

SEA

Current Global Macro Perspectives

Spring 2020 – Greg Siourounis

Why Sea Matters? Theory Check:

$$Y_t = H_t^\alpha (A_t X)^{1-\alpha}$$

- $H_t \equiv$ efficiency units of labor
- $A_t \equiv$ technological level
- $X \equiv$ land

So output is a function of education, **technological progress** and **resources**

$$z_t \equiv y_t = h_t^\alpha x_t^{1-\alpha} = h(e_t, g_t)^\alpha x_t^{1-\alpha} = z(e_t, g_t, x_t)$$

**However exogenous factors push factors affect the
Technology path let alone the INOVATION activity**

$$g_{t+1}^i = g(e_t^i, L_t^i, \Omega_t^i)$$

$\Omega_t^i \equiv$ characteristics affecting tech progress in country i :

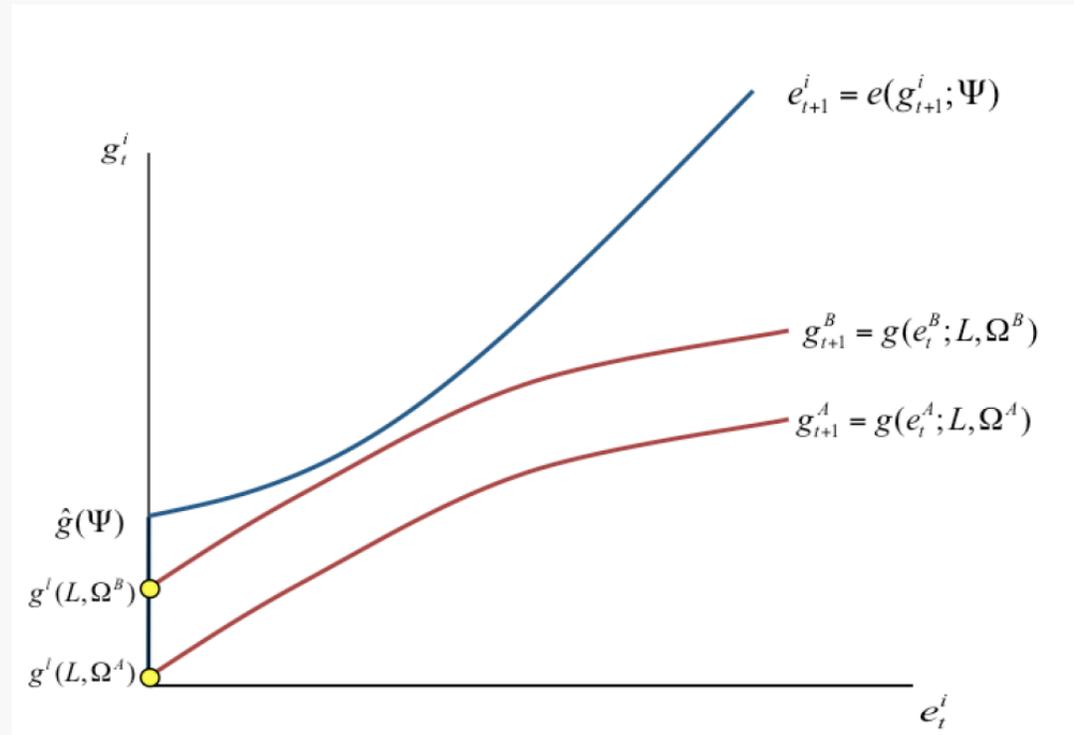
So what goes to Ω ?

- Protection of intellectual property rights (policy)
- The stock of knowledge within a society
- The propensity of a country to trade (geography & policy)
 - Technological diffusion
 - Specialization and technological progress via learning by doing

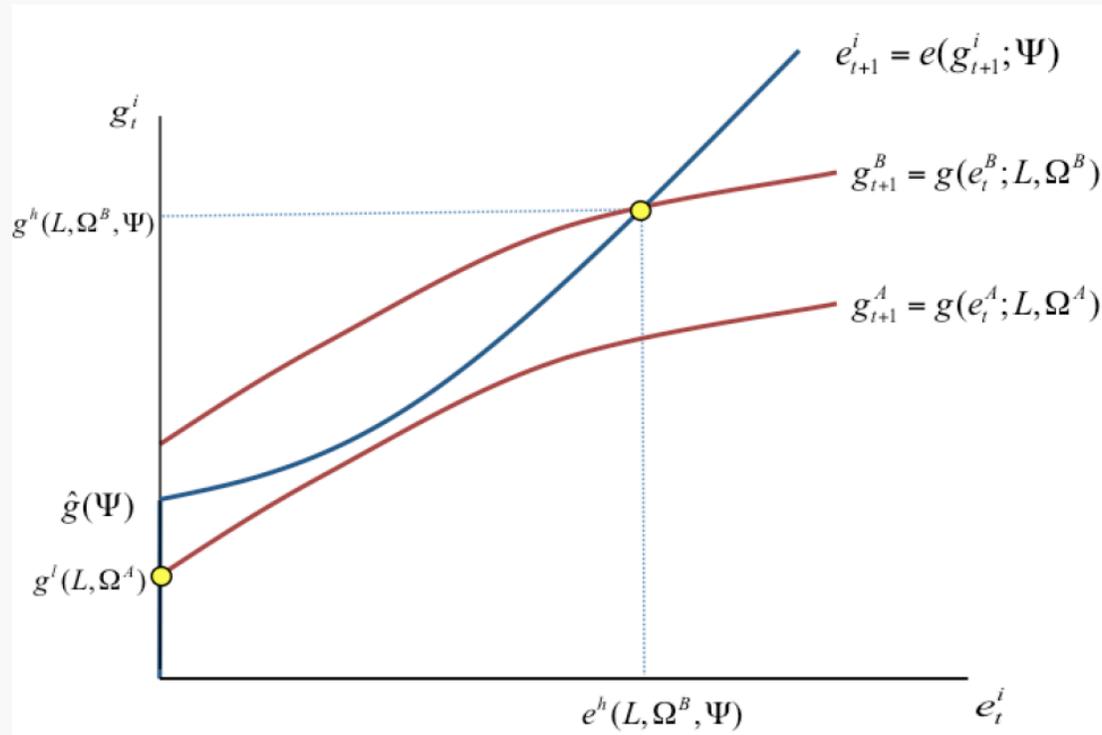
And more...

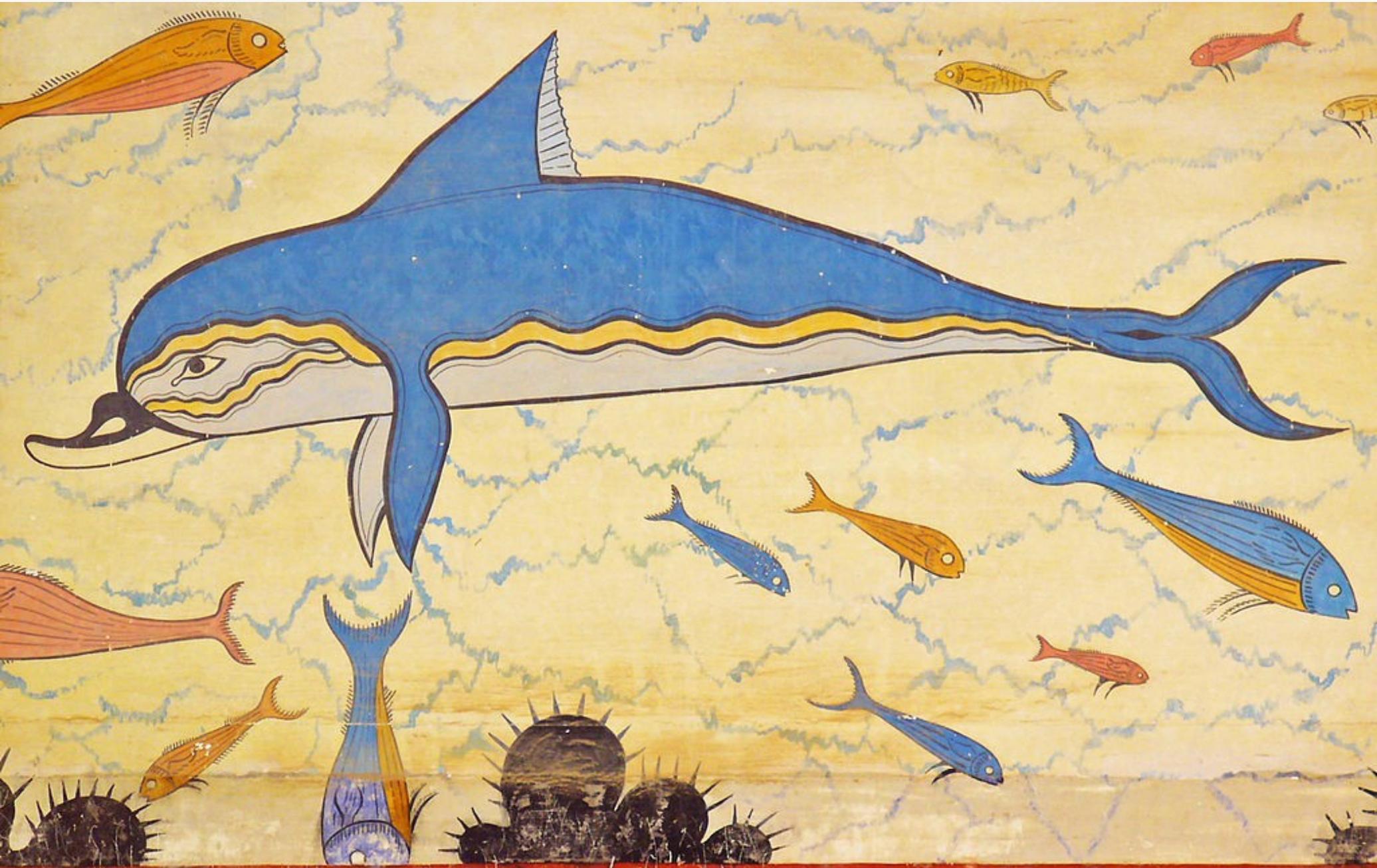
- The composition of interest groups in society
 - Incentives to block or promote technological innovation (e.g., Luddites; landowners)
- Cultural and genetic diversity
 - Wider spectrum of traits are more likely to contain the ones complementary to the adoption or implementation of new technologies
- Abundance of natural resources
 - complementary for industrialization (e.g., Coal & Steam engine)

So Again the Goals is to Move from no impact



To Impact...





The poets writes

- *If you take Greece apart,*
- *In the end you will be left with*
- *an olive tree, a vineyard and a boat...*
- *which means that with these items*
- *you can rebuild Greece...*
-
- Odysseas Elytis, Nobel Prize for Literature, 1979



Beautiful it is...

Conserve and sustainably use the oceans, seas and marine resources UN Statement

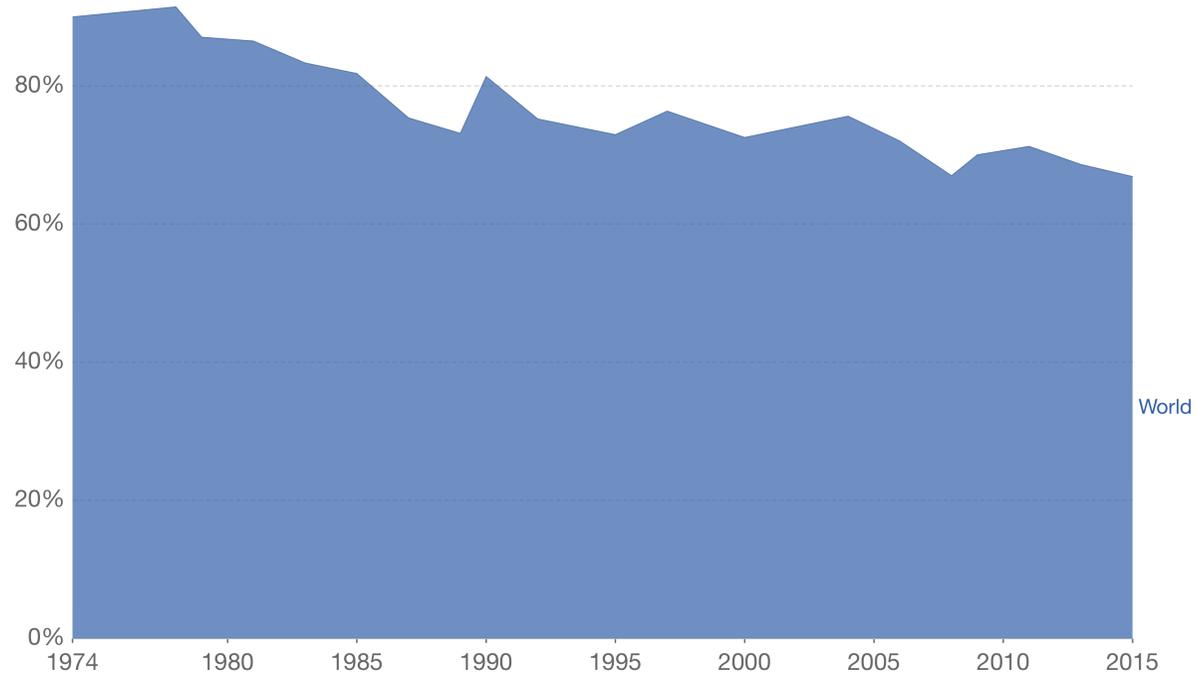
- *Our oceans — their temperature, circulation, chemistry, and ecosystems — play a fundamental role in making Earth habitable.*
- *Our rainwater, drinking water, weather, climate, coastlines, much of our food, and even the oxygen in the air we breathe, are all ultimately provided and regulated by the sea. Throughout history, oceans and seas have been vital conduits for trade and transportation. Careful management of this essential global resource is a key feature of a sustainable future.*

Exploit them all

Share of global fish stocks that are not overexploited, 1974 to 2015

Our World
in Data

Fish stock are subpopulations of a particular species of fish which have common parameters such as location, growth and mortality which define their population dynamics. A fish stock with abundance equal to or above the maximum sustainable yield (MSY) is classified as biologically sustainable, and not overexploited.



Source: UN FAO Fisheries and Aquaculture (FAOfish)

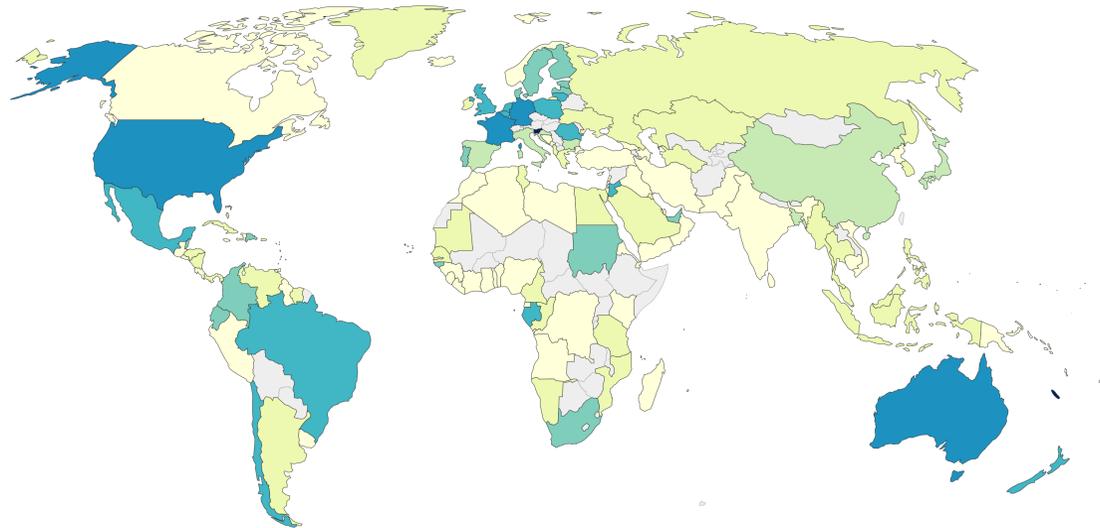
OurWorldInData.org/seafood-production • CC BY

Protection?

Share of marine territorial waters that are protected, 2017

Marine protected areas are areas of intertidal or subtidal terrain - and overlying water and associated flora and fauna and historical and cultural features - that have been reserved by law or other effective means to protect part or all of the enclosed environment.

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Source: World Database on Protected Areas (WDPA)

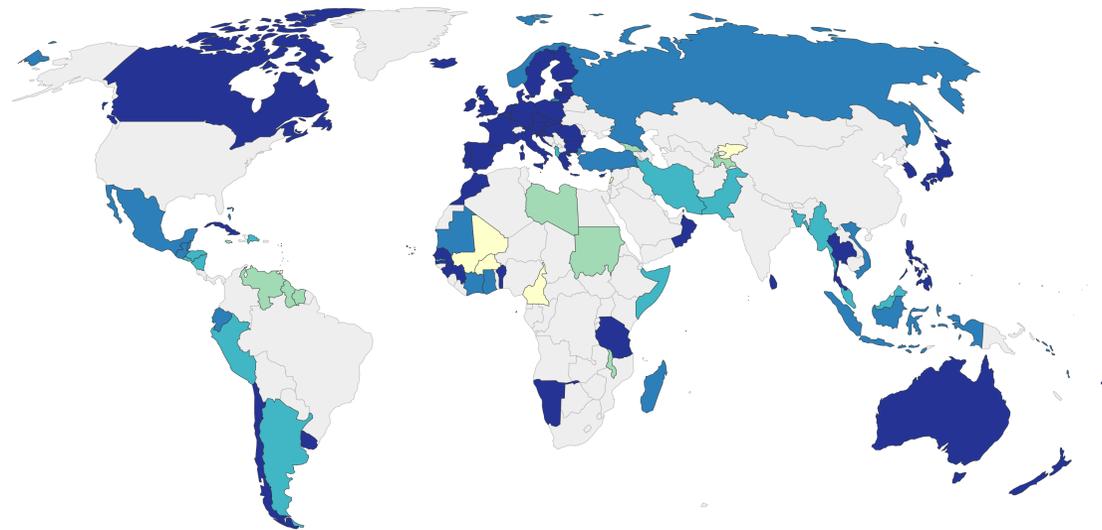
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Implementation?

Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing, 2018

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Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing (where 1 is lowest; 5 is highest).



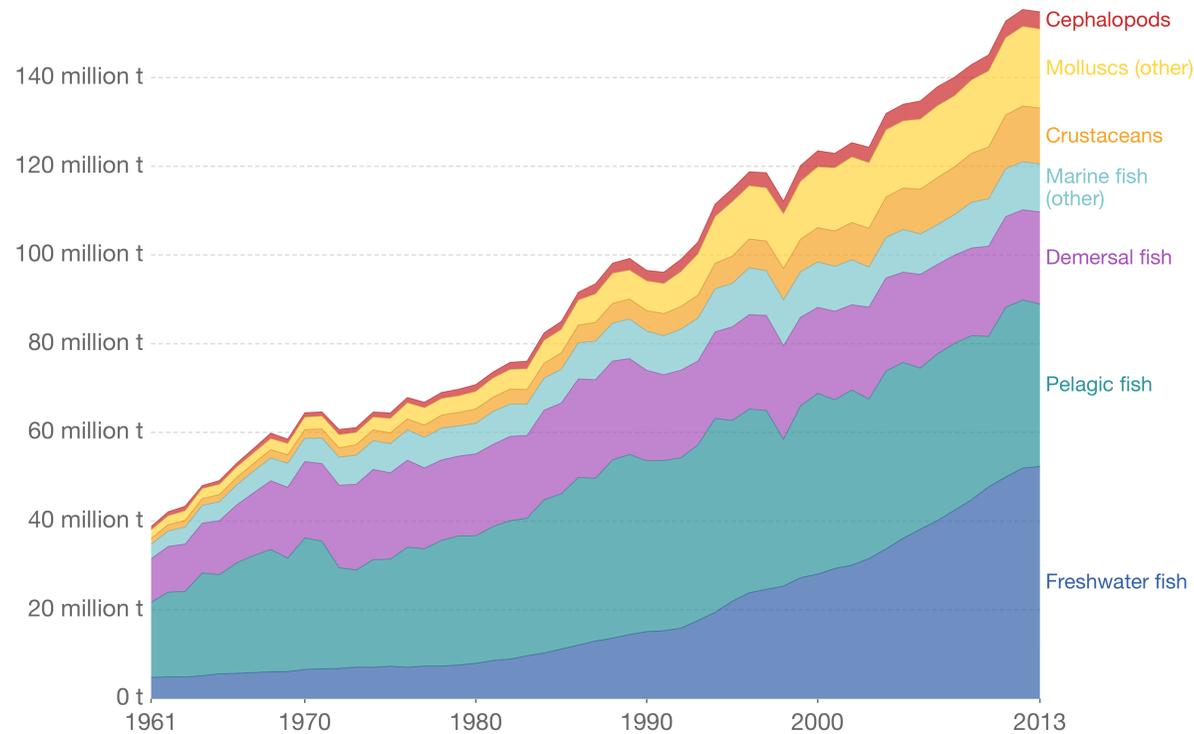
Source: UN Statistics Division (2019)

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Supply

Seafood and fish production, World, 1961 to 2013

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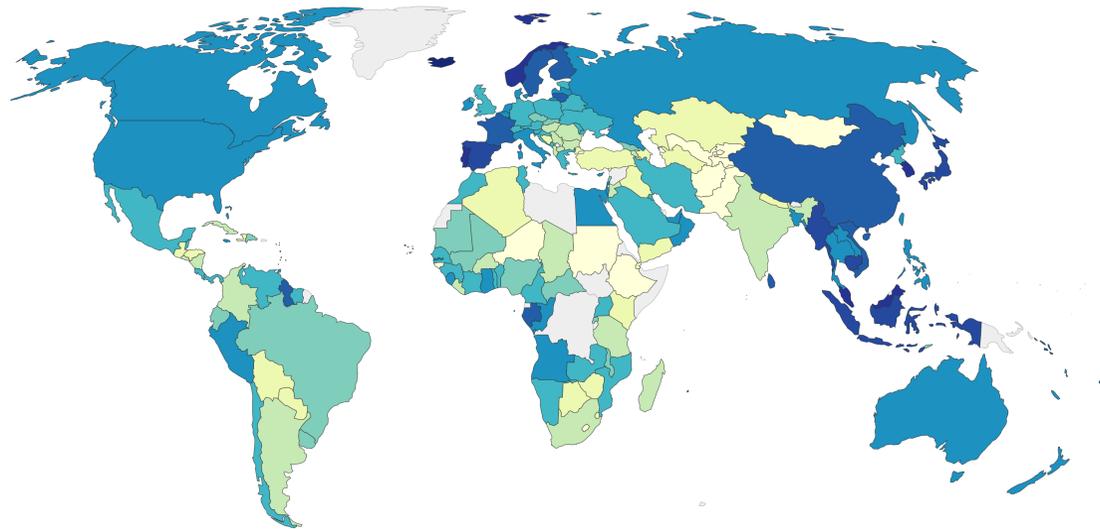
Source: UN Food and Agricultural Organization (FAO)

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Demand

Fish and seafood consumption per capita, 2017

Data is inclusive of all fish species and major seafood commodities, including crustaceans, cephalopods and other mollusc species.



Source: UN Food and Agriculture Organization (FAO)

OurWorldInData.org/seafood-production • CC BY

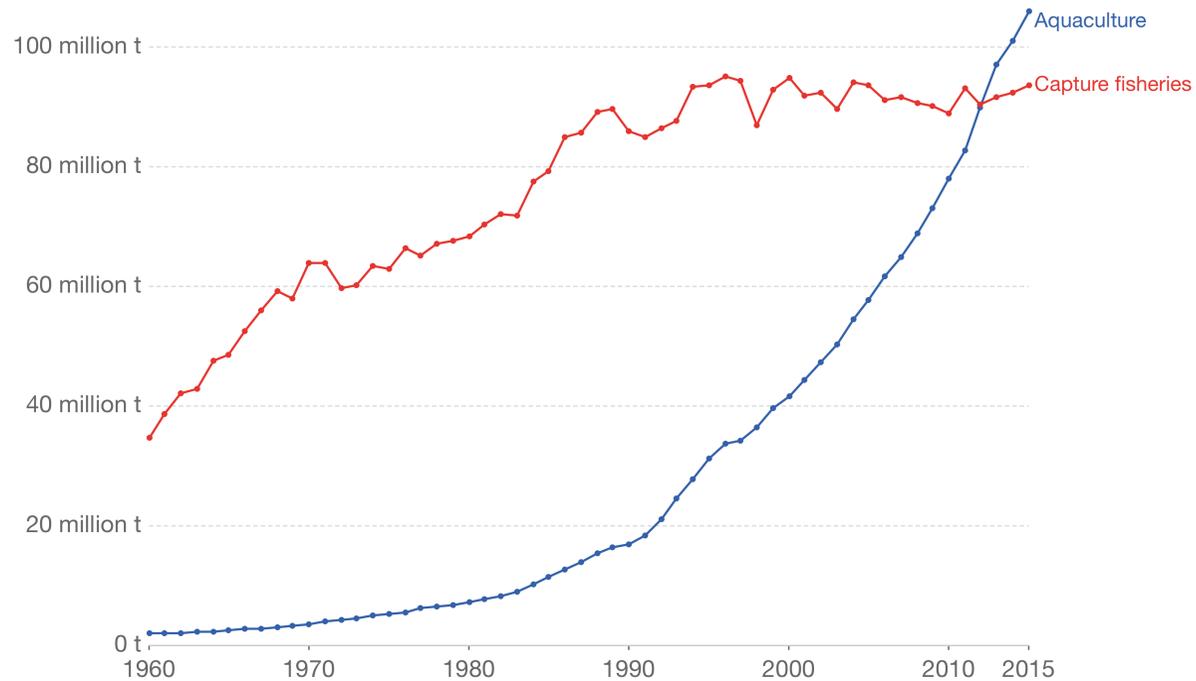
Note: Data is based on per capita food supply at the consumer level, but does not account for food waste at the consumer level.

Fingers Crossed

Seafood production: wild fish catch vs aquaculture, World, 1960 to 2015

Our World
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Aquaculture is the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Capture fishery production is the volume of wild fish catches landed for all commercial, industrial, recreational and subsistence purposes.



Source: UN Food and Agriculture Organization (FAO)

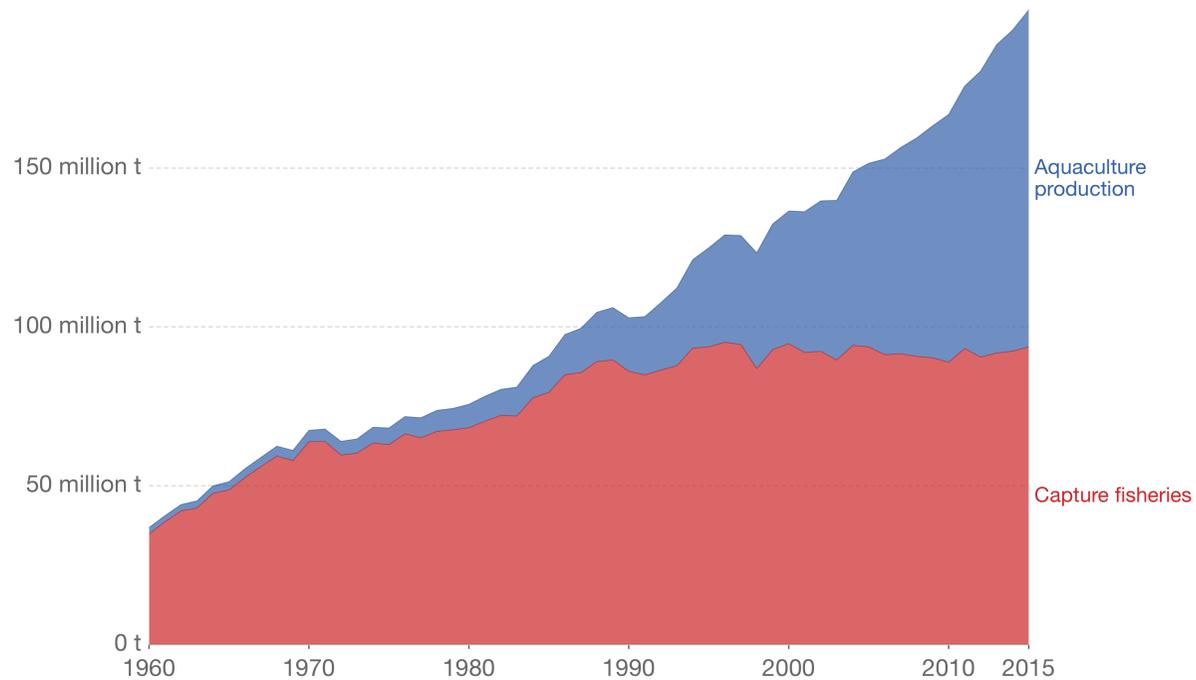
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Amazing growth

Seafood production: wild fish catch vs aquaculture, World, 1960 to 2015

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Source: UN Food and Agriculture Organization (FAO)

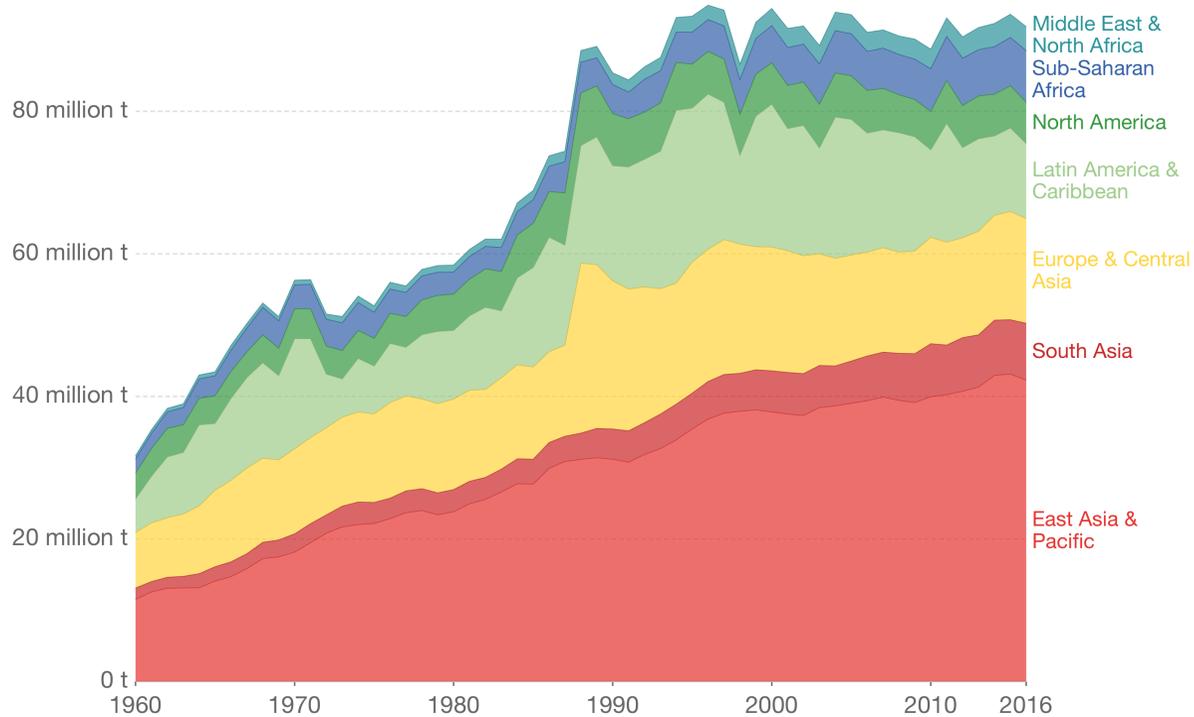
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Asia is leading wild capture

Capture fishery production, 1960 to 2016

Capture (wild) fishery production, measured in metric tons per year.

Our World
in Data



Source: UN Food and Agriculture Organization

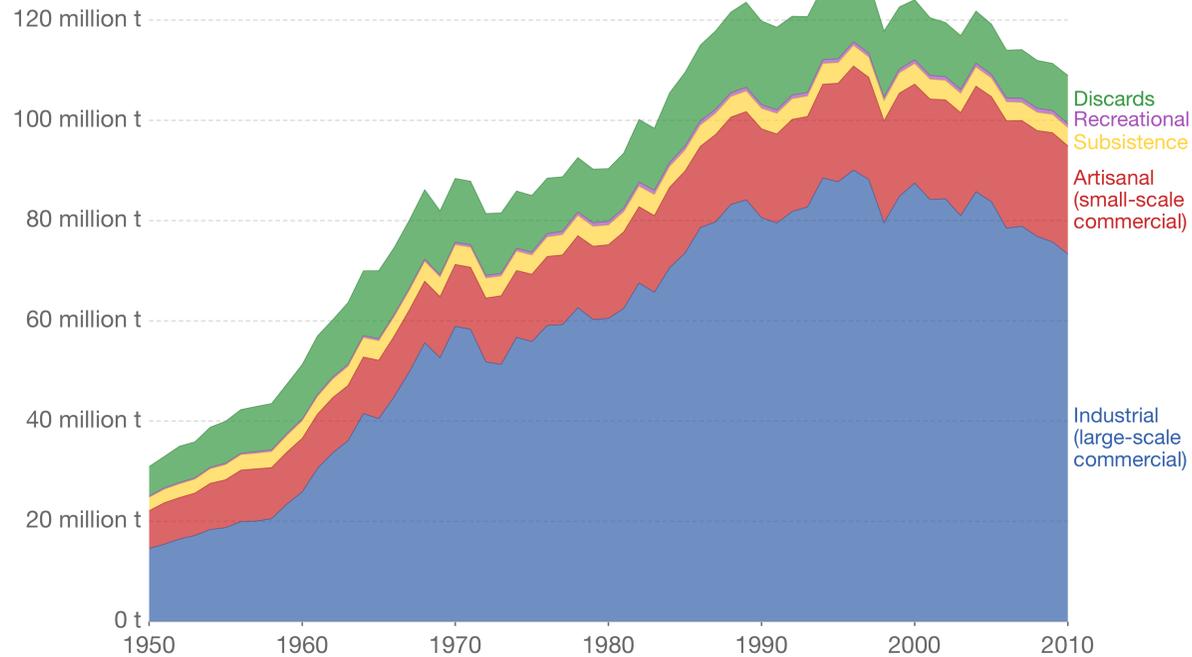
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Sectoral analysis

Global fishery catch by sector

Breakdown of global wild fishery catch by sector. This relates only to wild fishery catch, and does not include aquaculture (fish farming) production.

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Source: Pauly and Zeller (2016)

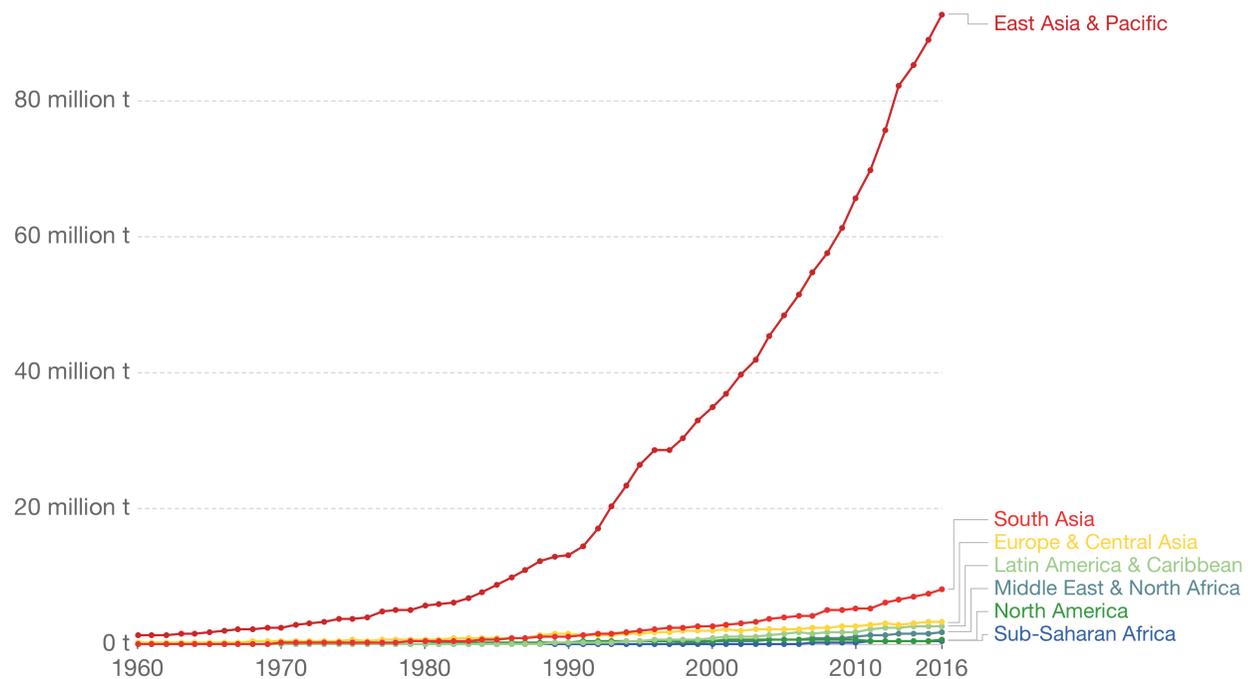
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Aquaculture

Aquaculture production , 1960 to 2016

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Aquaculture is the farming of aquatic organisms including fish, molluscs, crustaceans and aquatic plants. Aquaculture production specifically refers to output from aquaculture activities, which are designated for final harvest for consumption.



Source: UN Food and Agriculture Organization

OurWorldInData.org/meat-and-seafood-production-consumption/ • CC BY

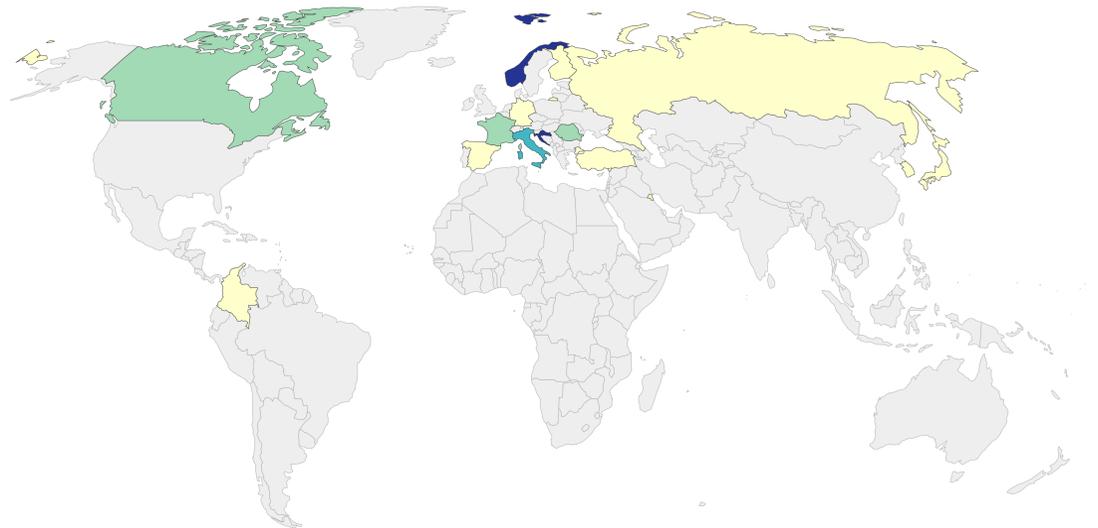
Aquaculture and Innovation: Aquatech

- Aquaculture is one of the fastest growing forms of food production in the world and the fastest growing sector in the livestock industry.
- In a \$140 billion market, startups in seafood and aquaculture technology raised \$193 million in 2016, which marked a 271% increase from the two years prior combined.
- The latest group of innovations in agtech could very well come from the water, as something we could call “aquatech.”

Science in Fishery

Ocean science as a share of total research and development funding, 2013

Our World
in Data



Source: UN Statistics Division (2019)

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Tremendous need for innovation

- Disease prevention
- Vaccine delivery (ViAqua Therapeutics)
- Fish meal replacement (Cargill, Knipbio, MicroSynbiotix, Calysta – insect based Ynsect, AgriProtein, Hexafly, nextProtein)
- Sustainability solutions (including closed-loop farming – Atlantic Sapphire – recirculating for salmon farming)
- Supply chain management. Blockchain?

Blockchain in aquaculture: Where?

- Blockchain could be used to exchange information about
- a fish's origin, history, harvest, processing and delivery, producing a transparent and verifiable origin of each singular aquaculture product.
- Companies like Fishcoin are pushing the envelope with blockchain to address the fragmentation of the seafood supply chain.
- If blockchain becomes pervasive, it could change the entire infrastructure of the fishery supply chain, adding the transparency and accountability necessary for sustainable practices.

Private Equity

- Aqua Spark
- Hatch Blue
- **Invest in?**
- InnovaSea
- Sea Farming Systems

And then Politics Arrive! Who owes the Sea???

- On land, countries are separated by borders that indicate which country governs a particular piece of land, its inhabitants and its natural resources.
- But what happens when these borders reach the coast?

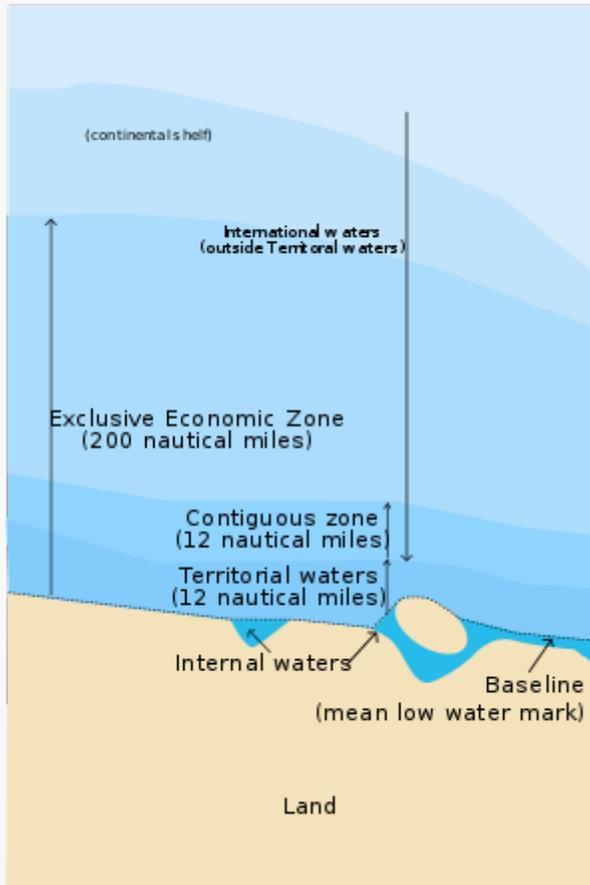
How are the many natural resources available at the seafloor divided between the different coastal countries and who governs the ships that travel across the seas?

- To provide an answer to these questions, in 1982 the United Nation Convention on the Law of the Sea defined a set of rules on how to divide the marine regions.
- A country has control over both the seafloor as well as ships travelling at the sea surface in an area that extends up to 12 nautical miles (22.2 km) from its coastline.
- This is called a country's territorial sea and its outline is similar to the borders that exist on land.

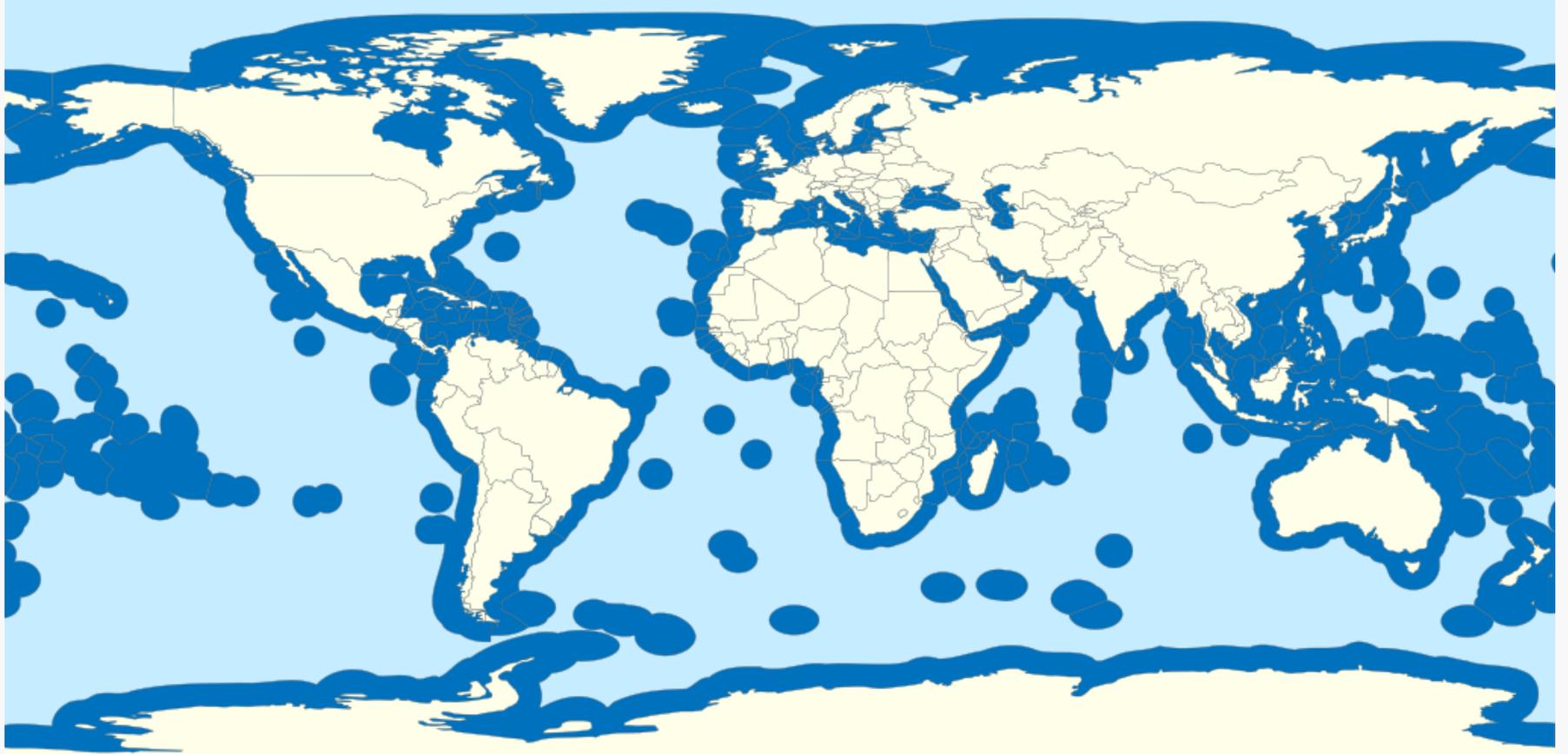
Exclusive Economic Zones

- Extending beyond this point and reaching up to 200 nautical miles (370.4 km) from a country's coast lies its Exclusive Economic Zone. Within this region, a country owns the natural resources at the seafloor but has no say on what happens at the surface. Any ships in an Exclusive Economic Zone are essentially in international waters.

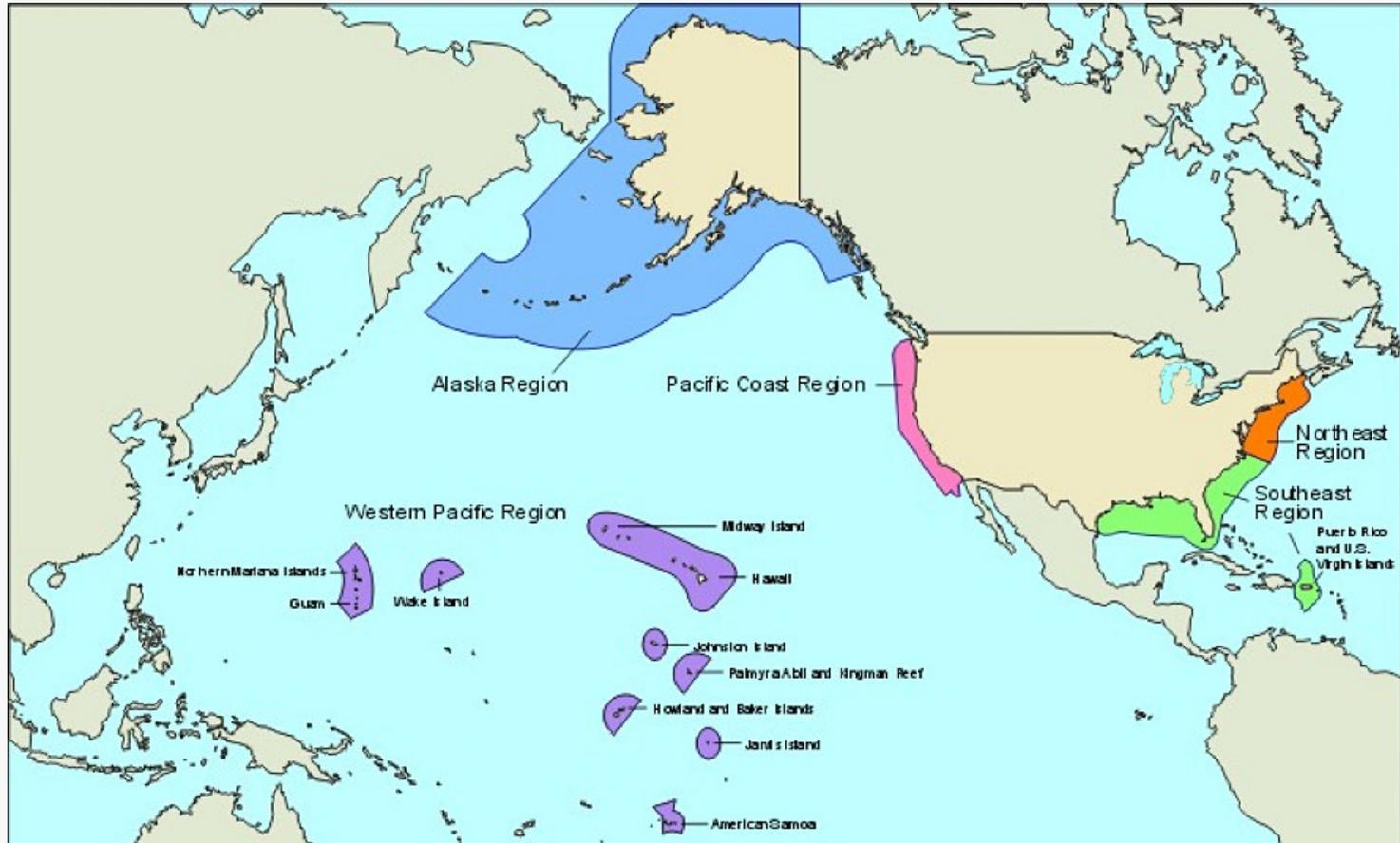
Definition in a map: Source wiki



GLOBAL MAP



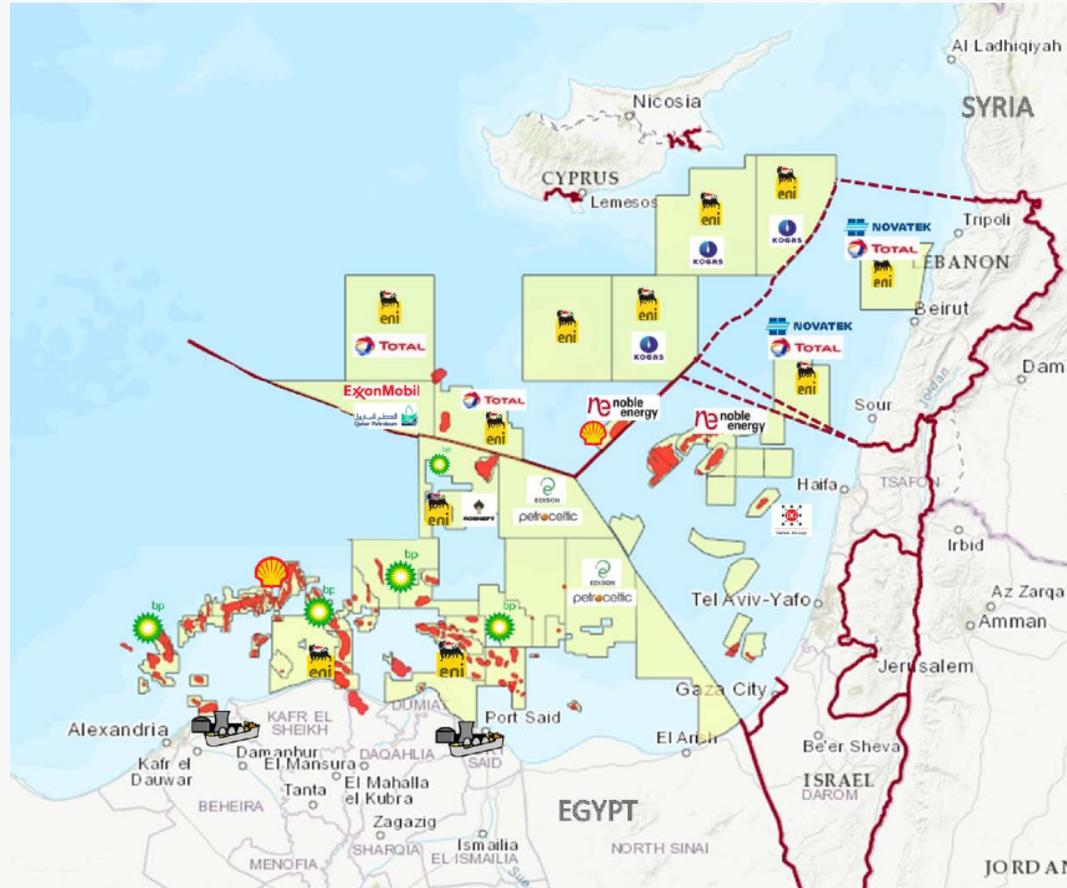
US: NOAA



Why two nations might be fighting over? Oil...



East Med: A Mess





What if we focus on this instead?

Why Fishery is Not Problematic? Fish Farms In Med



Why Fishery?

- **Attracts Innovation And Considerable Funds Open to Anybody**
- **Solves Food Supply Issue for Many Years to Come**
- **Is close to Costal Line so no Issue of 200miles Sea-Beds**
- **Is Renewable if Correctly Managed**
- **Its Very Competitive – Thus Maximizes Consumer Surplus and Innovation is increasing Efficiency**
- **IT'S THE FUTURE BEOYND FOSSIL**



**But who am I to judge? What about Zuck?
FB JUST INVESTED 5.7BLN**