



Unexploited fisheries resources

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Unexploited fisheries* resources

- “Food from the Oceans” two reports from the EU Scientific Advice Mechanism (SAM)
- Highest potential at low Trophic Level (TL)
- Mesopelagic organisms
- Growing organisms at low TL
- Action points

**A fishery is an activity leading to harvesting of fish. It may involve capture of wild fish or raising of fish through aquaculture (FAO, 2014)*

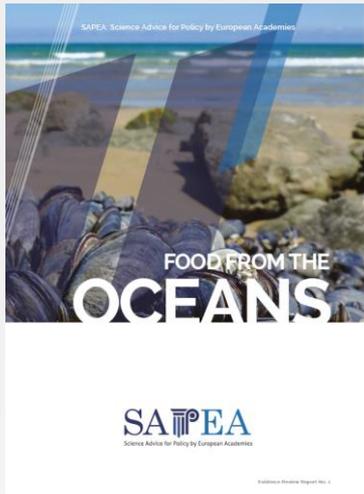


"Food from The Oceans"



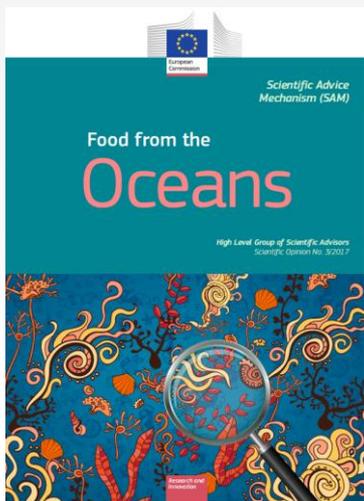
How can more food and biomass be obtained from the ocean in a way that does not deprive future generations of their benefits?

- question directed to the EU Scientific Advice Mechanism by the EU Commission



SAPEA Evidence Review Report (2017)

- Provide options, but no policy recommendations
- Literature review, WG meetings, expert meetings, and peer review



SAM Scientific Opinion (2017)

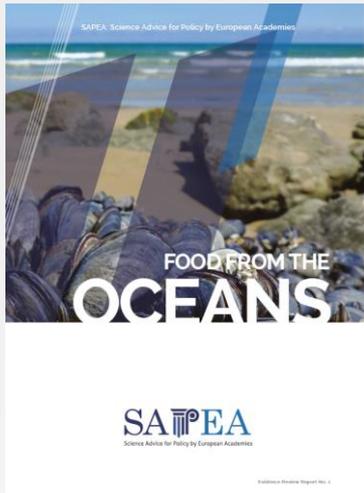
- Provide recommendations on EU policy
- Based on Evidence Review Report, stakeholder meeting, and the EU policy context

"Food from The Oceans"



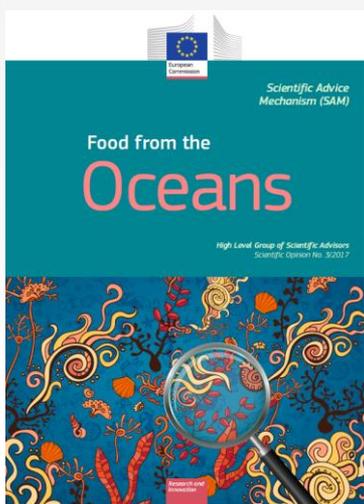
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SAPEA Working Group Members

Dag Lorents Aksnes (WG1 Chair), Poul Holm (WG2 Chair), Maarten Bavinck, Frank Biermann, Roberto Danovaro, Patricia Harvey, Stephen Hynes, John Ingram, Matthias Kaiser, Sachi Kaushik, Gesche Krause, Sylvie Lapègue, Alison MacDiarmid, Yngvar Olsen, Martin Quaas, Daniela Schmidt, Patrick Sorgeloos, Michael St John



SAM High Level Group of Scientific Advisors

Rolf-Dieter Heuer (Chair), Janusz Bujnicki, Pearl Dykstra, Elvira Fortunato, Carina Keskitalo

"Food from The Oceans" - context



Food production needs to increase with ~60% within 2050

- Population growth from 7 to 9 billions
- Nutrition issues
 - Hunger and undernutrition (1 billion)
 - Micronutrient deficiency (2 billions)
- Economic growth → more fish/meat in the diet

Agriculture – a large environmental footprint

- Accounts for a large part of Earth's land surface and World's use of fresh water
- Substantial increase in irrigation demands is required
- Accounts for around 30% of greenhouse gases



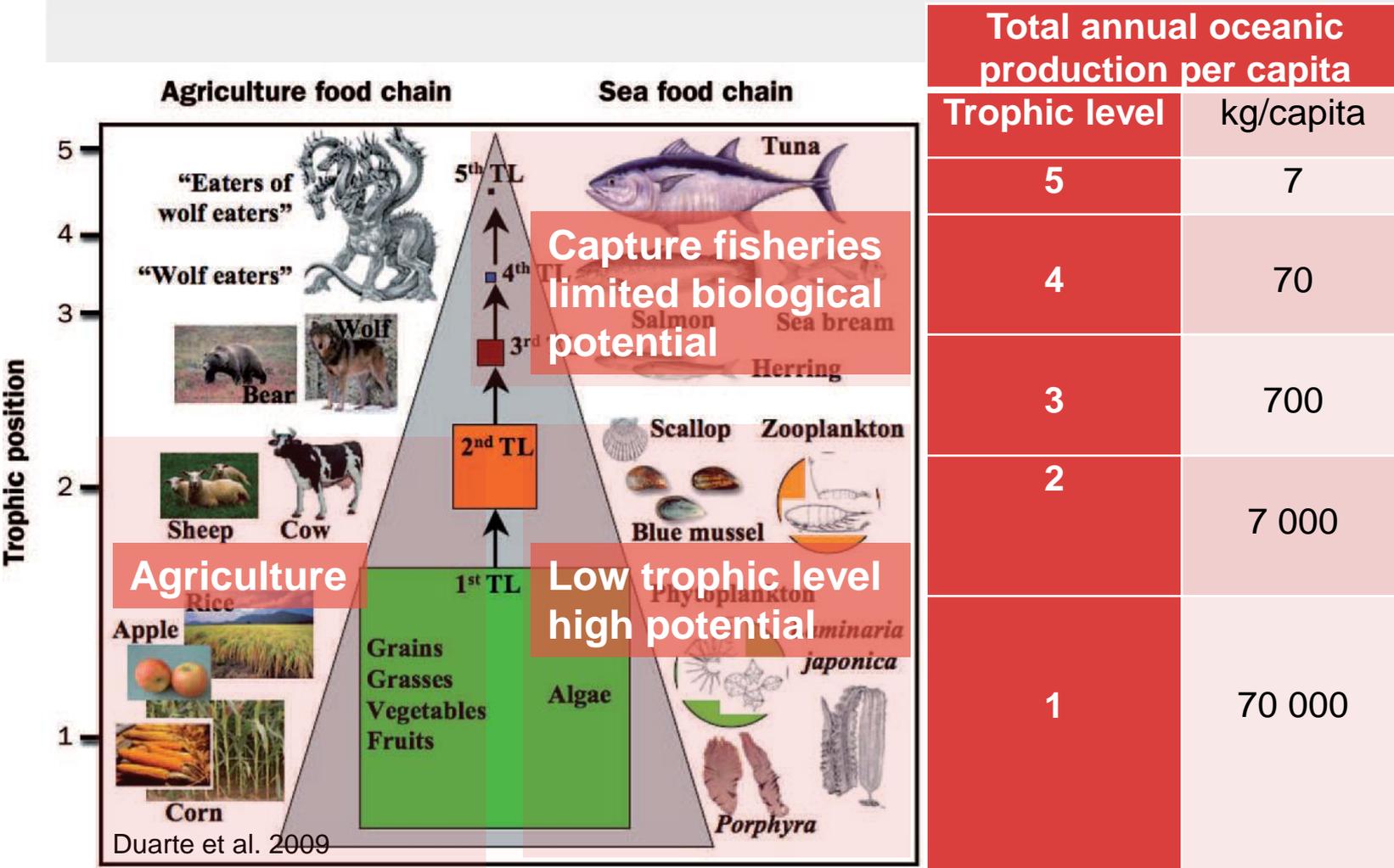
Food production involves many SDG



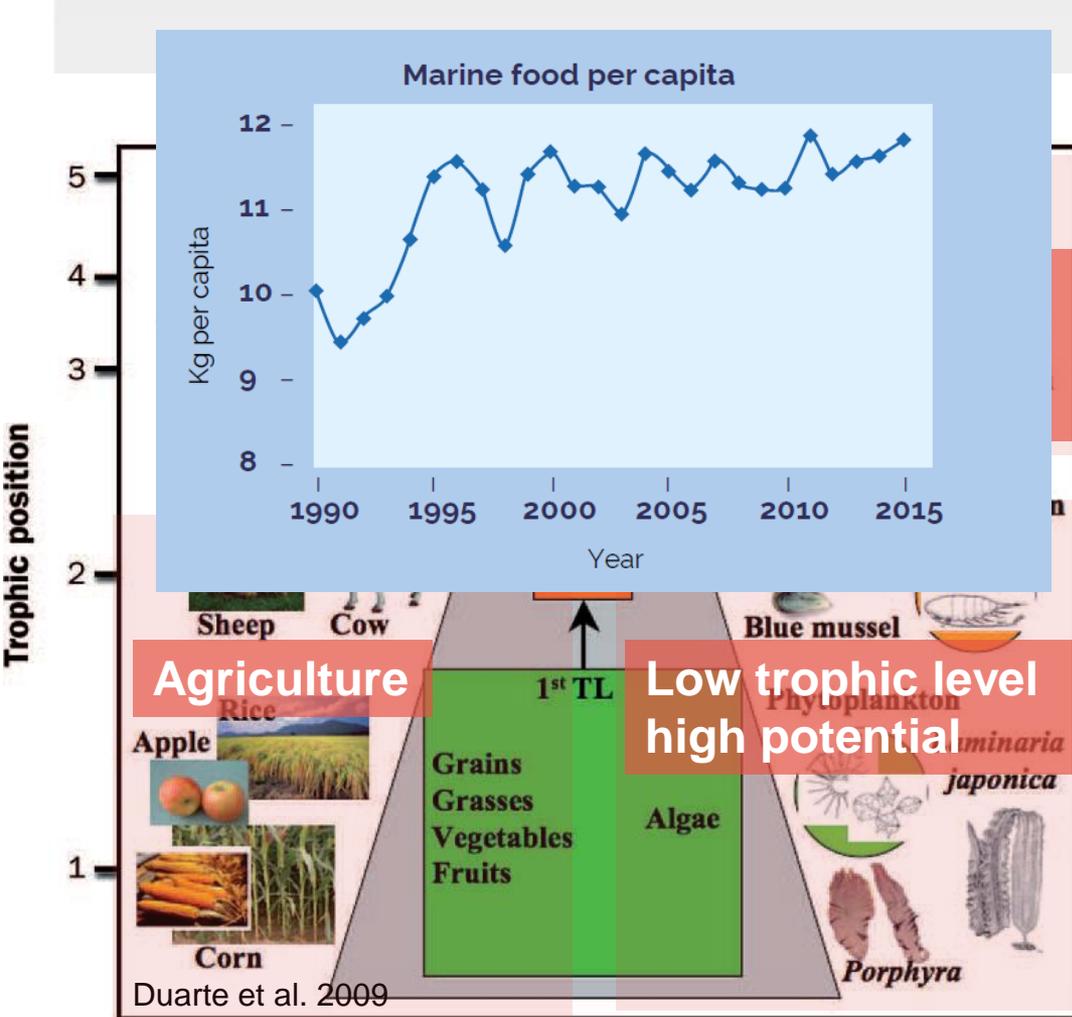
In a global food systems perspective:

Can increased seafood production contribute to reduced environmental footprint and increased sustainability?

The biological potential for producing significantly more seafood/feed is primarily at the lowest Trophic Levels (TL)



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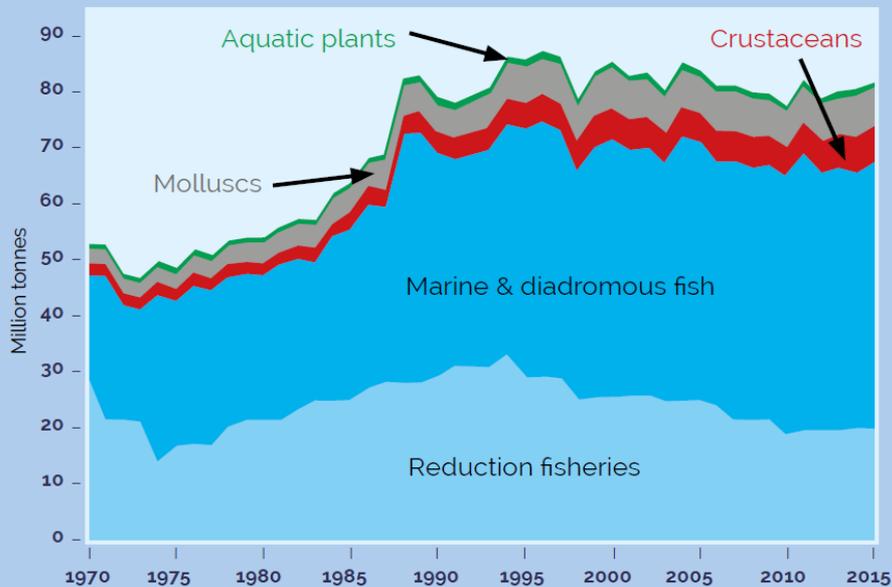


Total annual oceanic production per capita	
Trophic level	kg/capita
5	7
4	70
3	700
2	7 000
1	70 000

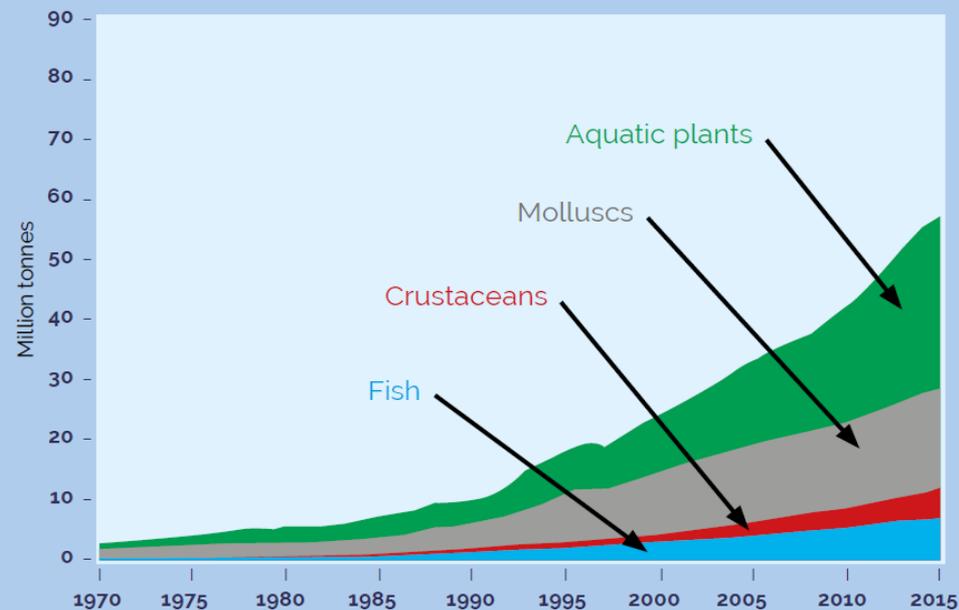
High growth potential at the lowest trophic levels is confirmed by past trends in seafood production



Marine landings reported to FAO



Mariculture production reported to FAO



Growth in capture fisheries ceased in late 1980's

Exponential growth in mariculture (freshwater aquaculture excluded)

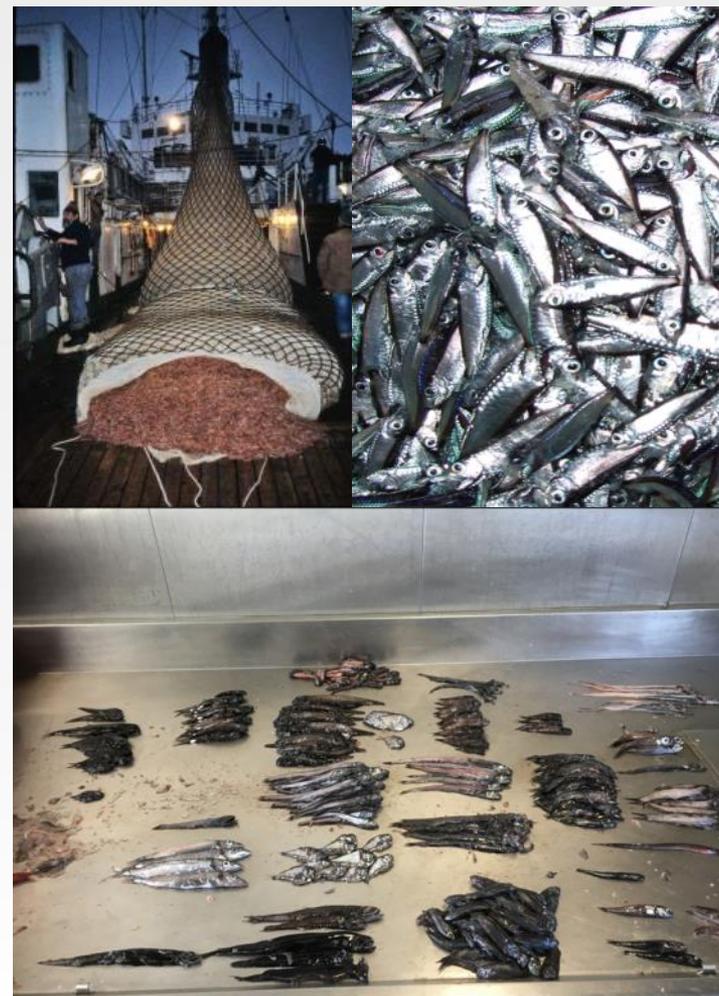
Capture fisheries on species that are not, or marginally, exploited?



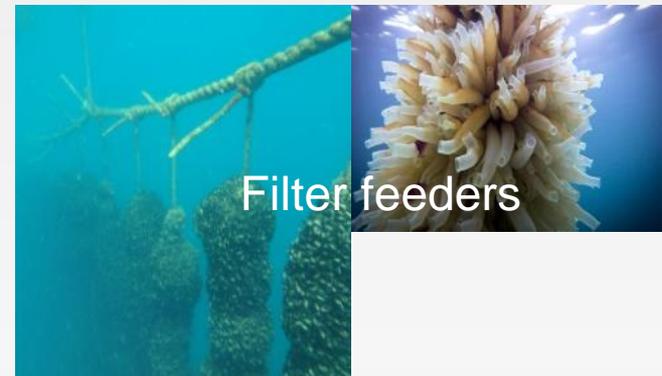
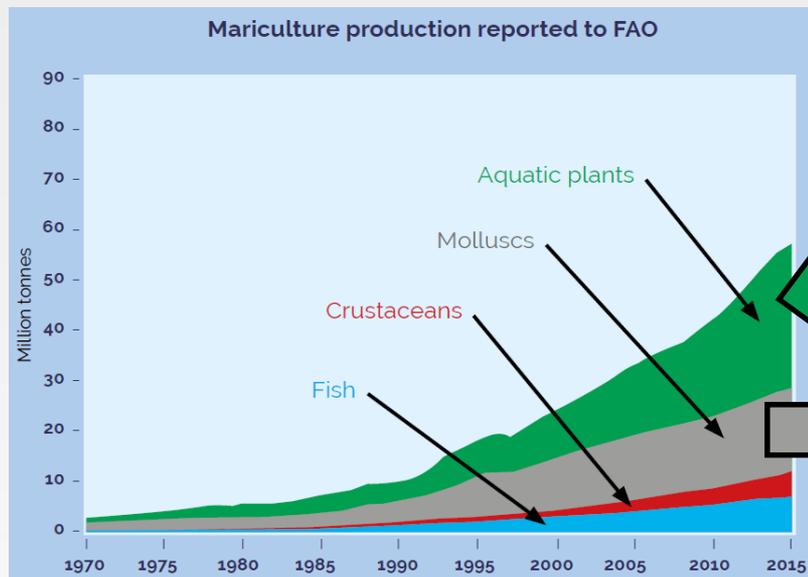
Mesopelagic fishes and krill

- Biomass is large (> 1 000 Mt), but species are small and diverse
- Biology is largely unknown for most species
- Lack of adequate harvesting technology
- Precautionary approaches apply (e.g. CCAMLR/ Antarctic krill fishery)
 - Concerns for negative effects on other ecosystem services and on traditional fisheries

→ *The potential for sustainable harvest might be large, but is uncertain*

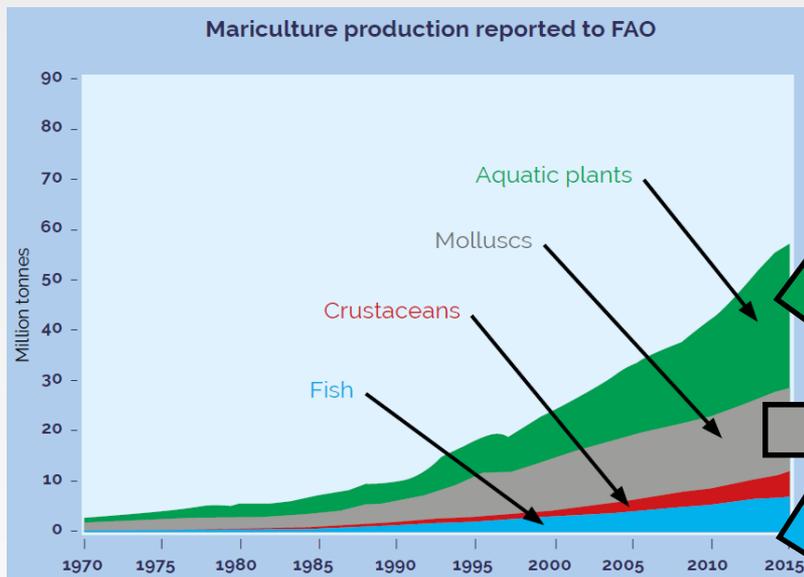
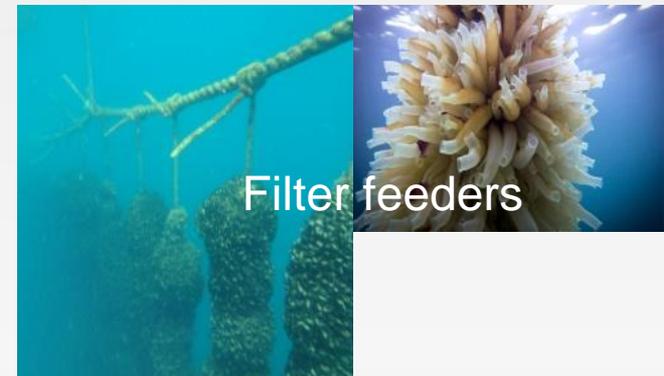


High potential: Growing organisms at low Trophic Levels (TL)



- Low TL benthic organisms that are cultivated in the pelagic habitat provides a large production potential (advection systems)
- In contrast to agriculture, such mariculture is independent of artificial fertilizer, feed and freshwater

High potential: Growing organisms at low Trophic Levels (TL)

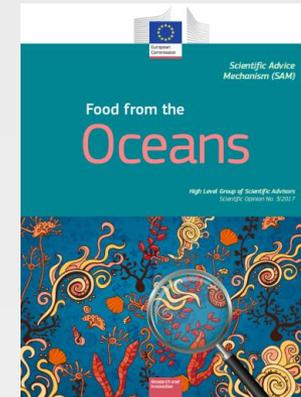
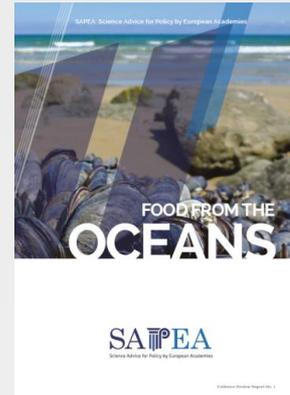


- Modern fish/crustacean feed consist of 70% agriculture plant material and 30% wild captured fish
- Can this feed be substituted by algae and filter feeders?



Action points

inspired by "Food from the Oceans"



Within a food systems perspective

- reduce the environmental footprint of global food and feed production by growing low TL benthic organisms in the free water masses (advection systems)
- explore if wild capture pilot fisheries of mesopelagic fishes and krill can contribute to more sustainable food production





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Thanks for the attention!