Havet; vårt sikre matfat?

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«Sårbarhet, risiko og løsninger: På innsiden av FN s klimapanels rapporter» 21. mai 2014
3 citations from AR5 WGII Ch. 7 (1)

1. Key adaptations for fisheries and aquaculture include policy and management to maintain ecosystems in a state that is resilient to change, enabling occupational flexibility and developing early warning systems for extreme events.
2. In addition to measures of calorie availability, *food security* can be broadened to include *nutritional aspects*. There is *robust evidence* and *high agreement* that *lack of essential micronutrients such as zinc and vitamin A* affect hundreds of millions
Primary sources of vitamin A and zinc

= fish and seafood
3) Food insecurity is closely tied to poverty; fisheries make particular contributions to food security and more than 90% of the people engaged in the sector are employed in small-scale fisheries, many of whom are found in the poorer countries of the world.
Primary AR5 Ch. 7 concerns:

- Resilient productive ecosystems
- Healthy food security for the poor

The underlying rationale for the Fishing for a Future initiative is the hypothesis that the effectiveness and trajectory of our efforts today are insufficient to ensure a sustainable fish food system that fully meets global needs in 2030 and beyond.
The oceans contribute 50% of the global biological production.

But humans only collect 2% of our food from the oceans.
We fish selectively on the large and few

«Promotion of species and size selective fisheries is an important foundation for Norwegian fisheries management»

Gullestad et al. 2012

Selectivity increases from LIC to HIC
= from south to north
In the aquatic food chain...

..the distribution of biomass is a pyramid.

1 kg large fish = 4-5 kg small
..and the distribution in the pyramid is based on size

...abundance is inversely proportional with size
.... it follows a constant pattern we can measure

Slope and intercept changes under selective harvesting
The North Sea ecosystem

Progressively less large fish and more small fish in the North Sea

Garcia et al. 2012
Selektivt fiske og minstemål

- Endrer det naturlige dødelighetsmønster
- Endrer populasjonenes aldersstruktur
- Nedsetter det reproduktive potensiale
- Gir lavere totale fangster
- Endrer artssammensetningen
- Fører til unødig utkast
- Skaper ubalanse og destabiliserer
- Fører til fiskeriindusert evolusjon

Kan det kalles økosystembasert tilnærmning?
Reconsidering the Conservation of Selective Fisheries


Concern about the impact of fishing on ecosystems and fisheries production is increasing (1, 2). Strategies to reduce these impacts while addressing the growing need for food security (3) include increasing selectivity (1, 2): capturing species, sexes, and sizes in proportions that differ from their occurrence in the ecosystem. Increasing evidence suggests that more selective fishing neither maximizes production nor minimizes impacts (4–7). Balanced harvesting would more effectively mitigate adverse ecological effects of fishing while supporting sustainable fisheries. This strategy, which challenges present management paradigms, distributes a moderate mortality from fishing across the widest possible range of species, stocks, and sizes in an ecosystem, in proportion to their natural productivity (8), so that the relative size and species composition is maintained.

which are not going to be used,” i.e., by-catch (13). Fisheries worldwide have used species and size limits (9, 14), gear technology (5, 15), and spatial and temporal fishing restrictions (16) to reduce fishing impacts while pursuing human benefits.

But selective removals will inevitably alter the composition of a population or community and, consequently, ecosystem structure and biodiversity. Old individuals contribute the most to reproduction (17). Even moderate fishing reduces the proportion of species and individuals in the North Sea (22) (fig. S1). By contrast, in several African small-scale inland fisheries, the fish size spectrum (23) has been maintained under intense and diverse fishing activities that cause high mortality with low selectivity (5, 24) (fig. S1).

Results from models suggest that moderating fishing mortality across a wide range of species and sizes maximizes overall catch summed across species while better conserving biodiversity. Multispecies fishery models show that increased mesh sizes may reduce

Balanced harvesting … distributes a moderate mortality from fishing across the widest possible range of species, stocks, and sizes in an ecosystem.
Balanced optimal harvesting is....

...to fish across all species and sizes in proportion to their productivity.

Yields are increased by factor 4-6
Ecosystem structure and resilience is maintained
By changing the way we fish, we can:

• Build resilient and productive ecosystems
• Maintain ecosystem structure and function
• Increase our sustainable harvest substantially
• Provide healthy food and micro-nutrients to millions of poor people (who are not so fastidious as we!!)

..but we have to change our policies and management!
Mange takk for oppmerksomheten