

The Legacy of Overfishing Week 2



Bycatch - fish

- **90% of the world's large predatory fish lost (Myers and Worm, 2003)**
- **Population decline of harbour porpoises in the Mediterranean and Black Sea areas → prey depletion (Notarbartolo di Sciara *et al.*, 2002).**
- **Whiting, the third most important commercial demersal fish in the North Sea, hit an all-time low during 1998 in this area and is currently a species taken as bycatch, particularly from the industrial fishery for Norway Pout (Santos and Pierce, 2001)**



Atlantic Dawn



The Atlantic Dawn catches in one month what 7,000 artisan fishermen would catch in a good year.

(Hargreaves, 2006)

A large shark is being processed on a ship's deck. A person wearing a red life vest and yellow gloves is holding the shark's head. The shark's mouth is open, showing its sharp teeth. The shark's skin is being peeled back, revealing the underlying flesh.

50% decline in north-west
Atlantic in last 20 yrs

£140/kg in Asia

From 600,000 – 800,000
tonnes in last 20 yrs

**Removal of the 'old men
of the sea'**

(Humphrey, 2009)



Lion's Mane Jellyfish

Reduction sharks in N. Atlantic –
explosion in cownose rays *Rhinoptera*
bonasus. Scallop industry in North
Carolina collapsed as a result

(Jha, 2008)



Krill



- Omega-3 fatty acids
- Enzymes – medical purposes
- Cleansers for contact lenses
- Basis of marine food chain
- Future ? Harvesting from 100,000 tonnes to several million tonnes

(Fogarty, 2008)

Fisheries Legislation

- Coastal states have sovereign jurisdiction – 12 nautical miles (nm) from baseline.
- A state can further extend its limit to 200nm – Exclusive Economic Zone (EEZ)
- Exploitation Rights
- Beyond EEZ – High Seas – freedom of movement and resource access (Rose, 1996).



Exclusive Economic Zone in Europe



Fisheries Legislation - Regional

- **Common Fisheries Policy** (2002) – fisheries required to minimise adverse ecosystem impacts.
- Inshore Fisheries & Conservation Authorities (formerly Sea Fisheries Committees) – statutory bodies which regulate territorial waters
- Enforce byelaws and undertake gear and catch inspections
- Jurisdiction out to 6 mile limit (CCW, 2003)



Fisheries Legislation - International

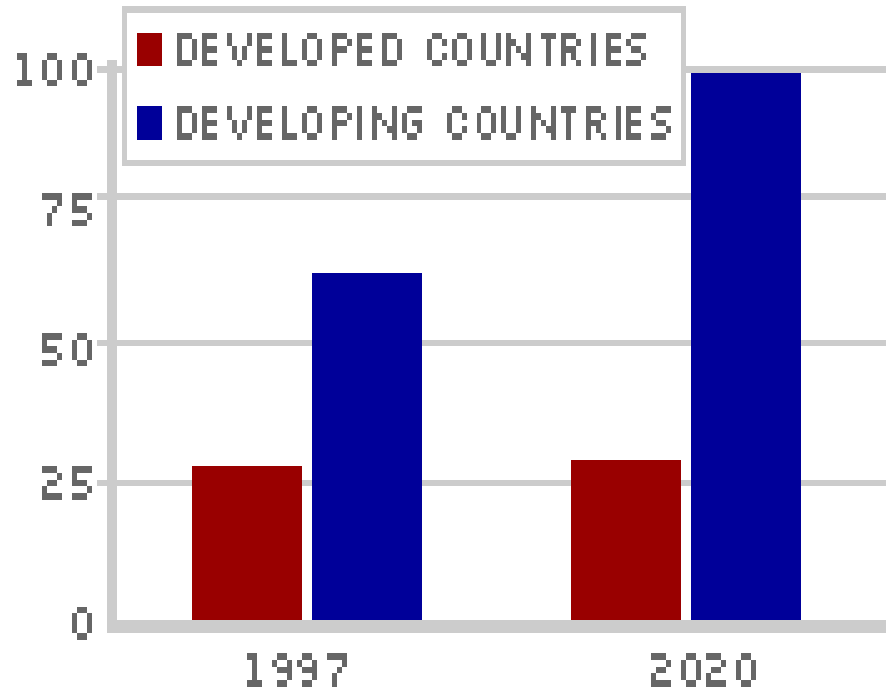
- **EU Habitats Directive**
- **ASCOBANS** (Agreement on Conservation of Small Cetaceans of the Baltic and North Seas)
- **UN Convention on the Law of the Sea (CLOS)(1995)**
 - Requires Member States to take responsibility for marine ecosystem and biota preservation within their national boundaries
 - Extends to EEZ
 - Legally binding for states who have ratified agreement

- "75% of EU fish stocks are overfished, compared to 25% on average world wide. This overfishing in the EU damages fish stocks, leads to uncertain catches and makes our fishing industry financially vulnerable. Fragile fish stocks lead to suboptimal catches and this in turn leads to more fishing. Today, overfished stocks are mostly made up of smaller and less valuable fish. These are discarded back into the sea either because of their low commercial value or because they are below the minimum size" (Europa, 2011:1)

Future Impacts?

Consumption of Fish

MILLION METRIC TONS



Fisheries Conservation Methods

- Basis for management: Common Fisheries Policy 1983; 2002; 2012
- Complicated, bureaucratic and expensive
- Protection of stocks:
 - Quotas
 - Technical conservation methods
 - Fleet reduction programme

Quotas

- Failed in their conservation objectives
- Landing of 'black fish' common practice
- 40% landings illegal in some ports
- Underestimation of landing statistics
- Quota hopping



Maximum Sustainable Yield

- Largest catch that can be taken over an indefinite time without harming the population
- Multiannual plans – fixing fishing mortality
- Achievable by 2015
- 11 stocks already – North Sea haddock, Rockall haddock, North Sea herring, megrim off Spain
- Fished sustainably with increased landings & income



EU cod fishing quotas increased in North Sea



(Jenkins, 2000)

MSY for data deficient stocks

- Obligation to land all catches
- New partnerships – scientists and fishermen
- Mixed fisheries – more selective gear
- Mixed fisheries – quotas for all species
- Selectivity trials
- Marketing initiatives – brand MSY fish

Technical Conservation

- Minimum mesh size
- Size of fish to be landed
- Transferable fishing concessions
- Producer organisation – pool concessions
- Restrict access to juvenile aggregation areas
- Real time closures



Discard ban

- Support from the European Maritime and Fisheries Fund (EMFF):
 - Extra storage capacity
 - Fund marketing campaigns
 - On-board observers
- Enforcement – Electronic tracking, reporting
- Self compliance through industry involvement – Producer Organisation



What happens when unintentional catches occur despite improved selectivity?

- High survival rate released
- Undersized fish – fishmeal or pet food production
- In excess of quota – marketed as normal but have to buy or lease additional quotas
- Overshoot of national quotas – swapping quotas with other Member States or deduct from next year's quota



Incentives to accompany discard ban

- Financial support for
 - Innovation
 - Increased gear selectivity
 - Participation in trials
 - Collaboration with scientists



Fleet Reduction

- Decommissioning
- Technological efficiency outweighing any decommissioning
- 'Rule beaters' – vessels below 10m escape certain forms of legislation



Atlantic Dawn



What About Pirate Fishing?

- Unregulated
- Flags of Convenience
- Cheap registration fees
- Low or no taxes
- Freedom to employ cheap labour
- Safety issues with language barrier
- Environmental Justice Foundation – look up reports



Pirate Fishing

- £8.3 billion p.a
- Chiefly in prawns
- Fleets from Japan, Korea, Taiwan and Europe
- Lack of governance beyond 200nm limit
- Somalia - £500 million loss p.a.



Aquaculture/Mariculture

Demand fish products increases

Global population increases

Over harvesting persists

Farmed fish can plug the void

2.5 million tonnes caged fish



- 
- Job creation
 - Product - fish, molluscs and crustaceans
 - Wastes – uneaten food, faeces, chemicals, disease organisms
 - So is aquaculture the answer to the overfishing?

Aquaculture

- 1 million tonnes salmon p.a.
- Pollution - Eutrophication
- Dilution of genetic integrity
- Habitat loss
- 50% reduction wild populations (Ford and Myers, 2008)



Aquaculture

- Sited sensitively
- Intensification of production
- Boat disturbance
- Feed consumption – 23% fishmeal production; 28% fish oil use
- Scavengers
- Predators
- Vectors of disease
- Waste – sea grass impacts



Self Study / Revision

- How does pirate fishing affect the global fishing industry and how extensive is the problem?
- Is aquaculture the answer to overfishing?