Save the seas!

Dr. Cornelia E. Nauen

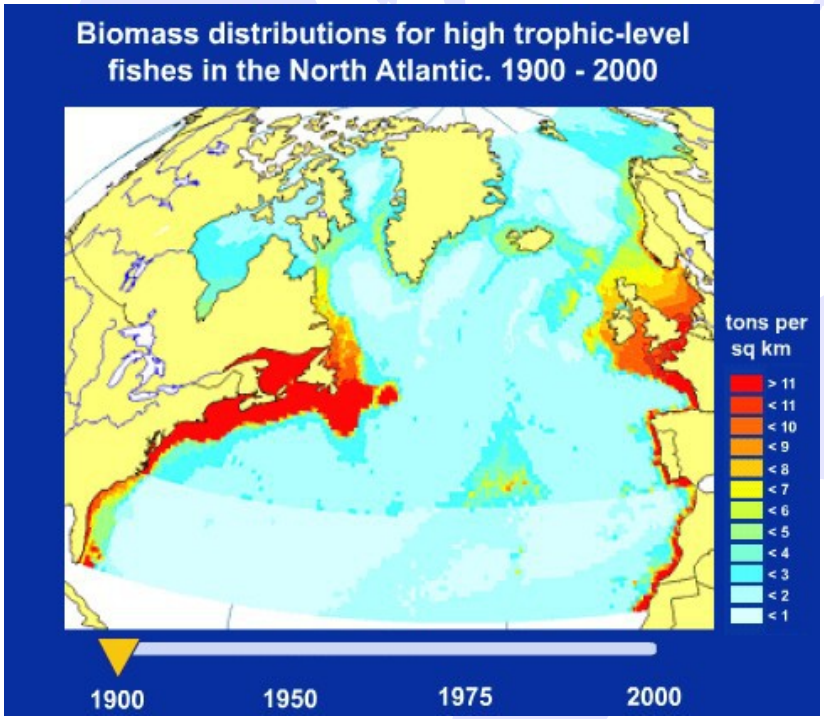
President
Mundus maris
Sciences and Arts for Sustainability asbl

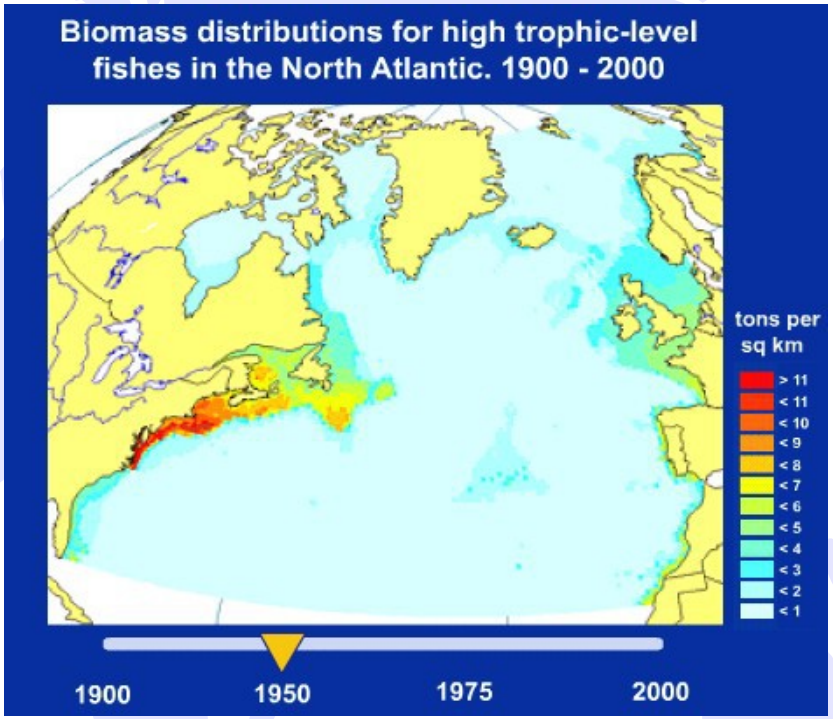
ISG, AWCB Rhode St. Genèse, 12/11/2012

Structure of the talk

- The major threats to our seas
- Why does it matter?
- Some recent field experience to engage teachers and young people in West Africa
- What we can do together to save our seas

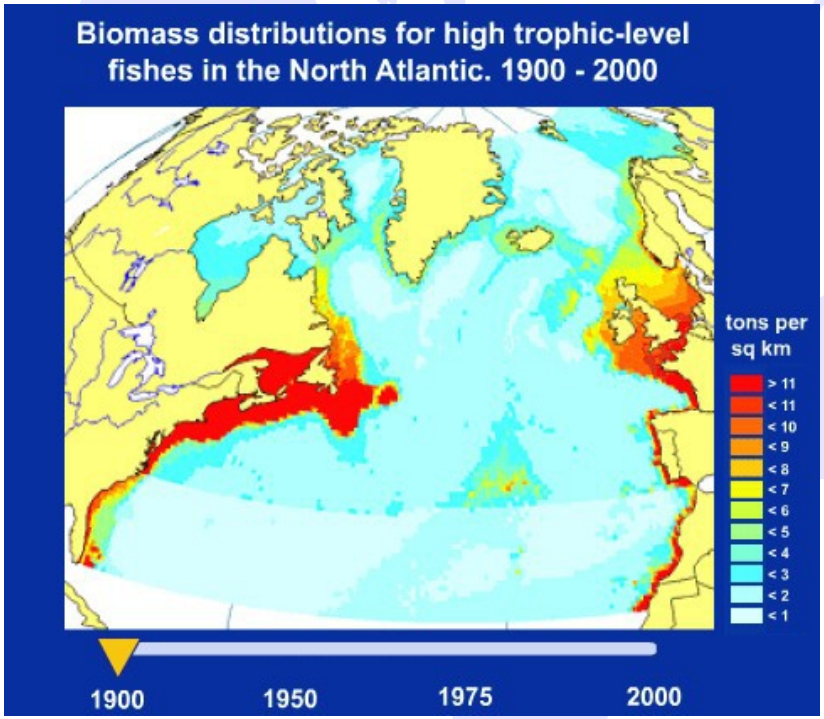
Major threat No 1: the global fisheries crisis (1)

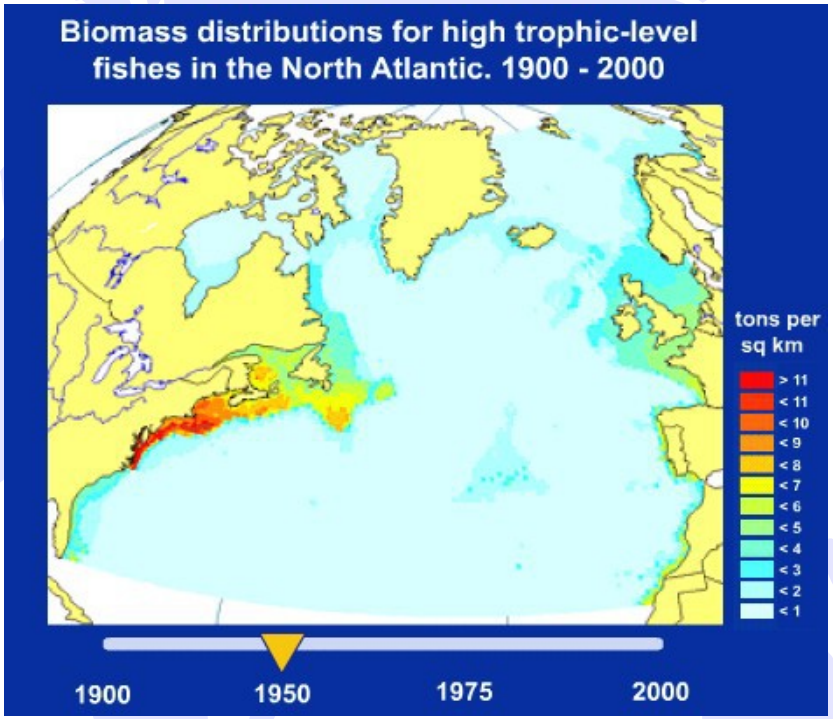




Christensen, V. *et al.*, 2003. Hundred-year decline of North Atlantic predatory fishes. *Fish and Fisheries*, 4:1-24.

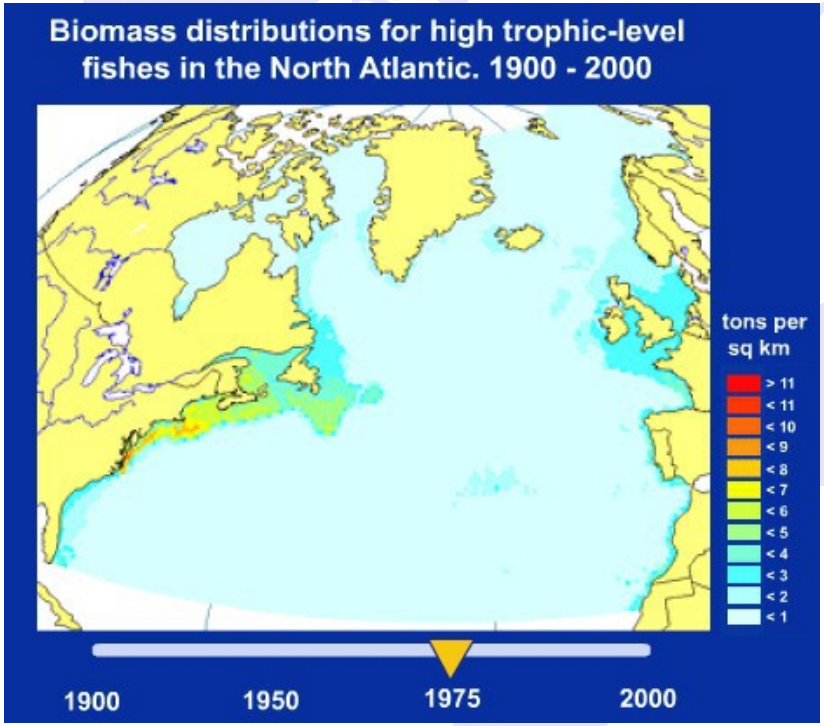
Major threat No 1: the global fisheries crisis (1)

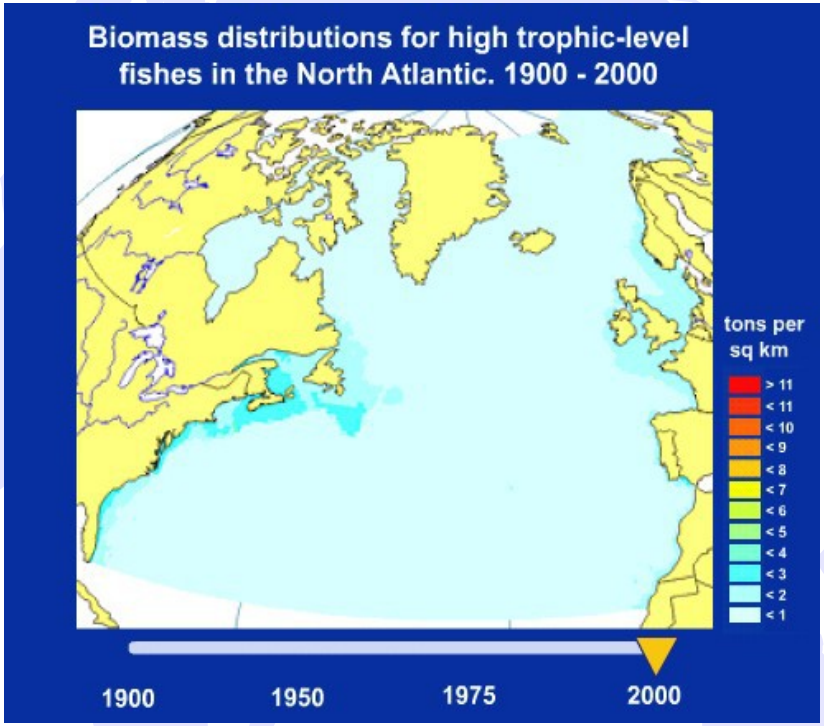




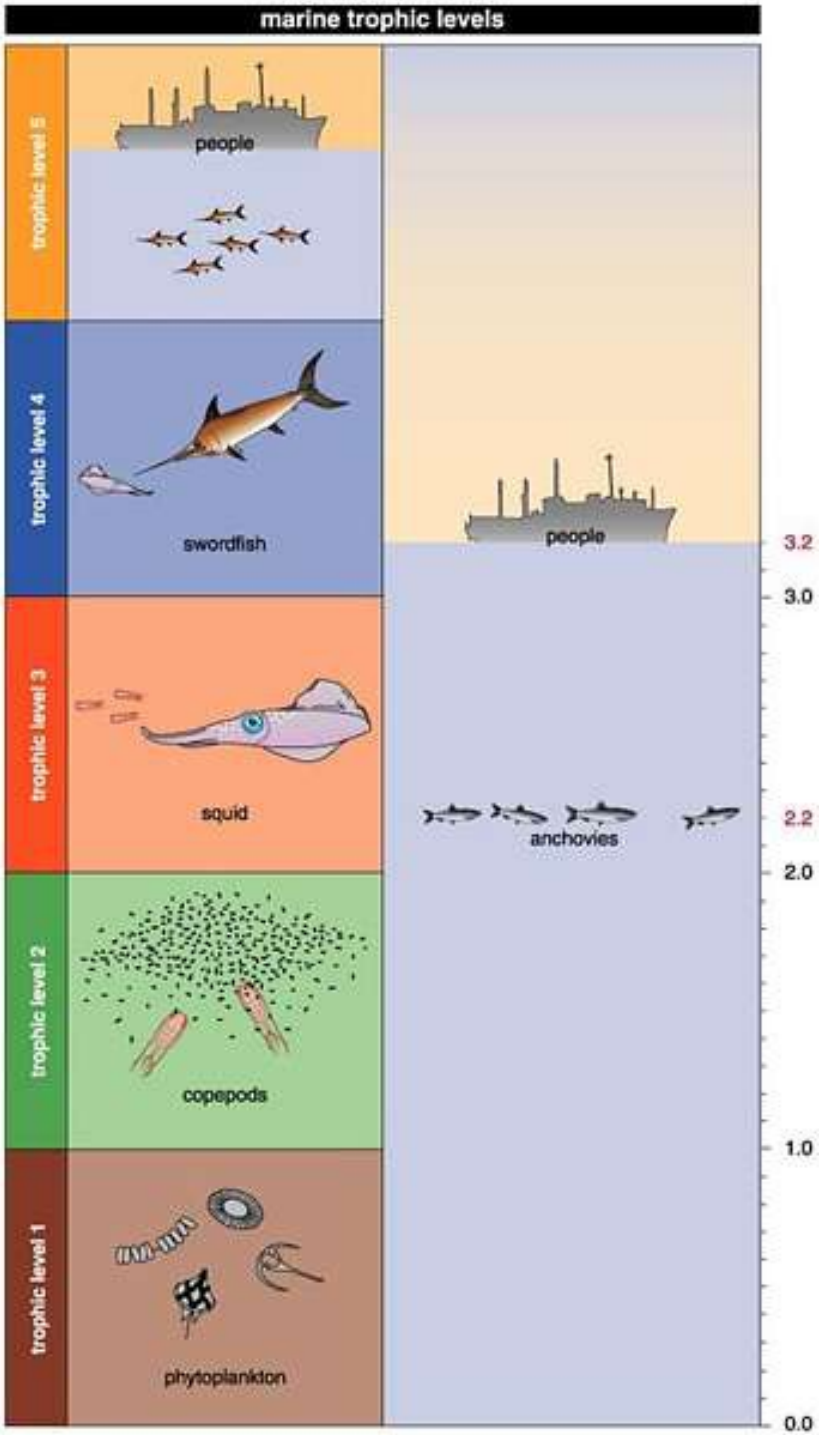
Christensen, V. *et al.*, 2003. Hundred-year decline of North Atlantic predatory fishes. *Fish and Fisheries*, 4:1-24.

Major threat No 1: the global fisheries crisis (2)





Christensen, V. *et al.*, 2003. Hundred-year decline of North Atlantic predatory fishes. *Fish and Fisheries*, 4:1-24.

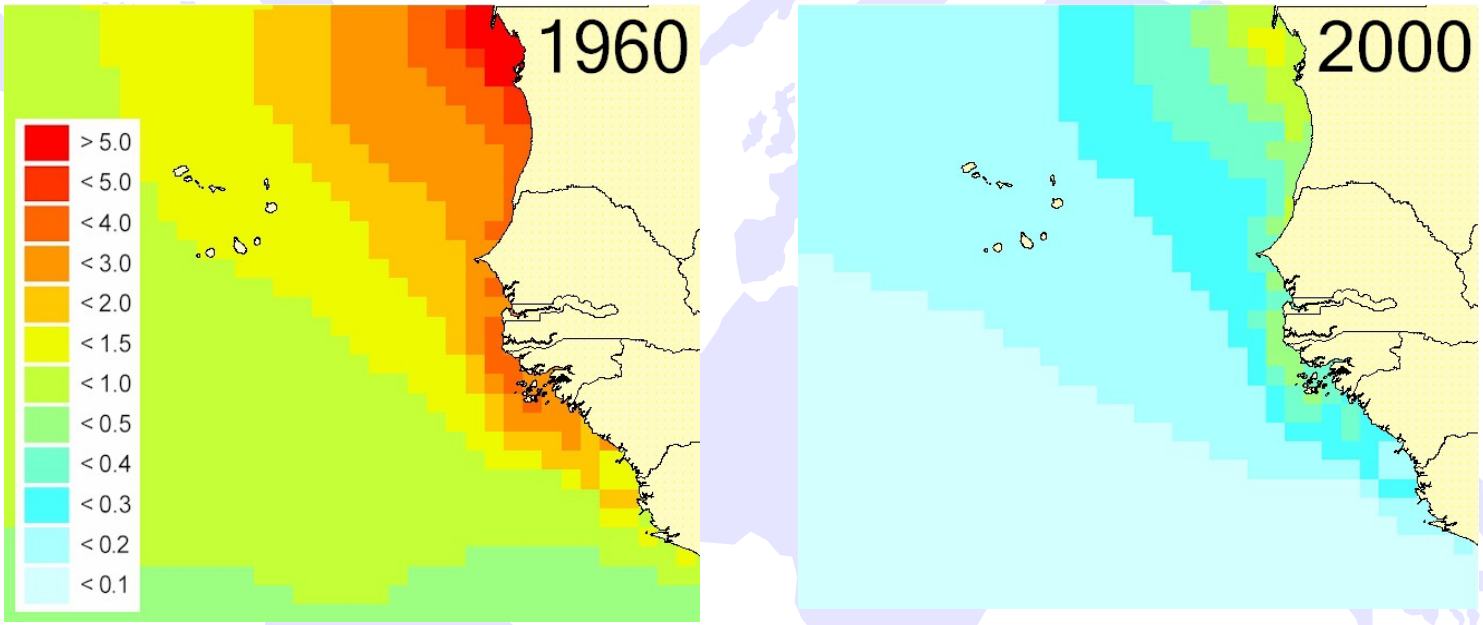


Major threat No 1: the global fisheries crisis (3)

In an ecosystem, where big fish or whales eat small fish or other organisms, we distinguish trophic levels from level 1 (phytoplankton as primary producers capturing the energy of the sun) to levels 2 to 5 (consumers feeding on plants and animals). Humans are consumers at the top of the food web.

Fisheries affect ecosystems very heavily by taking fish and other organisms out of their web of relations. Degraded systems (biomass <20%) can not sustain fisheries nor maintain basic ecofunctions (Froese & Proelss, 2010)

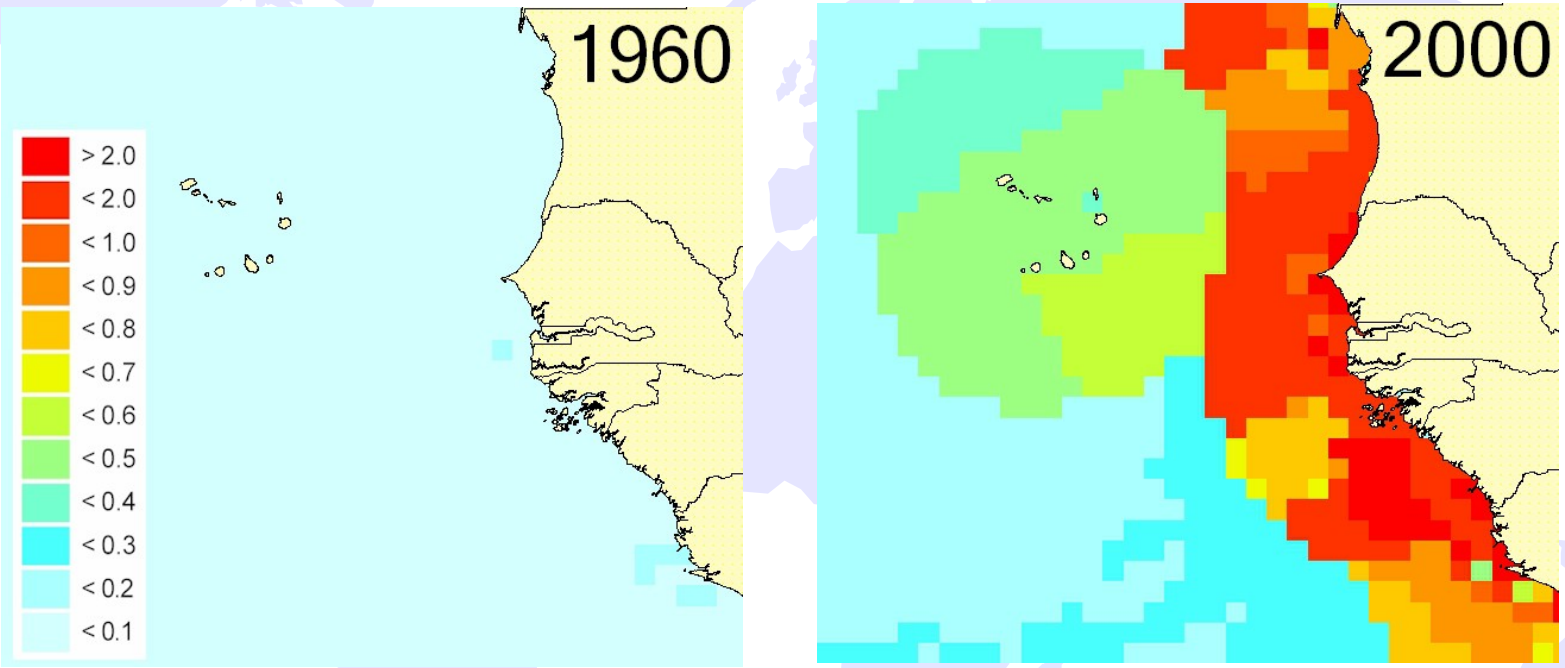
It's global (1)



Biomass distributions for fishes (trophic level ≥ 3.0, excluding small pelagics and mesopelagics)
off West Africa in 1960 and 2000 [tons per sq km]

Christensen *et al*., 2004. Trends in Fish Biomass off Northwest Africa. pp 377-386 In: Pêcheries maritimes, écosystèmes et sociétés en Afrique de l'Ouest: un demi-siècle de changement. IRD & Commission Européenne.

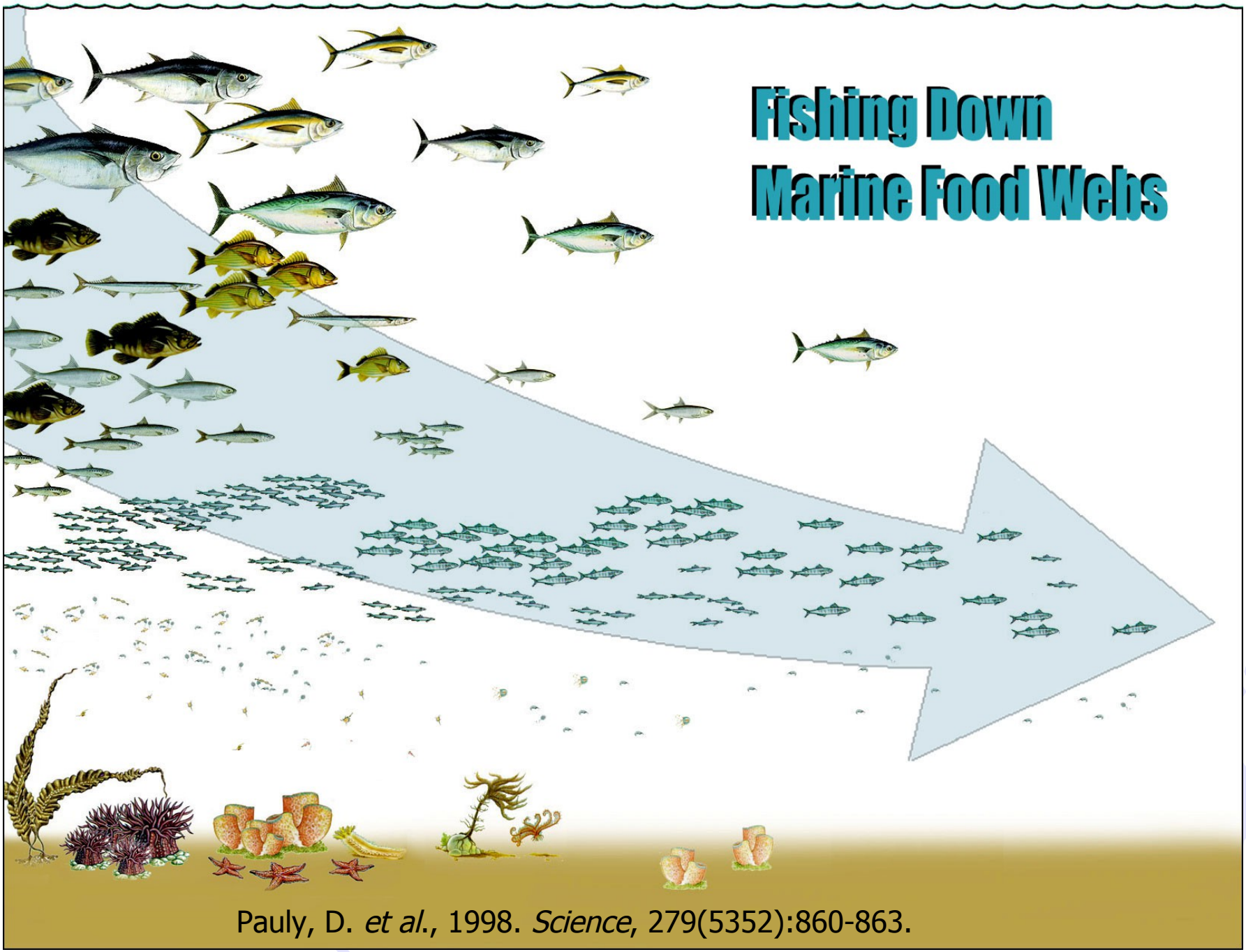
It's global (2)



Fishing intensity (= catch/biomass ratio)

for fishes (trophic level ≥ 3.0) in units per year

Christensen *et al*., 2004. Trends in Fish Biomass off Northwest Africa. pp 377-386 In: Pêcheries maritimes, écosystèmes et sociétés en Afrique de l'Ouest: un demi-siècle de changement. IRD & Commission Européenne



Pauly, D. *et al.*, 1998. *Science*, 279(5352):860-863.

Major threat No 2: climate change (1)

The first effect of climate change on the ocean is the increase of temperature. That means:

- thermic expansion of the volume with a contribution to sea level rise

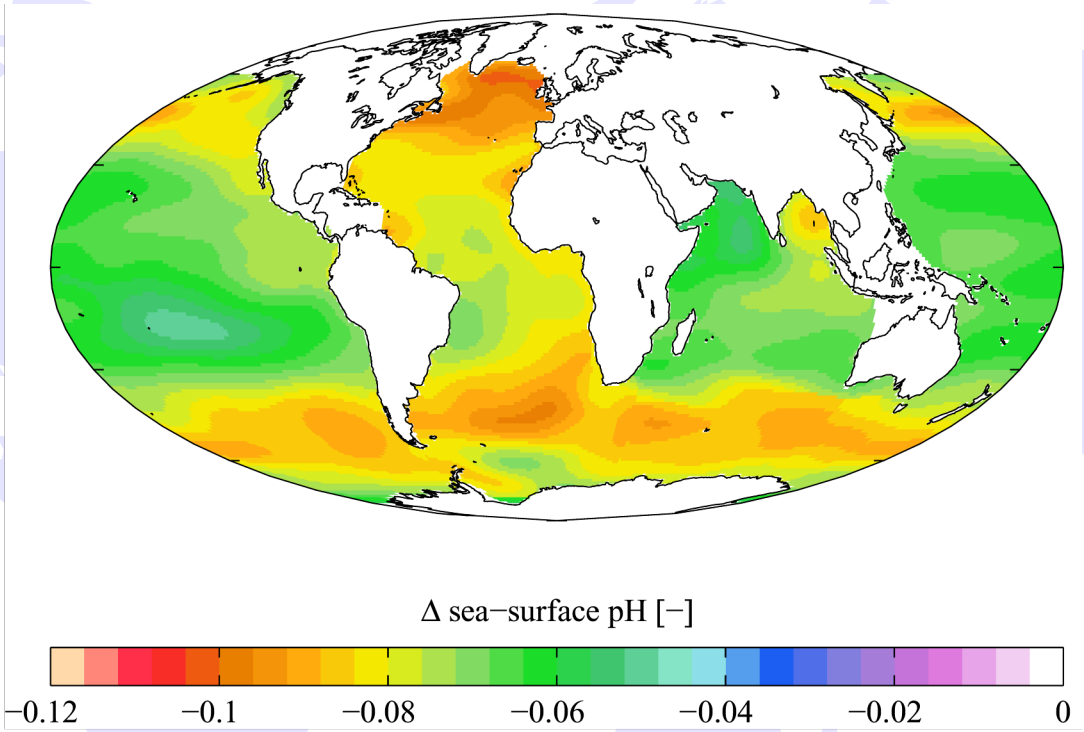
- less dissolved oxygen in sea water, so that certain big fish will not be able to live in tropical seas any more – the fauna will move polewards, if it can

Major threat No 2: climate change (2)

The second effect of climate change on the ocean is a change in ocean chemistry we call acidification. That means:

- Most organisms living in the oceans have a fragile form or skeleton, which depends on the pH of the seawater – whether its more acid or alkaline. Uptake of anthropogenic CO2 in combination with warming has increased acidity and now affects skeleton formation of plankton, bivalves, corals and other marine organisms.

Major threat No 2: climate change (3)



Estimated change in annual mean sea surface pH between the pre-industrial period (1700s) and the present day (1990s). Δ pH here is in standard pH units. Calculated from fields of dissolved inorganic carbon and alkalinity from the Global Ocean Data Analysis Project climatology and temperature and salinity from the World Ocean Atlas (2005) climatology – some data missing.

Major threat No 3: the global marine litter crisis (1)

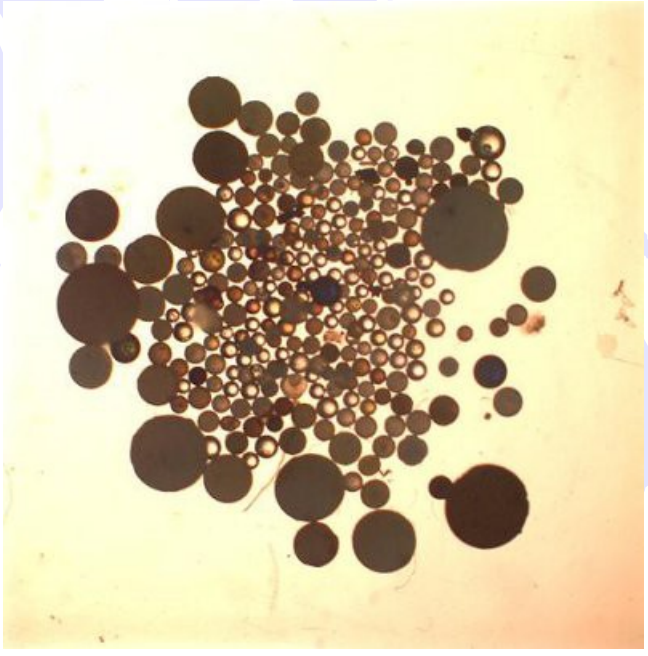
The majority of marine litter is constituted of plastic – estimates range from 60 to 80% in general to 90% for floating debris:

Up to 80% of marine litter is estimated to come from land-based sources

Major threat No 3: the global marine litter crisis (2)

The wave action and radiation breaks down the plastic material over time into small particles, which float throughout the water column.

They are ingested by marine organisms, entering the food web – and us
Plastic also releases toxic substances when breaking up, which again get taken up by marine organisms.



Major threat No 3: the global marine litter crisis (3)

Plastics leach toxic additives, used in the manufacturing of plastic materials (e.g. Tetrabromobisphenol A or TBBPA) when they arrive in the marine environment.

They can take up and accumulate persistent organic pollutants (POPs) such as carcinogenic and endocrine-disrupting polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and organochlorine pesticides while floating in the oceans.

Plastic debris can attract and concentrate POPs up to a million times their levels in the surrounding seawater and when consumed by marine animals, the POPs endanger both the creatures that ingest them and organisms higher up on the food web.

Why does it matter? (1)

At current trends in overfishing worldwide, we will not have the fisheries we know today by about 2050, many have already collapsed. (Worm *et al*. 2006, Science DOI: 10.1126/science.1132294)

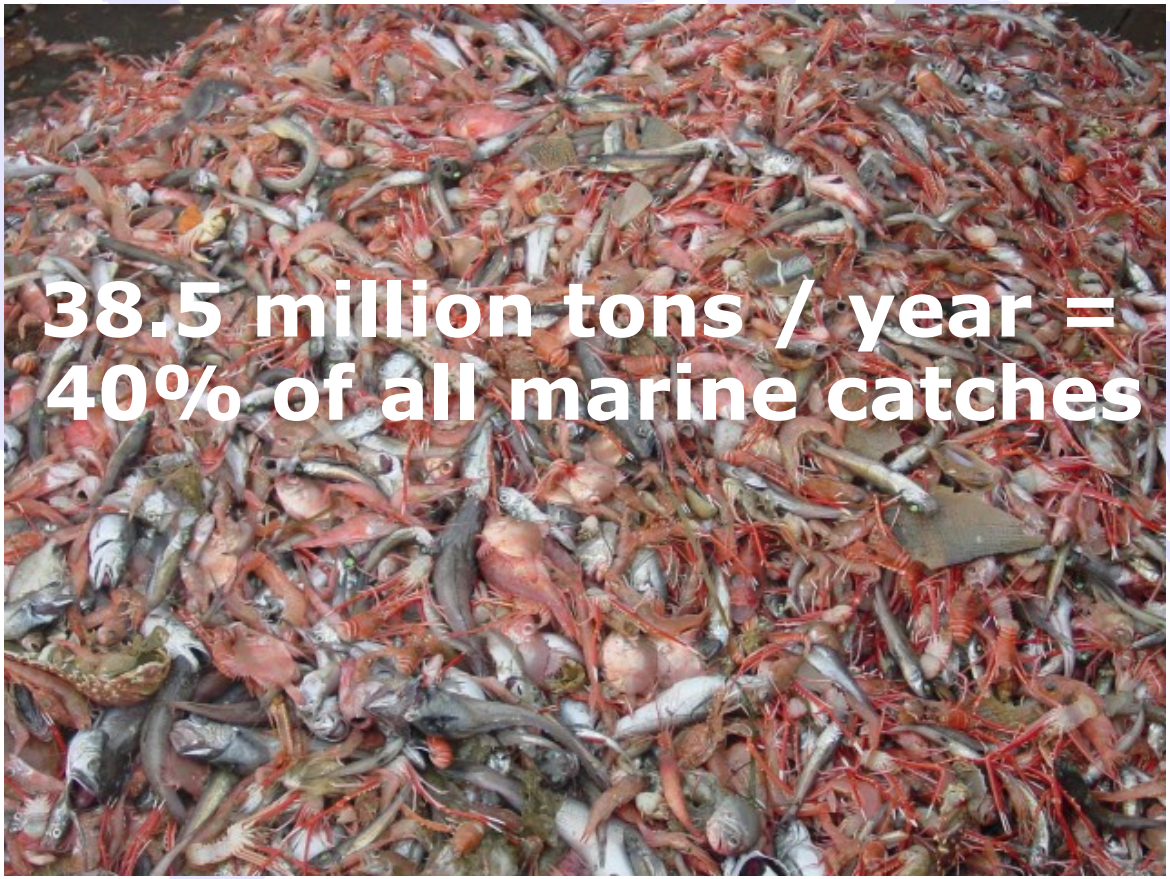
Namibia, a country in Southwest Africa (between South Africa and Angola) had an estimated **15 million tons of fish biomass** which could have sustained good catches.

Overfishing led to the collapse of this resource, now Namibia has an estimated **12 million tons of jellyfish** and much less fish (3.8 million tons) to go around.

(Lynam *et al*., 2006. Jellyfish overtake fish in a heavily fished ecosystem. *Current Biology*, 16(13):R492-R493).

Why does it matter? (2)

By-catch [and discards]



DAVIES, R.W.D., *et al*., 2009. Defining and estimating global marine fisheries bycatch. *Marine Policy*, doi:10.1016/j.marpol.2009.01.003

Why does it matter? (3)

Analysing qualitative and quantitative indicators about well-being of fishing communities e.g. in Senegal, there are clear signs that their initial wealth and well-being is being eroded rapidly:

- 'Thiof' (*Epinephelus aenaeus*), an emblematic fish and once the national dish has all but disappeared
- Instead, people now make do with sardines and mackerel, which used to be disdained (though they are good food), but are in turn overfished
- Children are taken out of (private) schools
- People start migrating out of the fisheries and the country – the so far biggest wave was in 2005/6

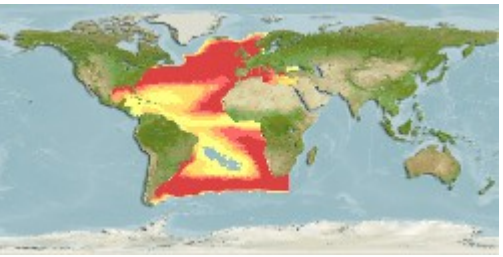
Why does it matter? (4)

53 countries (96% of global fisheries) do not respect the Code of Conduct for Responsible Fisheries adopted in 1995

Pitcher, T., D. Kalikoski and G. Pramod (eds.), 2006. updated April 2008. Evaluations of compliance with the FAO (UN) Code of Conduct for Responsible Fisheries. UBC, *Fish.Centre Res.Rep*., 14(2):76 p.

Why does it matter? (5)

- Trawling & other non-selective active fishing methods destroy habitat in addition to being very energy-intensive; Example: Ecological meltdown in the Firth of Clyde, Scotland (Thurstan & Roberts, 2010)
- Invertebrate catches have increased 6x since 1950 – 34% are collapsed or closed – 53% harvested with habitat destroying methods (Anderson *et al.*, 2011)
- Overcapitalisation of the fleets drive fishing further 'south' and 'deeper down' with times from peak to collapse shrinking (Pauly, Froese and others)



Why does it matter? (6)

- Every second breath we take depends on the phytoplankton and other plants in the oceans – climate change and acidification may disrupt marine food webs and the oceans' ability to stabilise our atmosphere and living conditions on Earth
- Coral reefs and atoll islands may disappear
- We expect poleward migrations of those marine organisms that can move; local extinctions of organisms trapped in bays and locations from which they can not move out in time; and thinning out of tropical waters containing too little oxygen e.g. for tuna and many other big gill breathing organisms.

Why does it matter? (7)

- We already observe starved marine organisms which have their stomachs full of plastic debris
- We observe sex-reversal in some fishes, all female bird colonies etc. as a result of the release of endocrine disrupters, through plastics, sun screens, pollution from pharma products
- When we eat affected marine fish and other organisms, we may ingest the micro-plastic and the polluting substances released and/or adsorbed on the surface.

Some recent field experience to engage teachers and young people in West Africa (1)

We know what to do

- Marine protected areas have been demonstrated to increase resilience of ecosystems against the major threats;
- Mitigate climate change and adapt;
- Stop using certain types of plastic and stop putting plastic into land fills from which they will end up mostly in the oceans;
- Creating greater awareness and engaging with citizens around the globe.

Some recent experience (2)

- Marine protected areas have doubled from around 1% of the global oceans to 2% - but still short of the 10% demanded until 2020 by the Convention on Biological Diversity;
- Efforts of the UNESCO Decade for Re-orienting teacher education towards sustainability
- Pilot activities for FAO to introduce ecosystem approaches into school curricula in Senegal and Gambia.

Some recent experience (3)

- Marine protected areas have doubled from around 1% of the global oceans to 2% - but still short of the 10% demanded until 2020 by the Convention on Biological Diversity;
- Efforts of the UNESCO Decade for Re-orienting teacher education towards sustainability
- Pilot activities for FAO to introduce ecosystem approaches into school curricula in Senegal and Gambia.

Some recent experience (4)

Kids as change agents – teaching them EAF principles – a promising collaboration with FAO

- Maintain ecosystem integrity
- Promote a precautionary approach to fisheries and other use of marine and coastal ecosystems and respect for the rules
- Broaden stakeholder participation
- Promote sectoral integration and safeguarding livelihoods
- Improve in research and access to research for conservation and management decisions based on the best available knowledge.

Some recent experience (5)

10 participating schools

- Needs assessment about communication and support
- Develop a strategy to address needs
- Develop teaching aids and other supports
- Implement the strategy by conducting tests and different pilot activities.

Some recent experience (6)

Examples of school initiatives

A visit to the Gunjur Fisheries Community Centre (Gambia) provided for contacts between kids and the local fisheries administration

Excursion to the landing site in Hann (Senegal) introduced fish measurements in situ

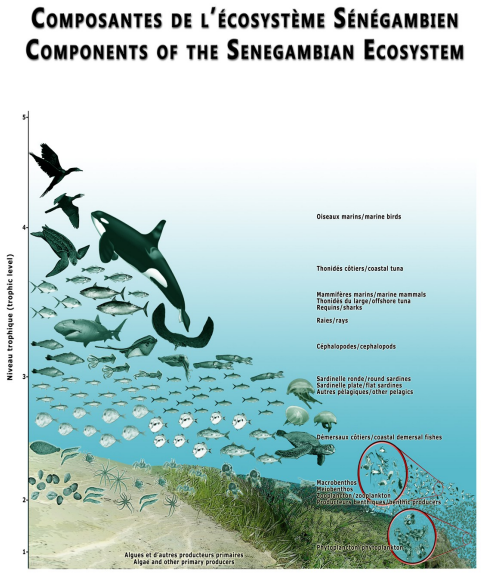
Some recent experience (7)

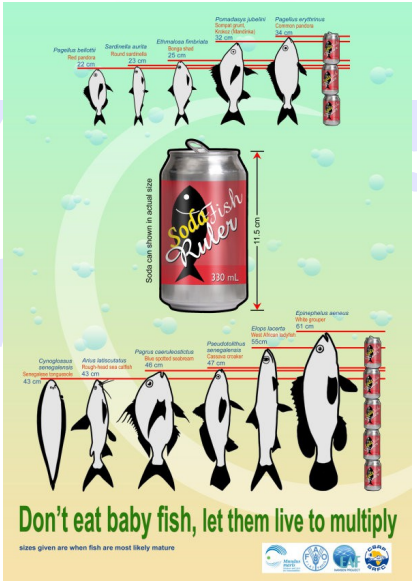
Teaching aids comprise

* Guidance on good practice
* Workbook for teachers
* Visual aids, e.g. posters
* Fish rulers
* Generic support materials
* Monitoring and evaluation sheets

In addition:

* Digital cameras
* Operational funding
* Teacher workshops
* More background reading etc.





What we can do together to save our seas (1)

Teachers want to continue testing the teaching aids at least until October 2013, but need support for that extra-work. Most needed are:

* Operational funds to continue with more practice-oriented forms of teaching, through excursions, sketches, explore rural radio transmissions, etc
* Shelves, books, colours, materials for theater sketches…
* Print more fish rulers and other materials to engage with more schools
* Upgrade IT equipment to bridge the digital divide, incl. Solar equipment, particularly in Gambia
* Teacher workshops for regular reviews and joint learning

What we can do together to save our seas (2)

Fish mongers in the historical Kermel market in Dakar want training and fish rulers to fight the wide-spread landing and marketing of baby fish – this is the result of outreach activities triggered by the school tests. What is needed:

* Operational funds to repeat the training in Kermel market and respond to demand for training and fish rulers in other markets (Central market in Dakar, Hann,...)
* Miniposters for decoration of vans of fish mongers to carry the concept to leave baby fish live and grow through the country
* Press event with fish monger association, video coverage

What we can do together to save our seas (3)

Give experienced community leaders a voice through video documentation: e.g. Awa, a leader of the women in St Louis

What we can do together to save our seas (4)

Support small scale fisheries, which are mostly much more sustainable than industrial ones and fight their marginalisation.

- **They use less energy/unit catch**
- **They are less destructive**
- **They are more selective**
- **They employ more people**
- **They produce high value fish.**

What we can do together to save our seas (5)

- Buy insurance against risk and uncertainty by supporting the creation of more marine protected areas (Lauck *et al*., 1996; Sumaila 1998);
- Value our great grandchildren's fish as their fish, not ours (Sumaila and Walters, 2005);
- Help reduce sectoral approaches in preference to those that cut across all activities of society and particularly those that are climate proof and also reduce pollution;
- Help to phase out bad government subsidies to fisheries (Asia US$ 11.5 billion, Europe $ 5 billion, Latin America and Caribbean $ 4.5 billion) and energy guzzling practices

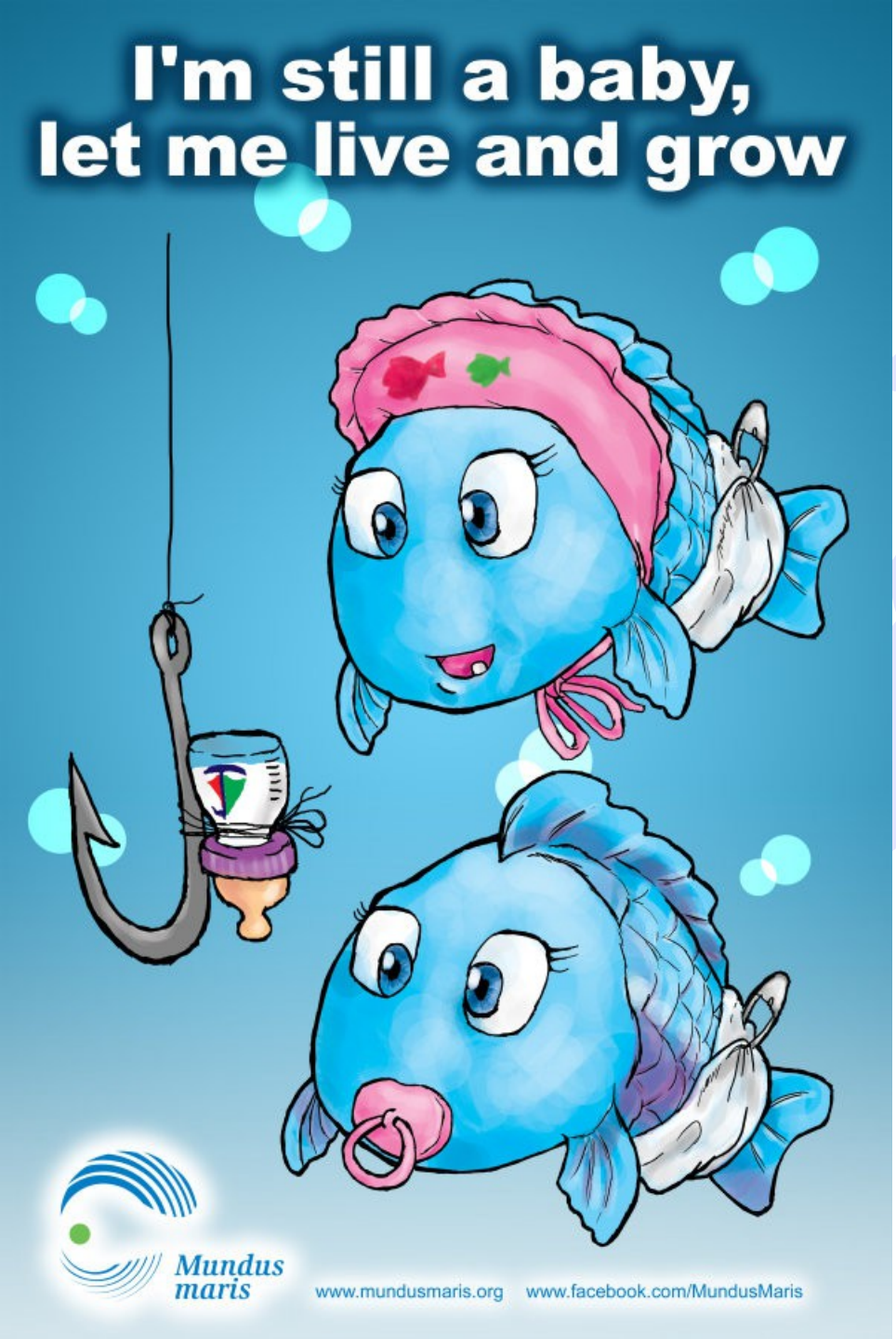
For more …

http://www.mundusmaris.org

Look us up and like us on Facebook

We encourage and welcome

Volunteering with us, donations to support our work, constructive criticism, advice and sharing expertise and experience



Thanks!

info@mundusmaris.org