



# Development of Regional Joint Master Program in Maritime Environmental Protection and Management - MEP&M -

## Blue Bioeconomy: Fisheries

**WP3. Capacity Building through staff training and equipment purchase .  
DEV 3.4.4 KNOW-HOW TRANSFER TO TEACHING STAFF RELATED TO THE  
MEP&M**

**Remedios Cabrera-Castro, Department of Biology (University of Cádiz)  
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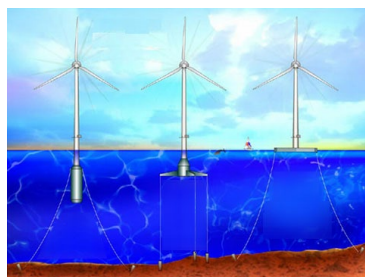
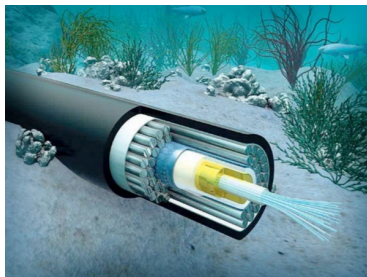
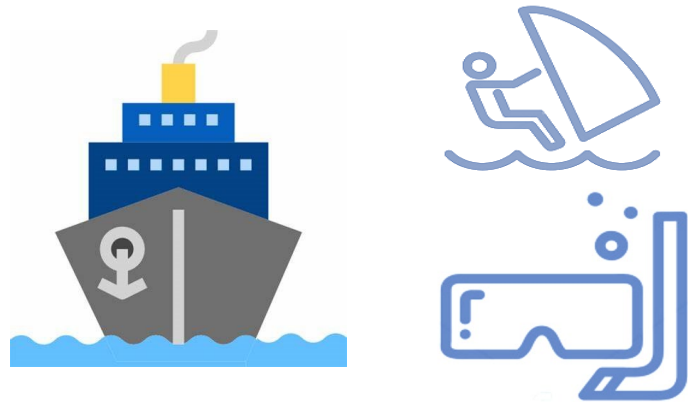
- 1) Why fisheries?
  - 2) History, systems and current status
  - 3) Fisheries impacts
  - 4) Sustainable fisheries
  - 5) Fisheries in 2030 Agenda and the Sustainable Development Goals
- 
- A silhouette of a fisherman standing in shallow water, holding a large fishing net. The background is a sunset over the ocean, with the sun low on the horizon, creating a warm orange and yellow glow. The fisherman's reflection is visible in the water.

# 1) Why fisheries: *marine resources*



Components of the oceans capable of producing economic benefits

## Non-extractive



## Extractive

Non living resources:  
Oil, gas, minerals...



Living resources







- Exploited biological resources
- +  
- by human action driven by socio-economic laws
- +  
- in a geomorphological context

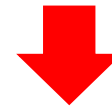


Stilt fishing. Unique method of fishing on the island of Sri Lanka.





BIODIVERSITY



ECOSYSTEM

Human dimension,  
social, institutional  
and governance  
framework

CLIMATE

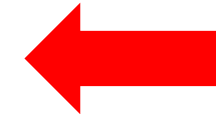


Biotic  
interactions:  
target  
species, other  
species,  
habitat

FISHING  
SYSTEM

Abiotic  
elements:  
seabed,  
water,  
topography

MARKET



OTHER ANTHROPOGENIC ACTIVITIES

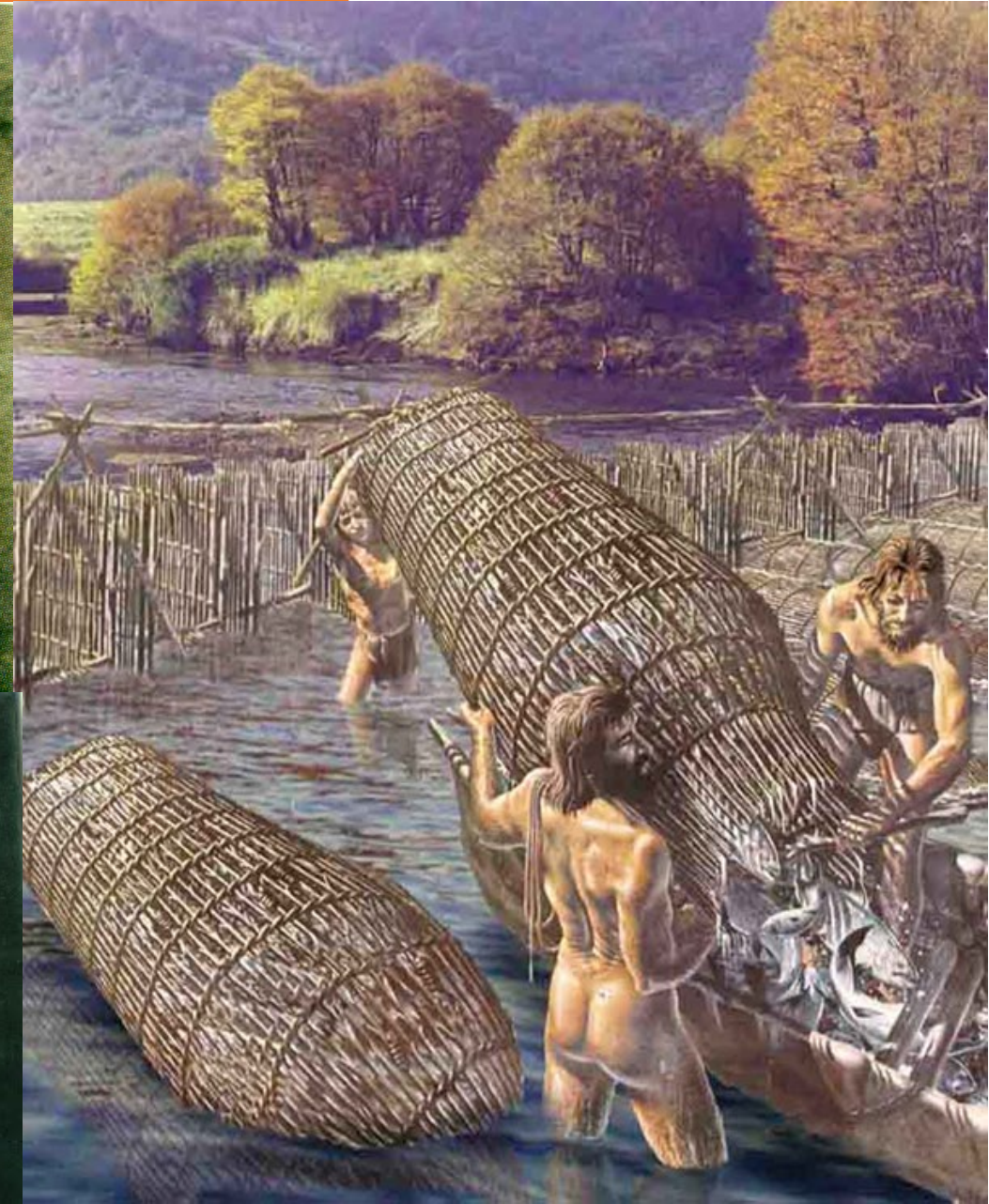
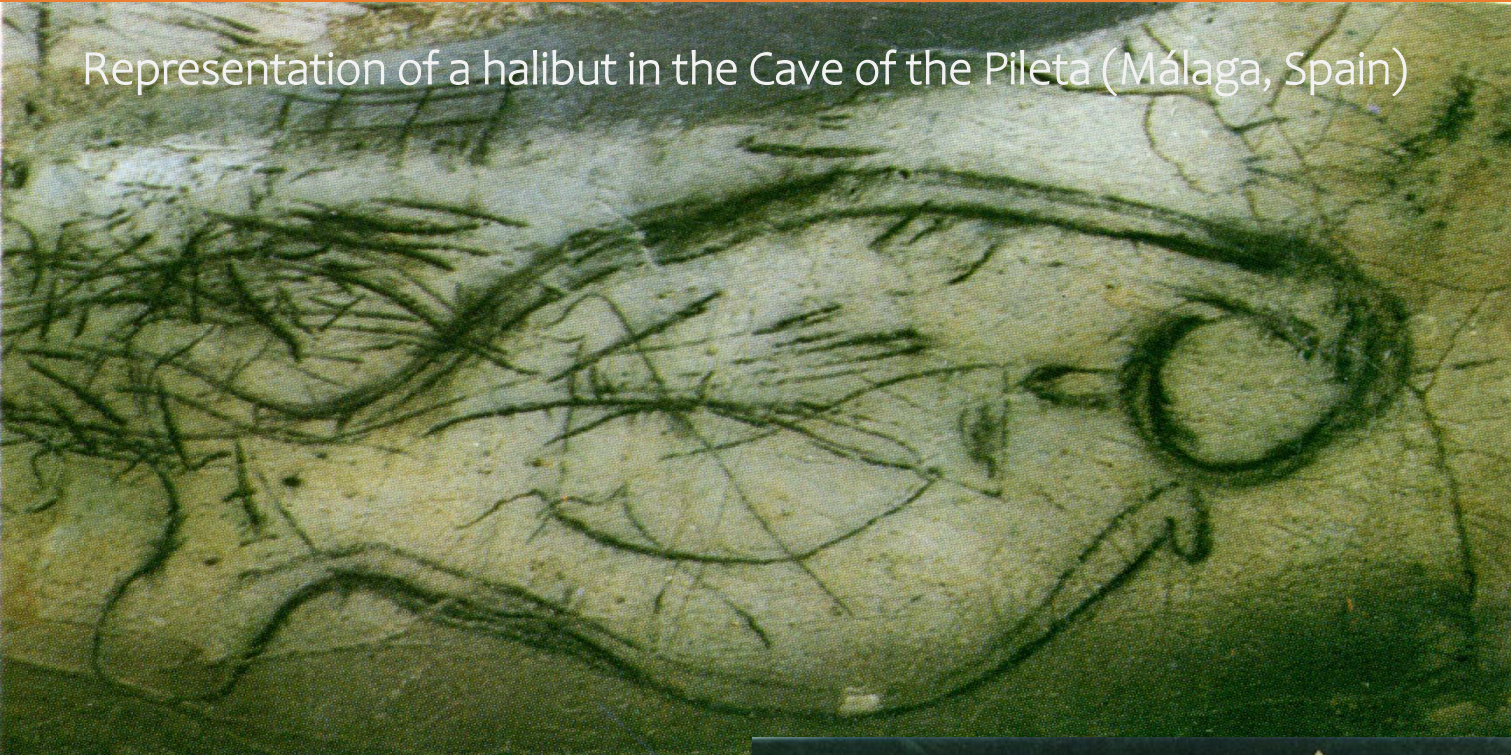


## 2) History, systems and current status

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Representation of a halibut in the Cave of the Pileta (Málaga, Spain)







The oldest fishing gear identified are harpoons found in the Congo, associated with the skeletal remains of extinct giant catfish.

90,000  
years



*Magdalenian harpoons from the Pendo Cave (Cantabria, Spain)  
Final Palaeolithic*





Pompeii market mosaic (Italy)



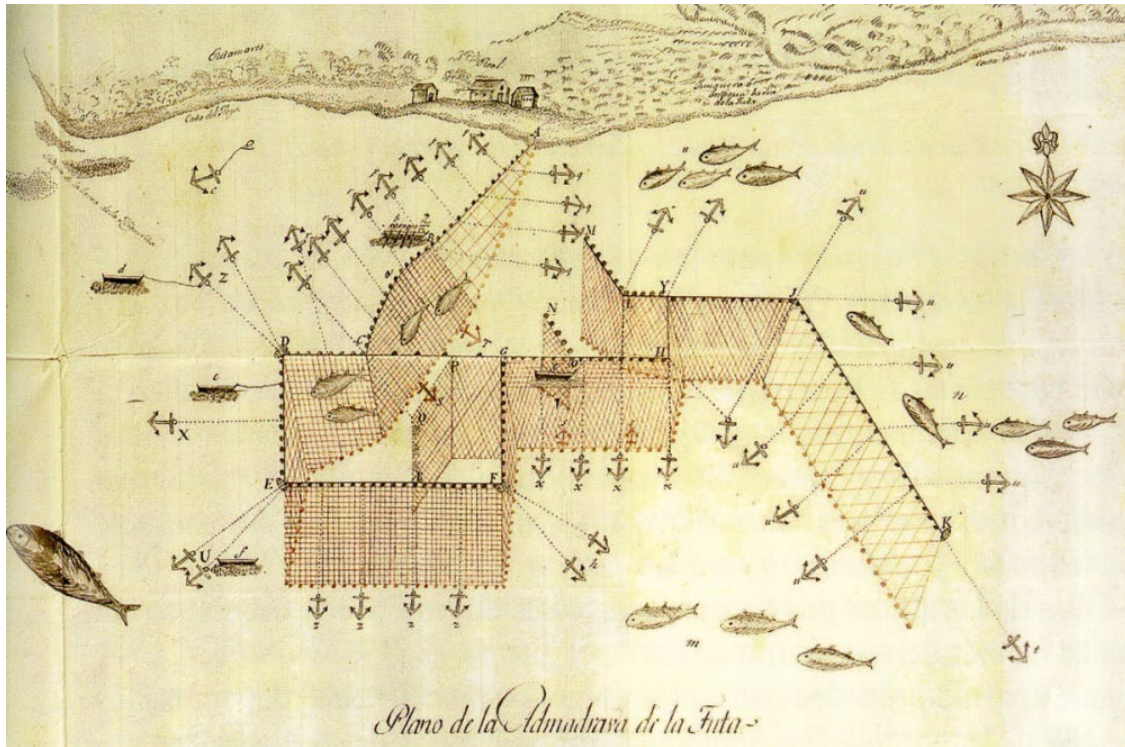


# Development of fishing



In Roman times there was a development of catching techniques and commercialisation processes focused on a more industrial fishing: Tuna fishing.

Around this industry, tuna migrations through the Strait of Gibraltar are known.

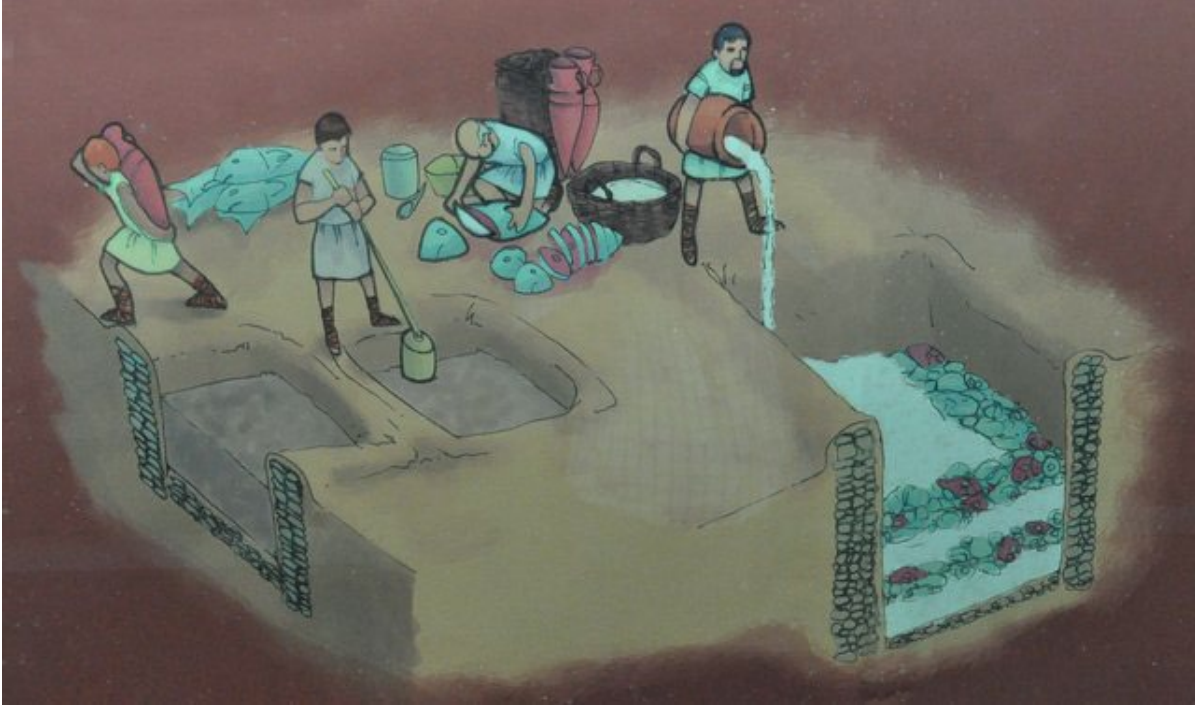


Tuna salting pool in the city of Baelo Claudia (Tarifa, Spain)  
An example of a Roman city built around a fishing activity.

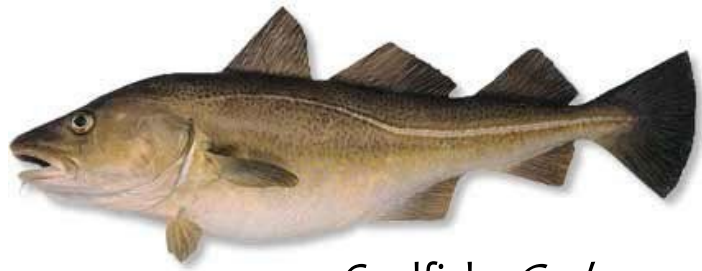
Traditional fishing gear for catching tuna: *Almadraba* (tuna traps)



*Fisheries Development (processed)*







Codfish, *Gadus morhua*

1 in 4 days

it was obligatory to eat fish



Roman Christianisation



Strict rules of the Vigil and Lent



~91 days / year





## 18th Century

- decline of traditional resources  
(sardine and tuna)
- introduction of new gear  
(pair trawling)
- movement of fleets from one region to another

- boats were propelled by sail
- nets were made of esparto grass
- hooks were not made of steel
- preservation techniques: salting and smoking
- limited marketing





19th Century - materials and transport

## Decline and collapse of menhaden and plaice

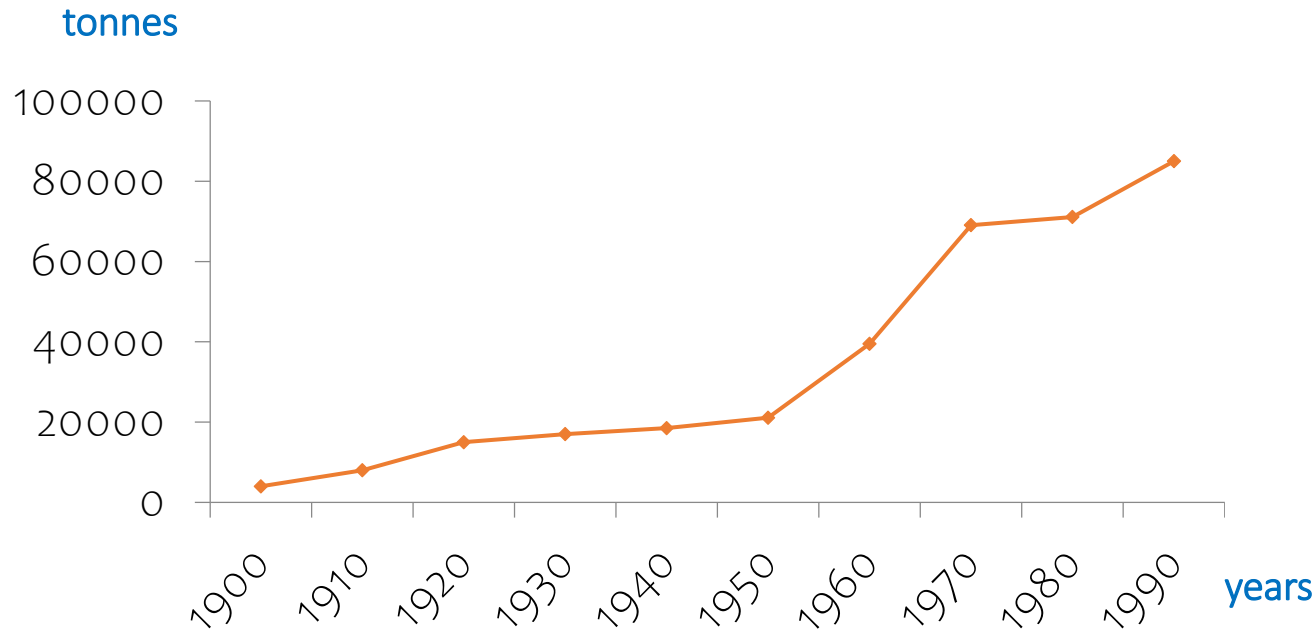
- Esparto grass is replaced by hemp.
- Steel hooks and spear guns were introduced.
- Ice production and canning techniques become widespread.
- The railway enables rapid distribution and marketing.
- Steam trawlers are introduced in the North Sea, doubling catches.



## 20th Century



In 1902, the International Council for the Exploration of the Sea (ICES) was established.



Until the Second World War, the expansion of fisheries was limited to the countries of the western Northern hemisphere.

From 1900 to 1970, world fish production increased from 4 to 70 mT.

From the 1970s onwards, catches stabilised (collapse of the Peruvian anchovy)

- Development of radar, echo sounders, positioning systems.
- Improvement of engines, new materials for ship and gear construction, synthetic fibres appear, freezer fleet.



In 1976 Iceland, Canada and Norway expand their EEZ from 12 to 200 miles.

In 1980, 200-mile EEZ covered a total of 130 million km<sup>2</sup>, 35% of the ocean's surface, where 95% of living marine resources are concentrated.

### INDUSTRIAL FISHERIES:

It is extended all over the world by the incorporation of new countries.

- Ship autonomy and improvement of conservation methods.

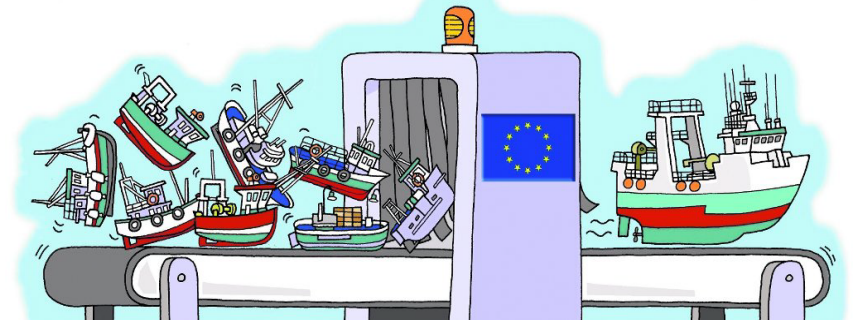


### INTERNATIONAL CONFLICTS

*Marine resources are no longer free: they have an owner.*

In UE - Conversion plans of fleets begin. Oversize

EEZ: Exclusive Economic Zone



### *3) Fisheries impact*

ON HABITAT

ON THE TARGET SPECIES

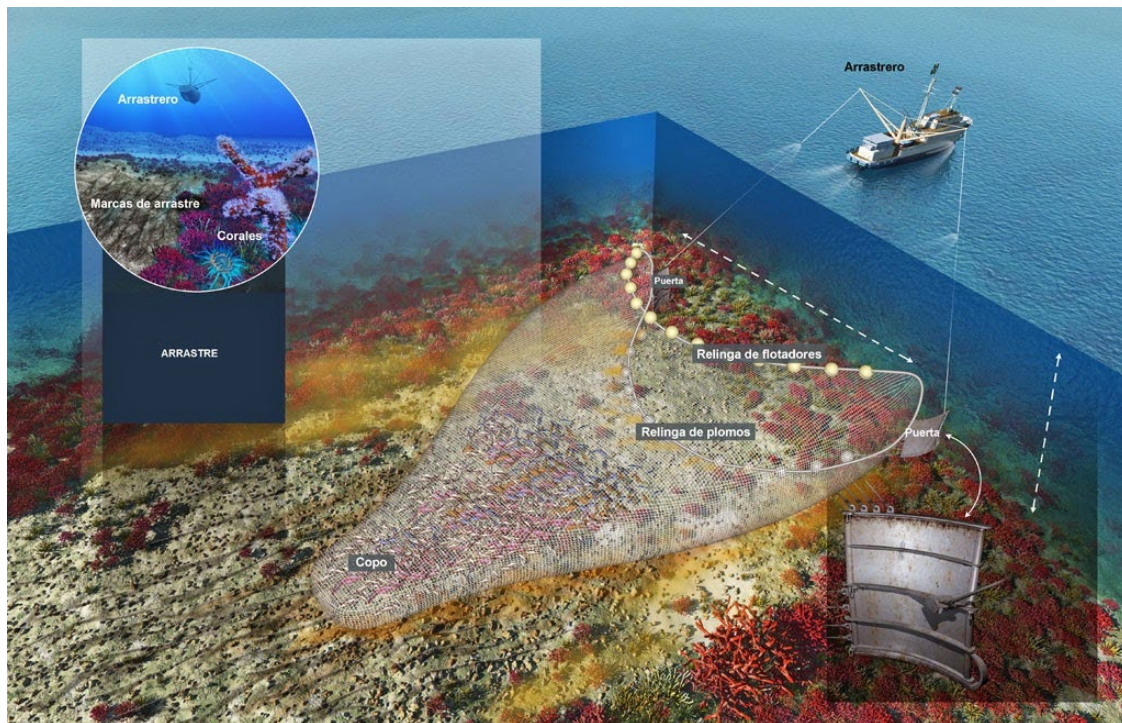
ON OTHER SPECIES





## On habitat

### Physical impacts and habitat destruction



*Turbidity - resuspension of sediment after fishing trawling*



# 3) Fisheries impact

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## Litter waste



## Ghost fishing







On the target species



Overfishing



ships super-trawlers



Up to 13 Jumbo jets could fit in the mouth of a super-trawler's net.



## On other species

## Bycatch and discards

### LONGLINER IN OPERATION

**LONGLINE FISHING BOATS**  
Fishermen usually tow three many longline boats and set in the ocean but estimates indicate there are over 5000 longline vessels fishing for tuna and tuna like species in the world.

**LONGLINES + HOOKS** up to 150 km long  
up to 3000 hooks

**MAKING ANIMALS DYING**  
300,000 sea turtles and at least 140,000 seabirds and millions of sharks die annually in longline fisheries.

**OVERFISHING**  
All target tuna species are overfished, being overfished or depleted.

**SHARK FISHING**  
Sharks often targeted for their high value fins make up as much 50% of catches in some longline fisheries.

**SOLUTIONS**

- Reduce fishing capacity and enforce sustainable catch limits
- Ban all at-sea transhipments
- proper monitoring and 100% observer coverage

**MITIGATE BY CATCH BY:**

- Not targeting sharks and banning shark finning
- Use circle hooks and other best practice mitigation methods

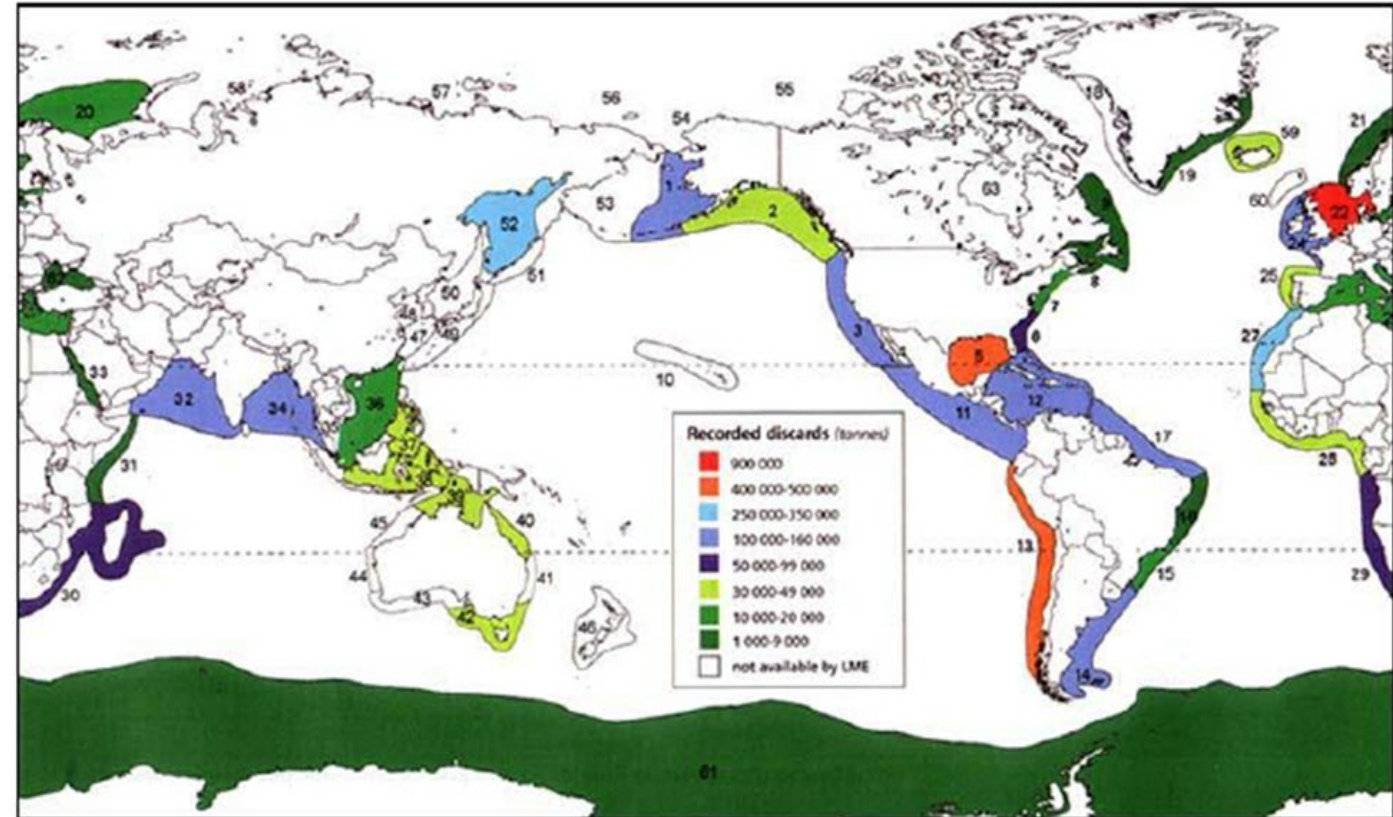
**WELFARE OF CREW**  
Vessels can stay at sea for several years keeping their crew in a captive environment.  
1 YEAR | 2 YEARS | 3 YEARS

**PRIVATE FISHING AND TRANSSHIPMENT**  
Many vessels transfer their catches at sea resulting in high amounts of unreported and illegal fishing.

**SIZE**  
Longline fishing boats can be up to 60m long, however, most are so-called small scale vessels of less than 24m.

**UP TO 50% OF CATCHES CAN BE SHARKS**

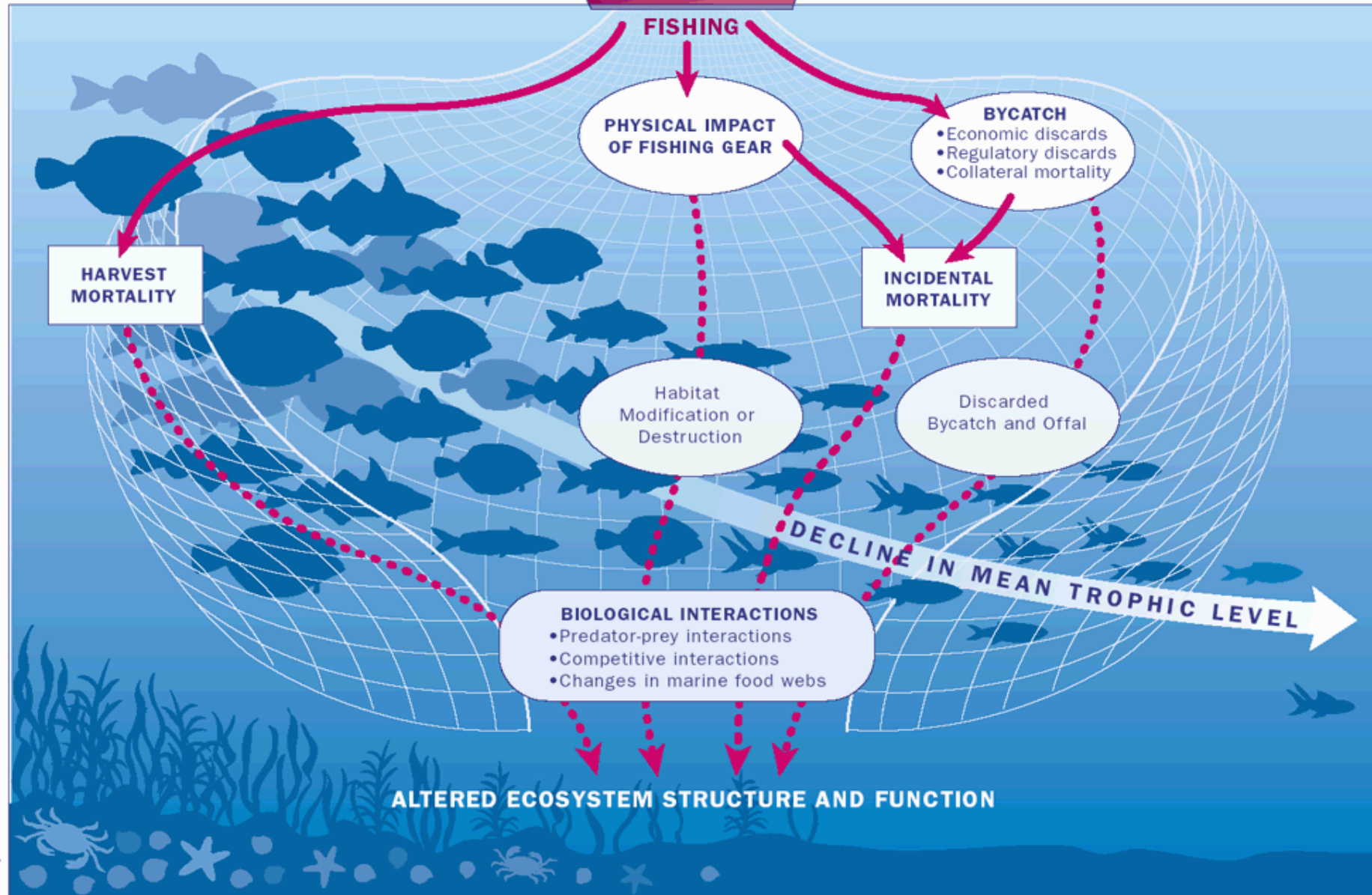
GREENPEACE





# Ecosystem Overfishing

Indirect impacts on biological interactions



Art: John Michael Yanson

Source: Adapted from Pauly et al., 1998; Goñi, 2000.



# 4) Sustainable fisheries

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Robert Anyó - fotograf



# Artisanal fishing

Small-Scale Fisheries

**SSF**





# 4) Sustainable fisheries



How much fish comes from small-scale fisheries?

What does the governance of small-scale fisheries look like?



How many people depend on artisanal fisheries for their livelihoods?

What are the contributions and role of women in small-scale fisheries?

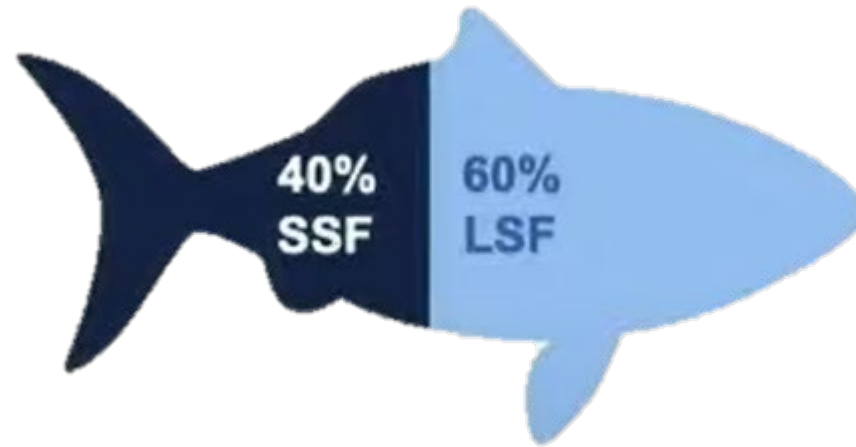
How do artisanal fisheries catches contribute to good nutrition?





The total global fisheries catch  
is **92** million tonnes

**37 million  
tonnes**



**55 million  
tonnes**

Small-Scale Fisheries  
SSF

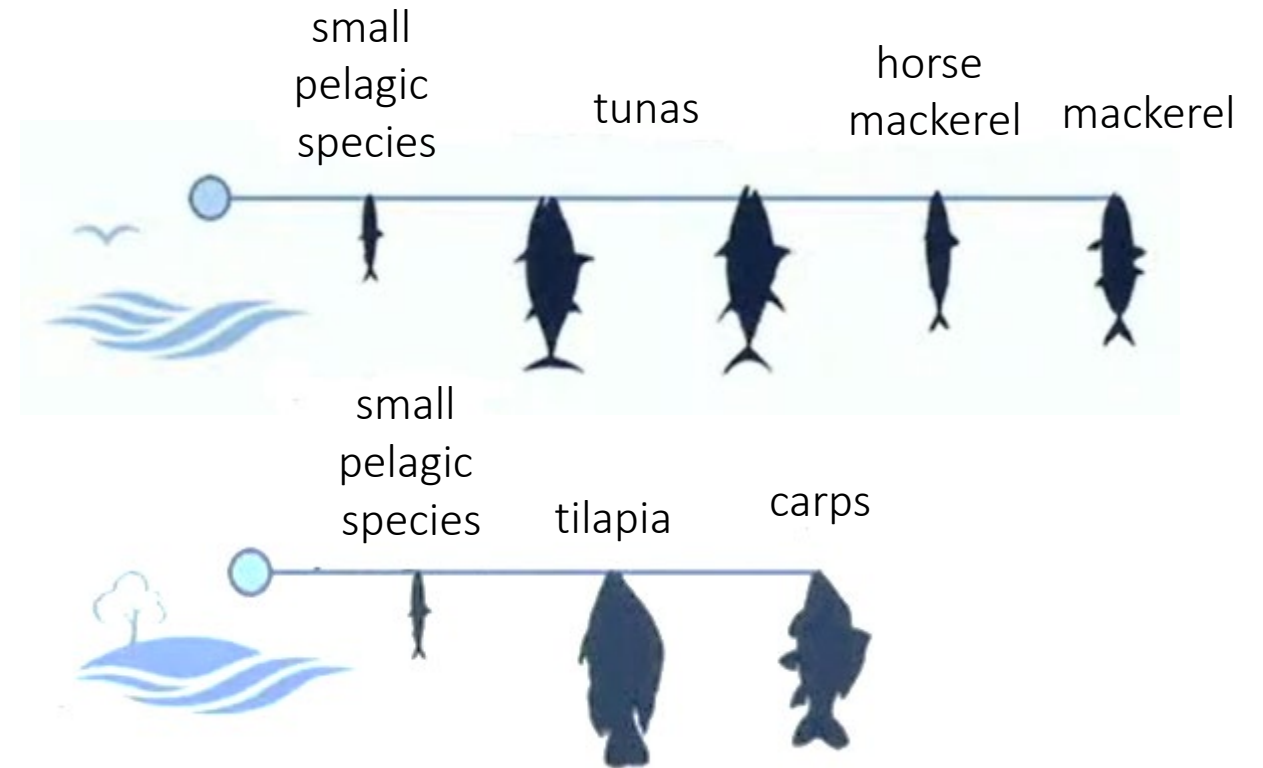
Large-Scale Fisheries  
LSF



SSF: 40% of total  
world catch

37 million  
tonnes

68%  
in marine  
waters  
+  
32%  
in inland  
waters







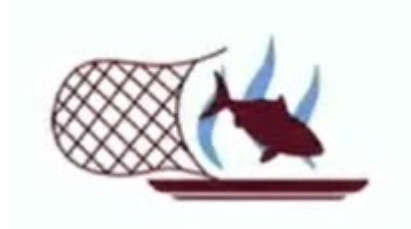
# 492 million people

depend, at least partially, on the work in the SSF



**60 million people**

are part-time and full-time  
employment in SSF



**53 million**

work in subsistence  
fishing



**379 million**

of additional household  
members are supported

These people represent 90% of employment of capture fisheries



77,000  
million USD

of total income come from  
the first sale of SSF catch



Marine waters represent

58,000  
million USD



Inland waters represent

19,000  
million USD



## 4) Sustainable fisheries: *women contribution*

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### Participation of women in value chains



**15%**

pre-catches



**19%**

commercial catches



**50%**

post-catches



**45%**

subsistence fisheries

## 4) Sustainable fisheries: *women contribution*

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45 million  
women

participate in SSF



**4** out of **10** people  
in SSF are women





Fish is rich  
in micronutrients,  
which are essential for a  
good health and development

Nutritional values vary significantly  
across different fishes

Small fish are especially nutritious



Zinc, Selenium, Calcium,  
Omega-3 fatty acids, Vitamin A, Iron



SSF landings may supply:

987

million women

in the world with 50%  
of the recommended  
daily intake of omega-3  
fatty acids



477

million women

in the world with 20% of  
the recommended daily  
intake of calcium,  
selenium and zinc





It was estimated:

**99%** of producer organisations have sustainable fisheries catch and management targets in place

**60%** have human welfare objectives



It is estimated that **20%** of SSF takes place under **co-management** schemes

## 4) Sustainable fisheries: *shared governance*



Fishermen and fishery workers see themselves as **active contributors** to the sustainability of fisheries







## The Sustainable Development Goals (SDG) 2015 - 2030

- Based on the Millennium Development Goals (2000 -2015)
- Broadly negotiated between states and civil society.
- Integrate the three dimensions of Sustainable Development:  
[social, economic and environmental](#)
- Extend to all states, but are non-binding
- Recognise that in order to achieve sustainable development, a wide range of issues need to be addressed





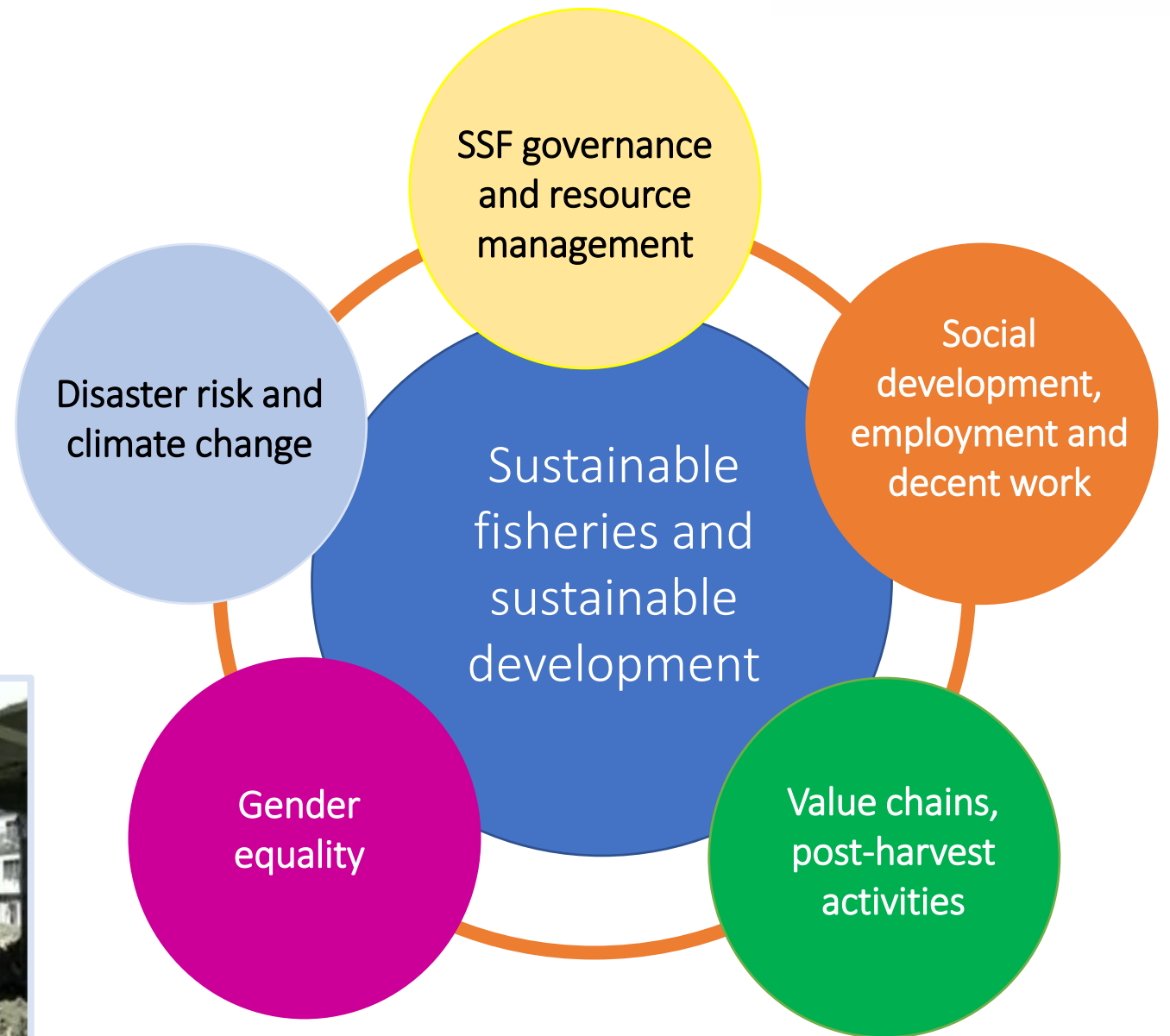
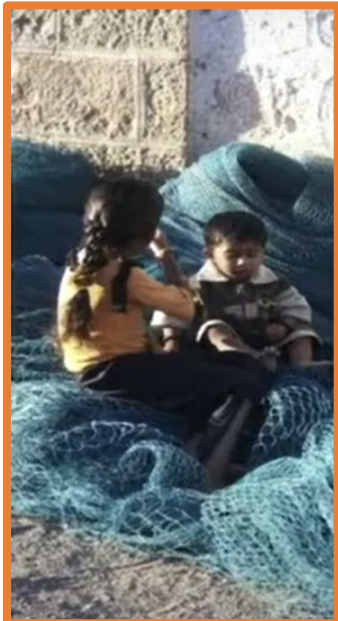
## SDG 14: Interlinked Goals

Objective 14 is closely linked to other objectives





# 5) Fisheries in 2030 Agenda and the Sustainable Development Goals



# ¡GRACIAS!

# Thank you

# Faleminderit

# Hvala

Professor Doctor: Remedios Cabrera Castro

E-mail: [reme.cabrera@uca.es](mailto:reme.cabrera@uca.es)

## OTHER INFORMATION:

Department of Biology

Faculty Marine and Environmental Sciences

University of Cádiz

