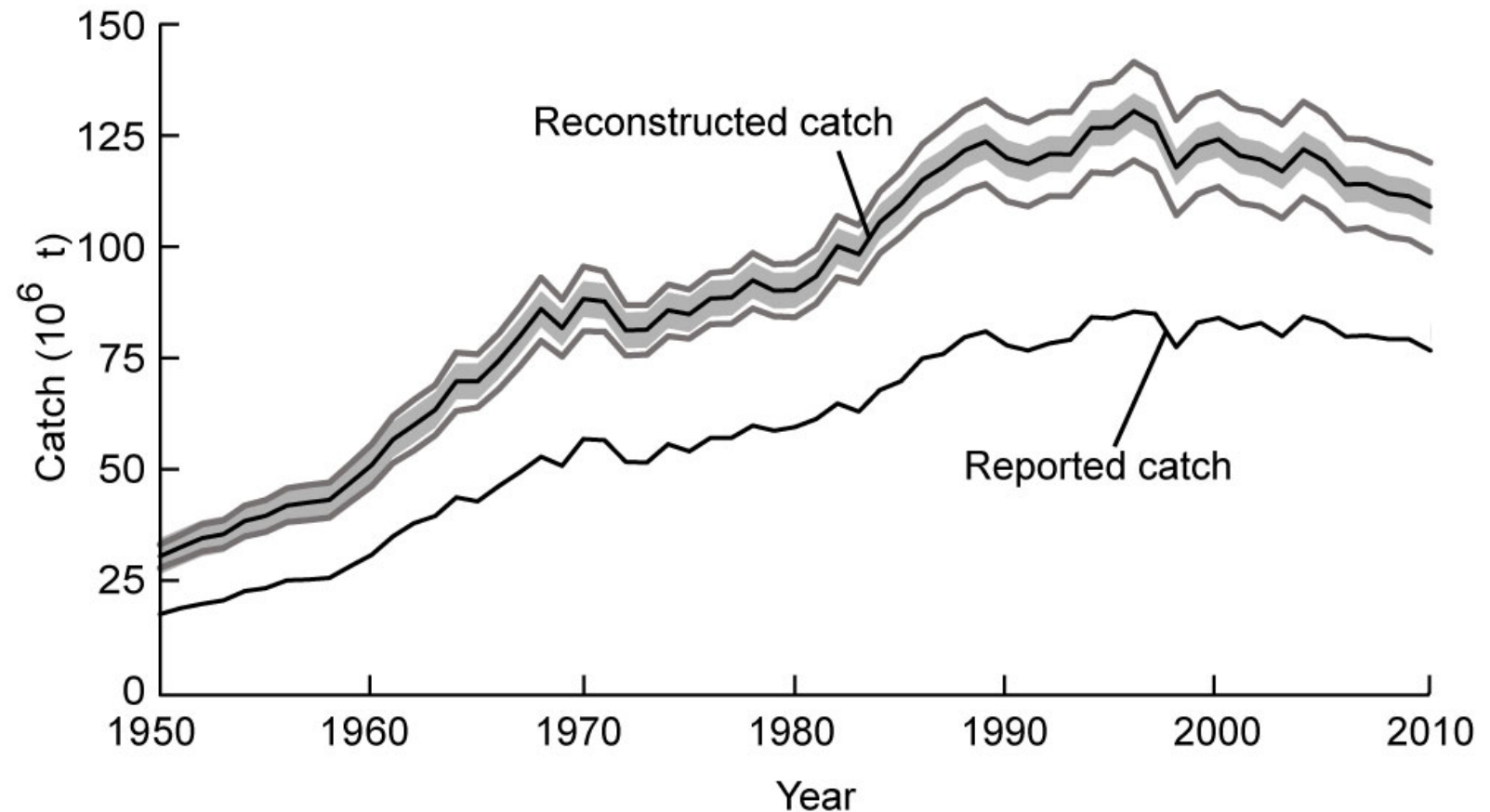
see www.searoundus.org

Subsidies are a major driver of unsustainable fishing



The world's fisheries catches are much higher than officially reported, and declining since 1996.

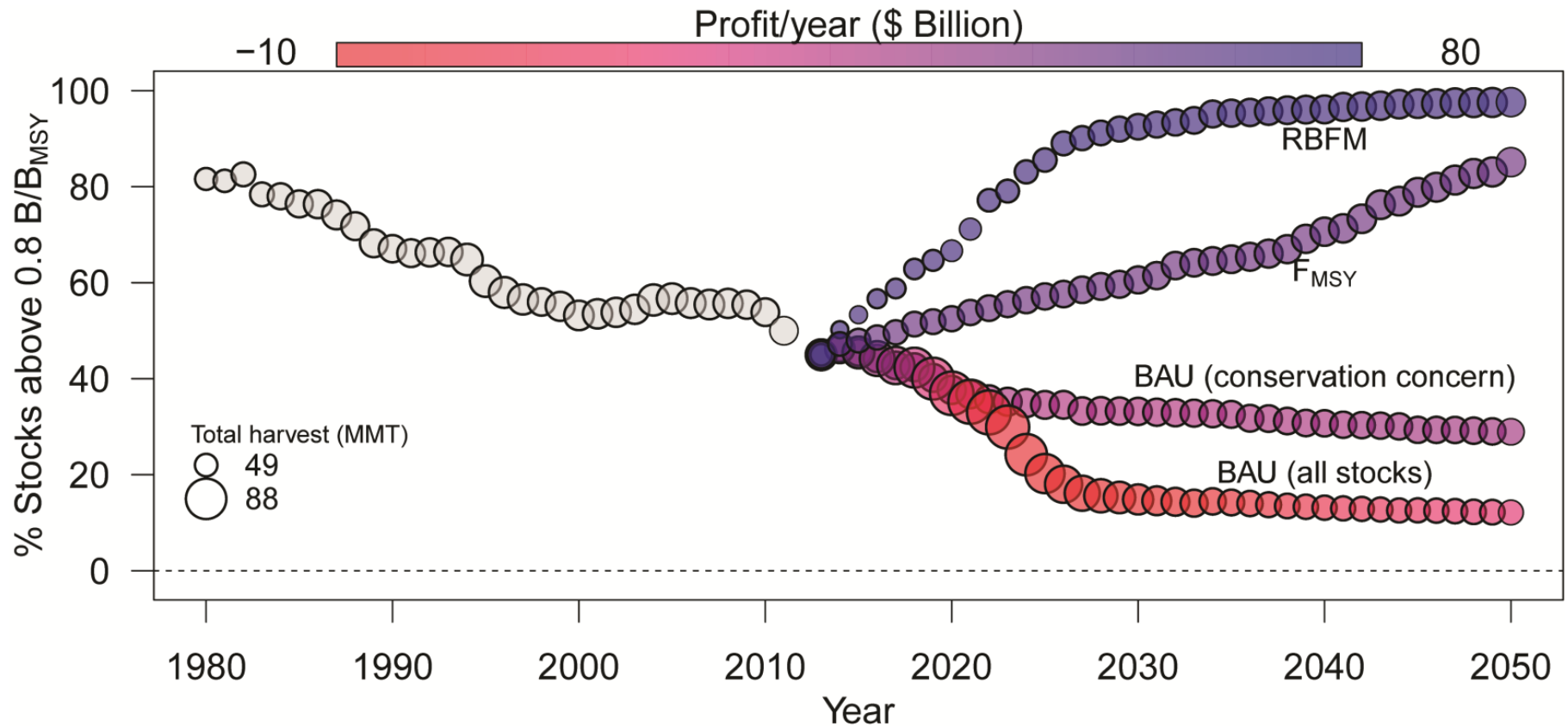
(see www.seaaroundus.org)



Pauly & Zeller (*Nature Comm.* 2016)

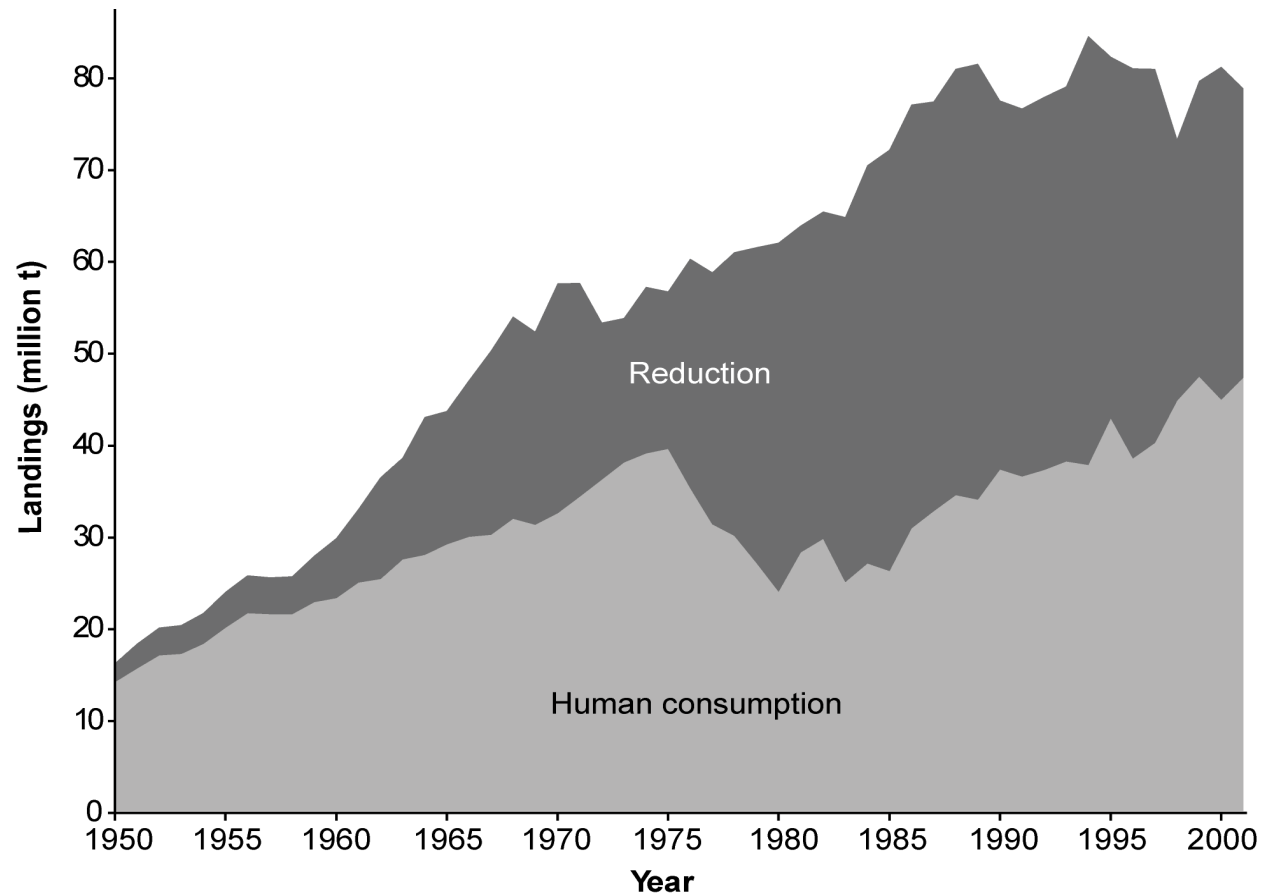
Global fishery prospects under contrasting management regimes

Christopher Costello^{a,1}, Daniel Ovando^a, Tyler Clavelle^a, C. Kent Strauss^b, Ray Hilborn^c, Michael C. Melnychuk^c, Trevor A. Branch^c, Steven D. Gaines^a, Cody S. Szuwalski^a, Reniel B. Cabral^a, Douglas N. Rader^b, and Amanda Leland^b



This needs some explaining...

Industrial fishing is the source of 1/4 to 1/3 of the world's fish catch which is currently wasted, i.e., turned into animal feeds



Source: Watson, Alder & Pauly (2006, with update)



...although we can eat the fish that
are use to make fishmeal



Restaurantes Semana de la Anchoveta

Bravo Restobar, Casa Moreyra,
La Baguette, Malabar, Matsuei,
Osaka, Toshiro's, La Mar, Caplina,
Costanera 700,
La Red,

Mi Causa, Pescados Capitaes,

Pizza Mavery,

Xtravagancia,

Huaca Pucllana, Tabla,

La Bodega de la Trattoria,

Astrid y Gastón,

La Eñe, La Trattoria

de Mambrino, Señorío De Sulco,

Canta Rana, La Rosa Náutica,

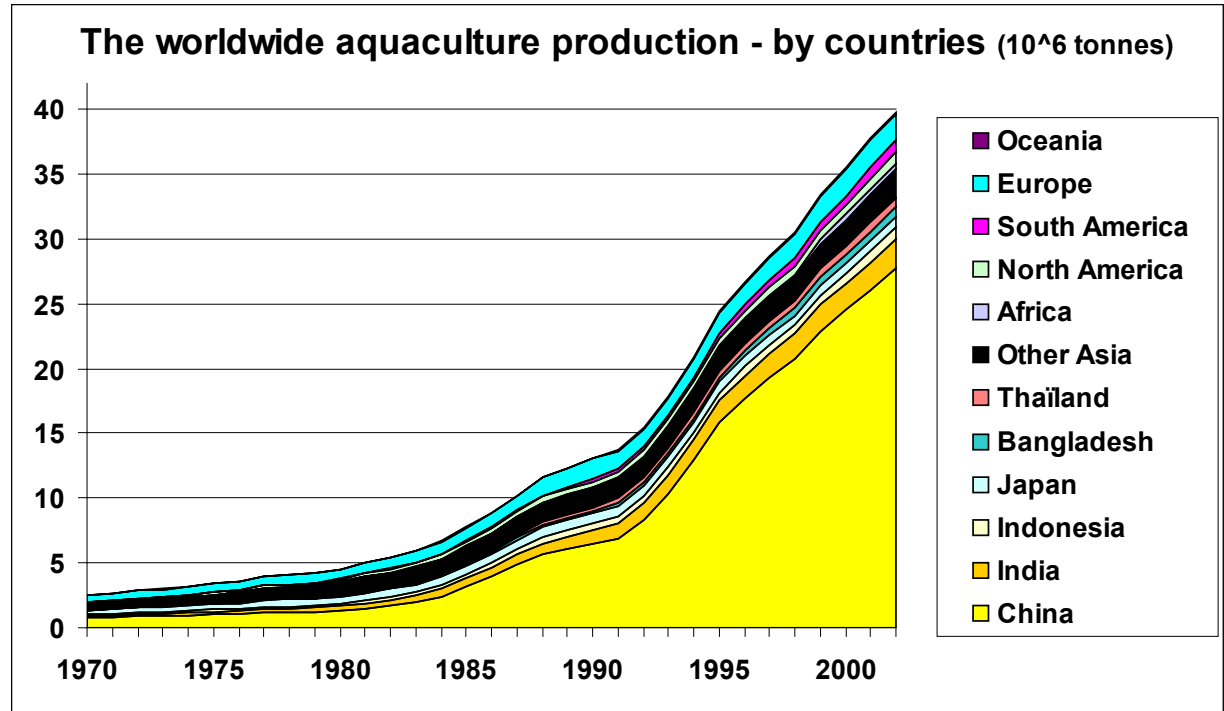
Pastelería Rovigno,

T'anta, Pastelería

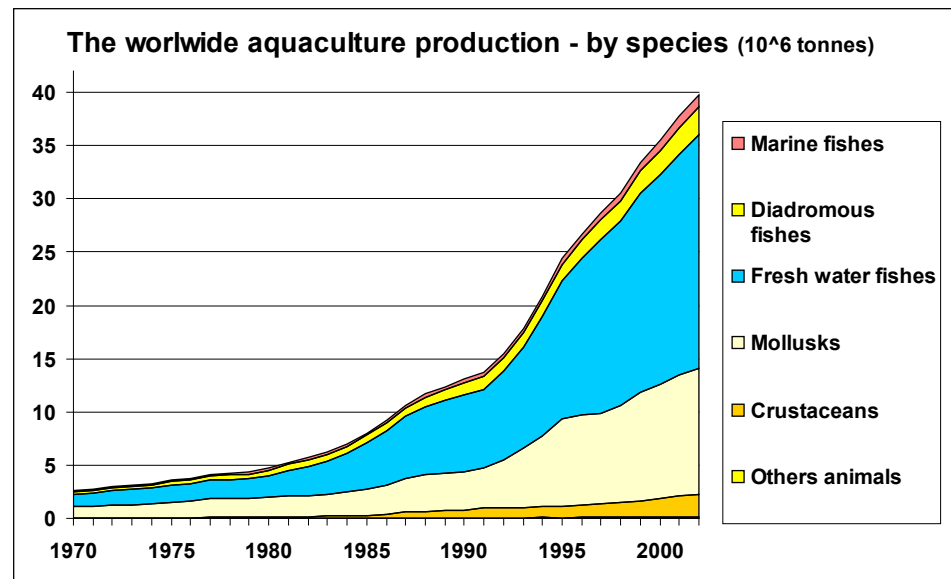
San Antonio.



How about
aquaculture?

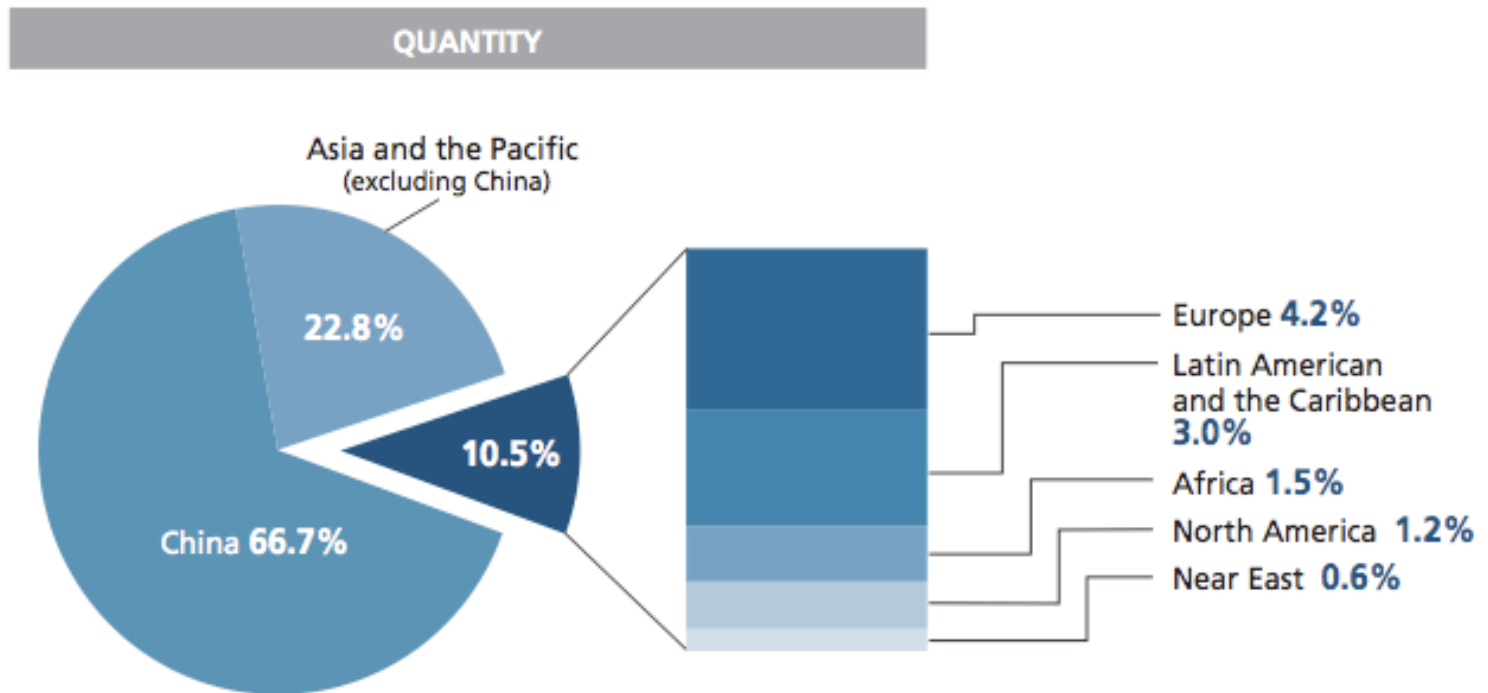


First we must
realize that most
of aquaculture is
in China, and in
freshwater...



It is important to understand that when we, in the West, talk of ‘aquaculture’, we mean the farming of carnivores, whose diet must contain fish products. Thus, we are robbing Pedro to pay Paul. (Why ‘Pedro’ and not ‘Peter’?).

Aquaculture production by region in 2006



Also, we
are farming
up the food
web...

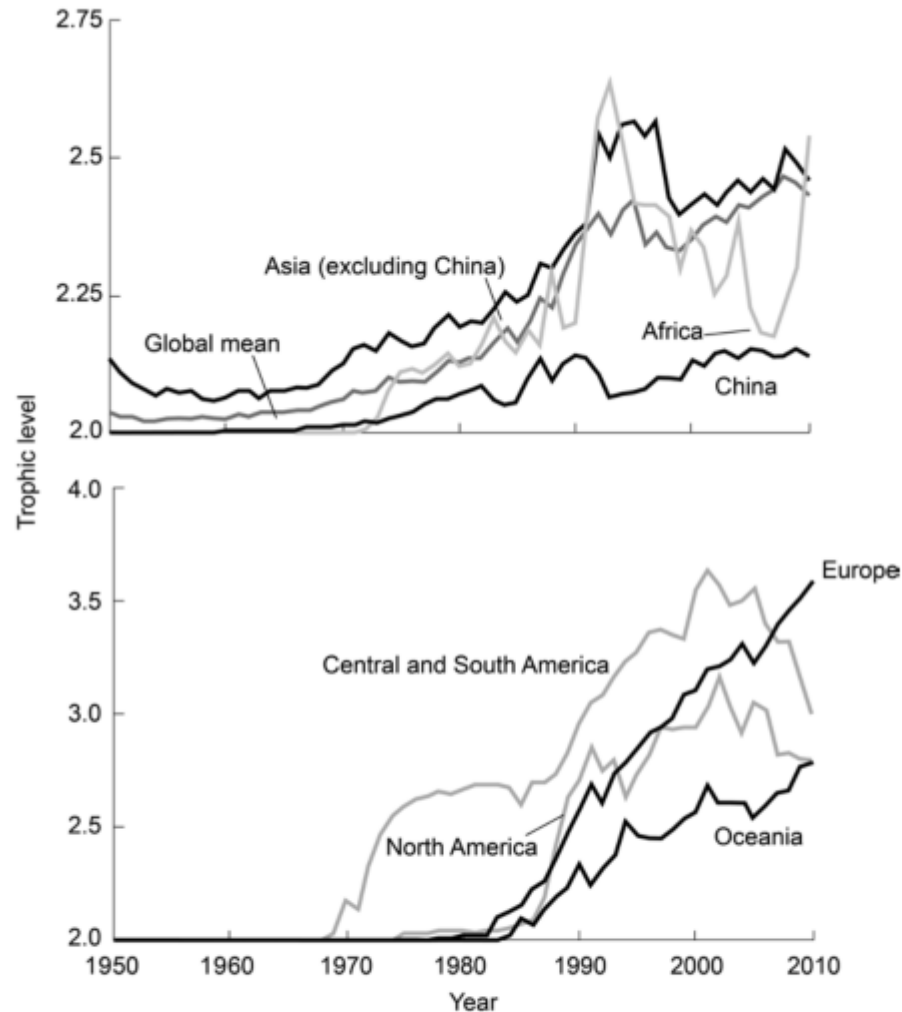
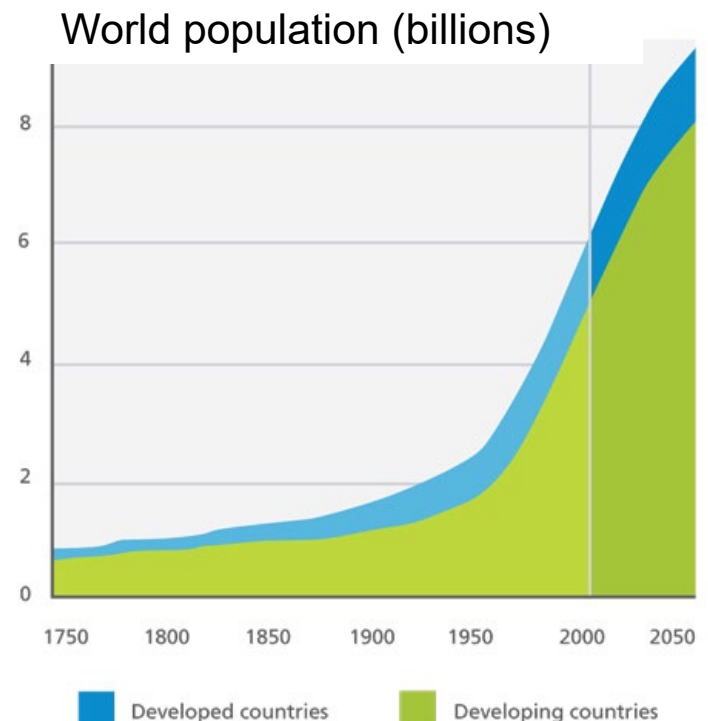


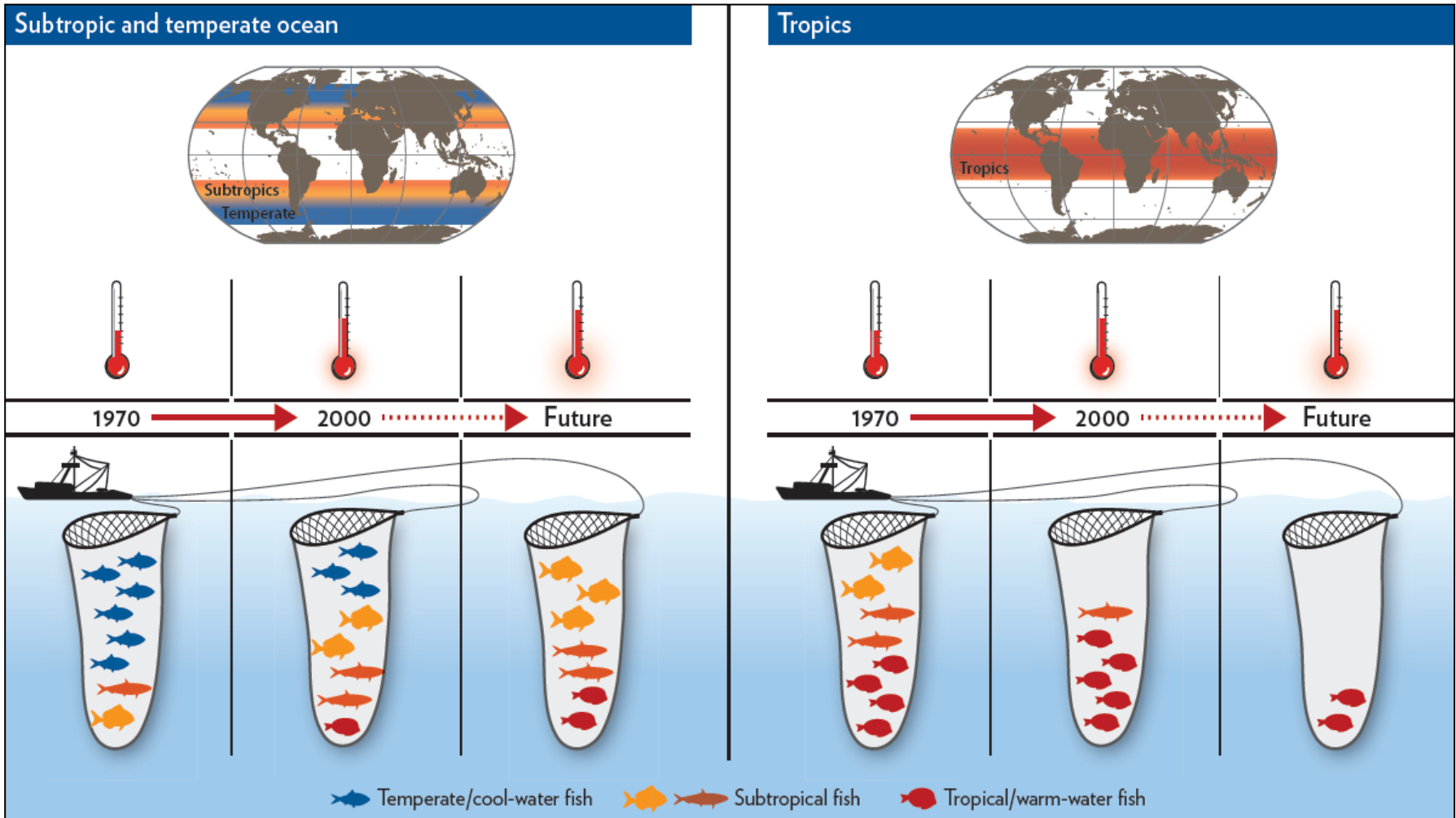
Figure 12.4. Change in the weighted mean trophic level (TL) of mariculture production in the GMD, demonstrating farming up the food web. (A) Change in the world on average and in regions where the weighted mean TL is stable or has decreased since the 1990s. (B) Change in regions with a marked increase in weighted mean TL since 1990. (Adapted from Campbell and Pauly 2013.)

Some points:

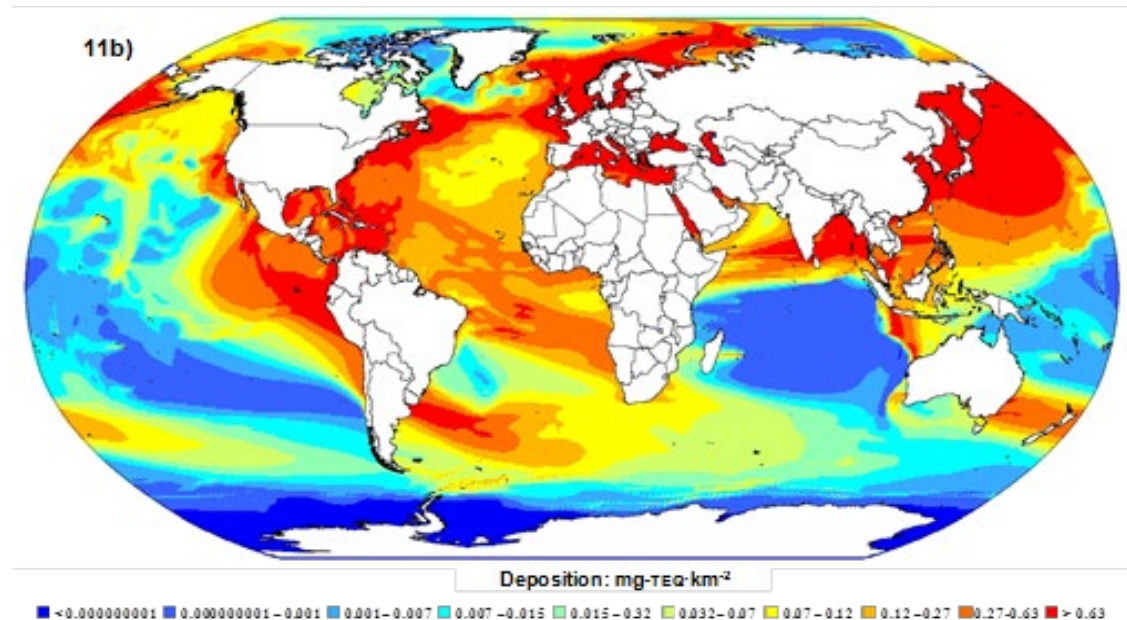
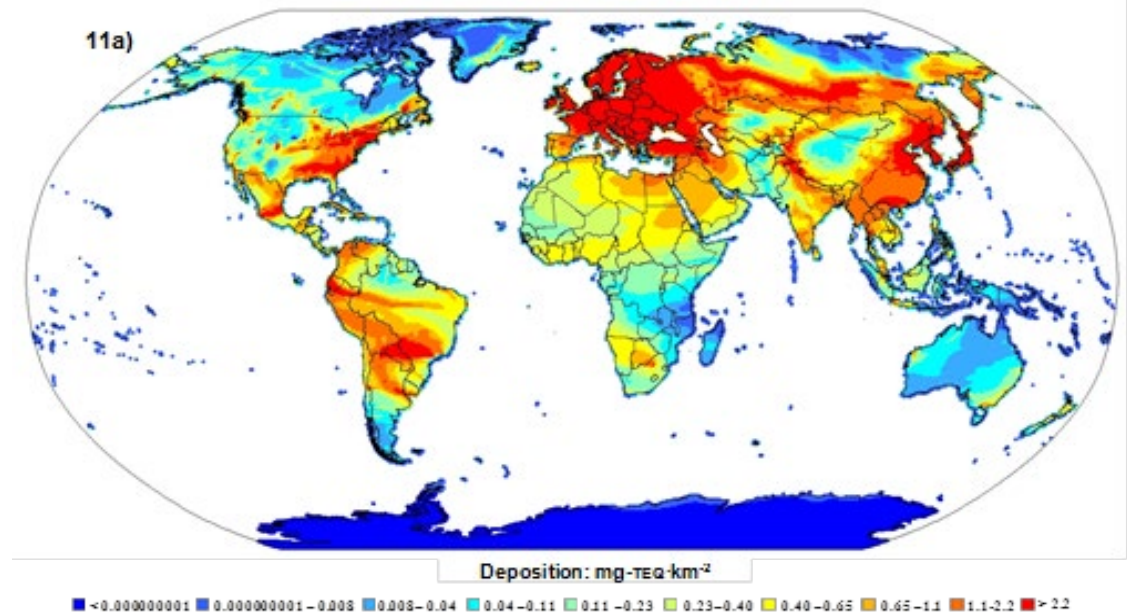
- Seafood in general and aquaculture in particular are not going to 'feed the world';
- One reason is that fish migrate from developing to developed countries;
- Developed countries have enough other animal protein food; many developing countries don't;
- The current craze for fish as 'health food' may pass, as did the craze for spinach (1950s); vitamin C (1970s); fiber (1980s); shark cartilage (1990s) and micronutrients (2000s).



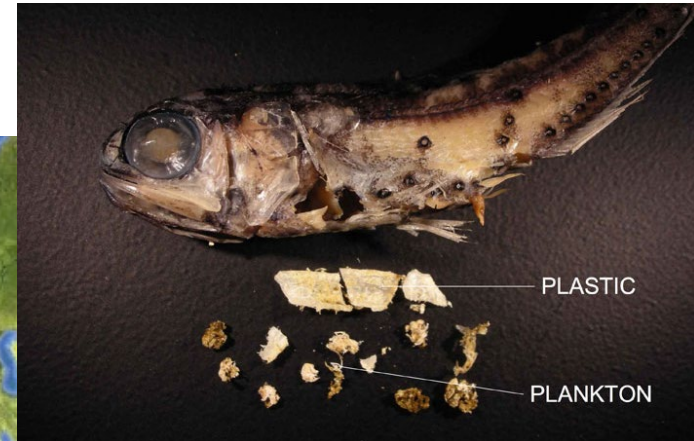
Summary of the the ocean's warming effects:



Marine pollutants take several forms; one of them is persistent Organic Pollutants (POPs), such as dioxin, whose land and ocean deposition can be modeled globally, then used as an input to food web models...



Plastic pollution is an increasing issue, as fish that have not ingested some microplastic are increasing rare, with all of what it implies in the POPs in the flesh and their concentration up marine food chains.



Conclusions:

- Fisheries scientist would know how to manage fisheries for sustainability, but they have few opportunities to do it (one positive example is the Alaska pollock fishery). The result is globally declining marine catches since 1996.
- Rich countries such as the US, Canada or Japan or the E.U., import 60-80% of the seafood they consume, i.e., fish that usually come from badly- or un-managed fisheries often rife with ethical and health issues (illegal catches, slavery at sea, pollution...);
- The farming of carnivorous fish, i.e., 'aquaculture' as conceived in Western countries cannot feed the world. Indeed, it consumes, rather than producing fish.
- Global warming will reduce fisheries catch, particularly in the Global South.



Thank you.

