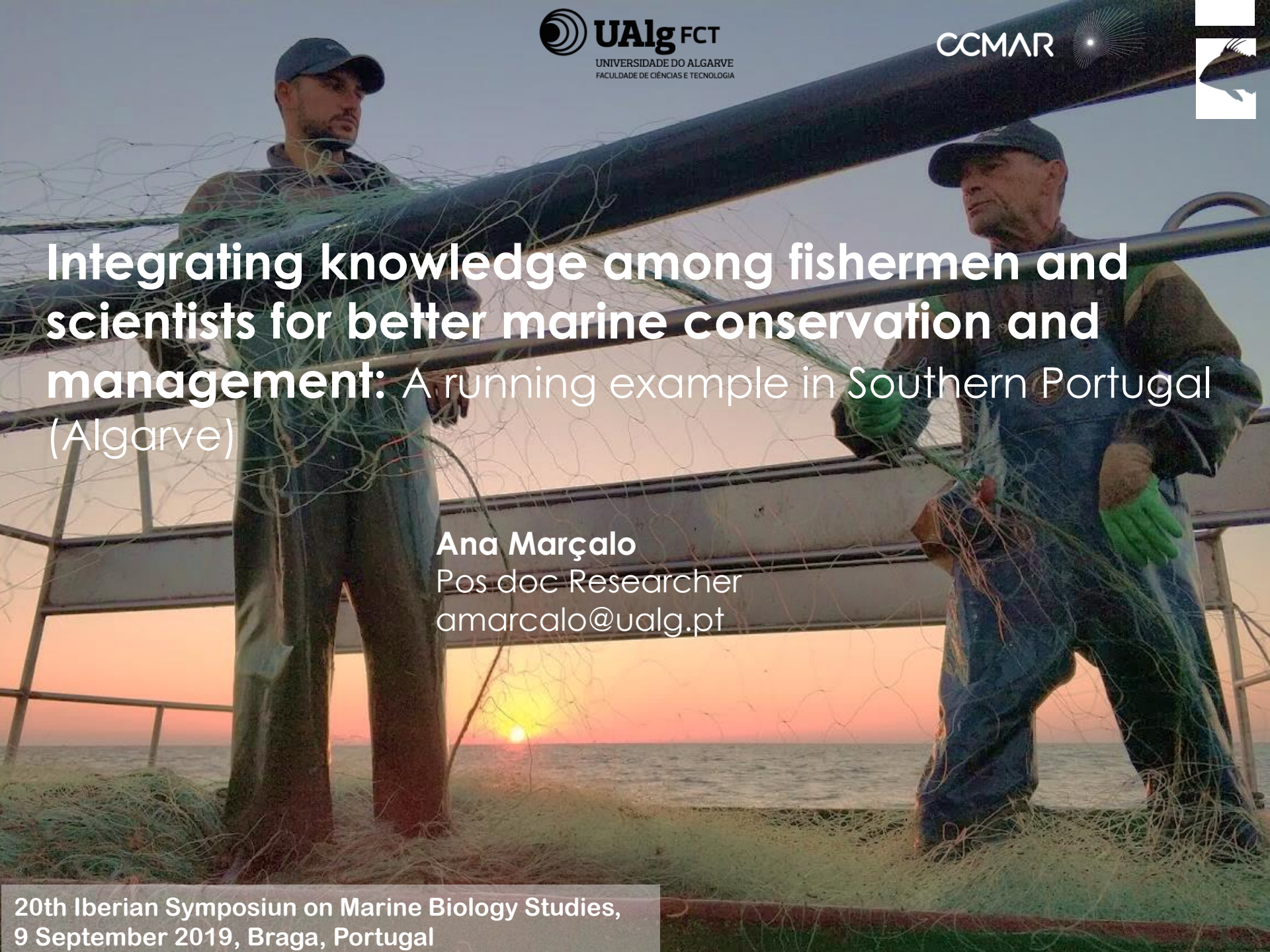

Integrating knowledge among fishermen and scientists for better marine conservation and management: A running example in Southern Portugal (Algarve)

Ana Marçalo
Pos doc Researcher
amarcalo@ualg.pt

20th Iberian Symposiun on Marine Biology Studies,
9 September 2019, Braga, Portugal

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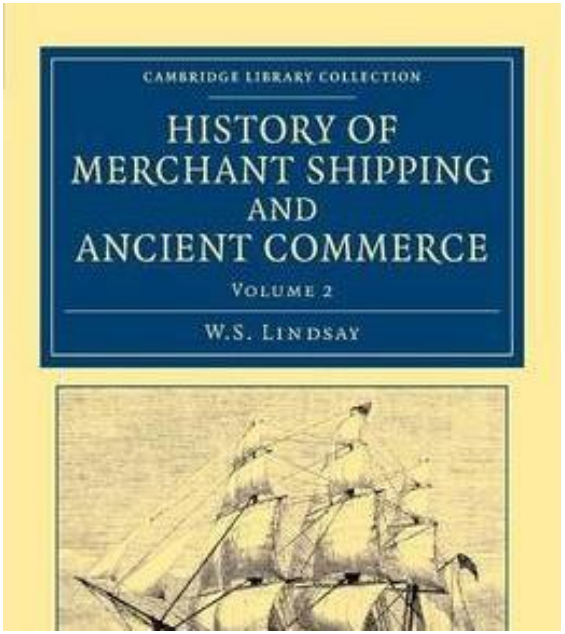
1. HOW MEN USES THE OCEAN ENVIRONMENT
2. CONSEQUENCES
3. HOW CAN THE PROBLEMS BE SOLVED?
4. BEST APPROACHES TO SOLVE PROBLEMS ASSOCIATED WITH FISHERIES
5. EXAMPLES OF CASE STUDIES IN PRACTICE AT CCMAR RUN BY THE FBC GROUP
    a) MITIGATING DISCARDS IN PURSE SEINING
    b) MITIGATING INTERACTIONS OF CETACEANS AND FISHERIES IN THE ALGARVE COAST



OLD TIMES

Men and the “Sea”

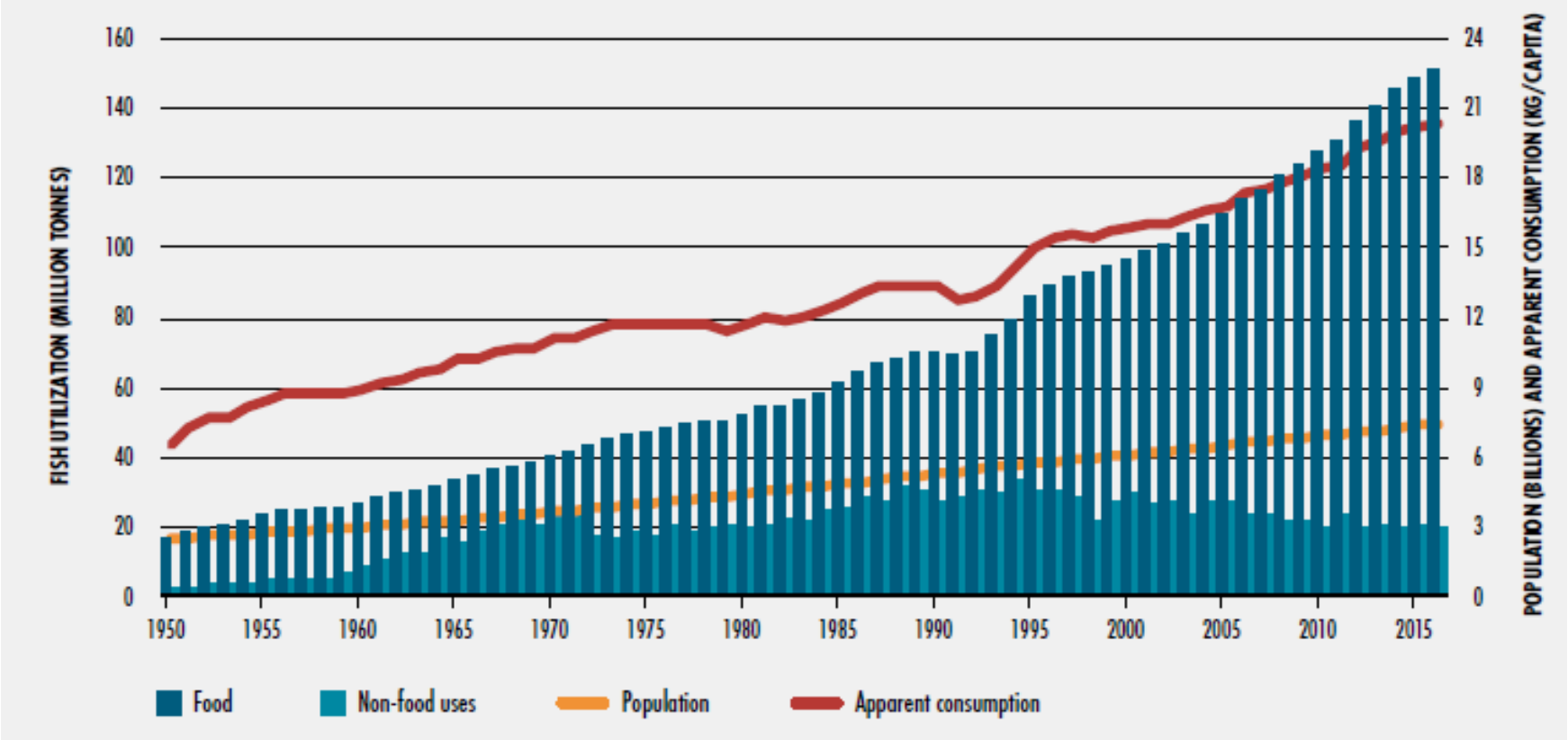
Fishing and shipping

RECENT TIMES

Men and the “Sea”

Fishing, shipping, tourism, offshore oil and energy extraction

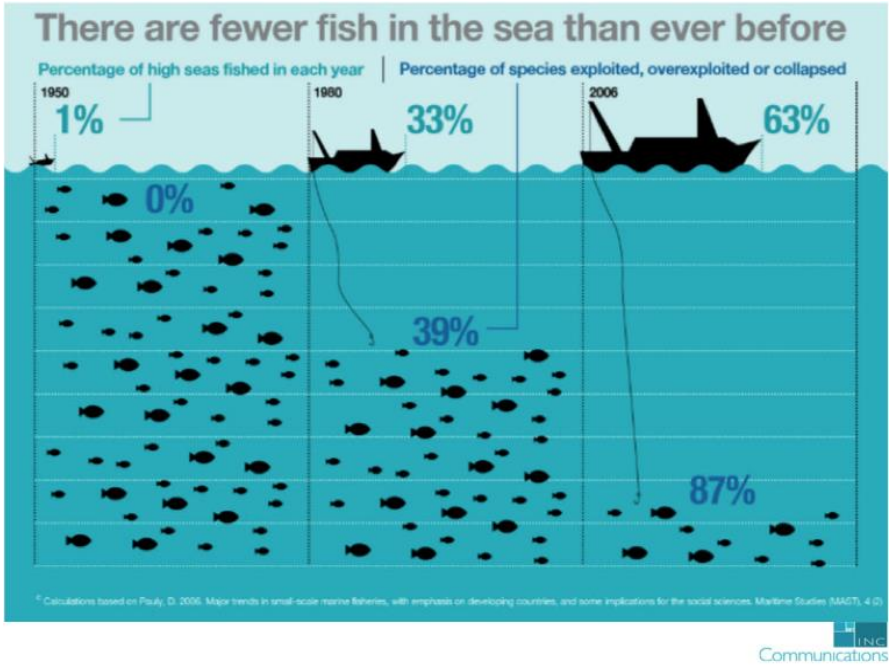
WORLD FISH UTILIZATION AND APPARENT CONSUMPTION

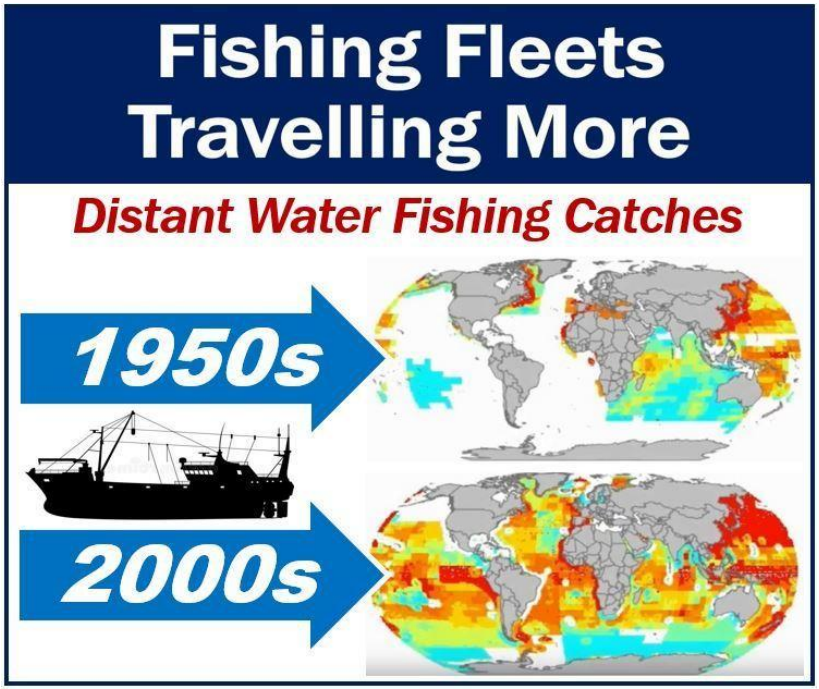


in "The state of world fisheries and aquaculture", FAO 2018

CONSEQUENCES: 1. OVEREXPLOITATION

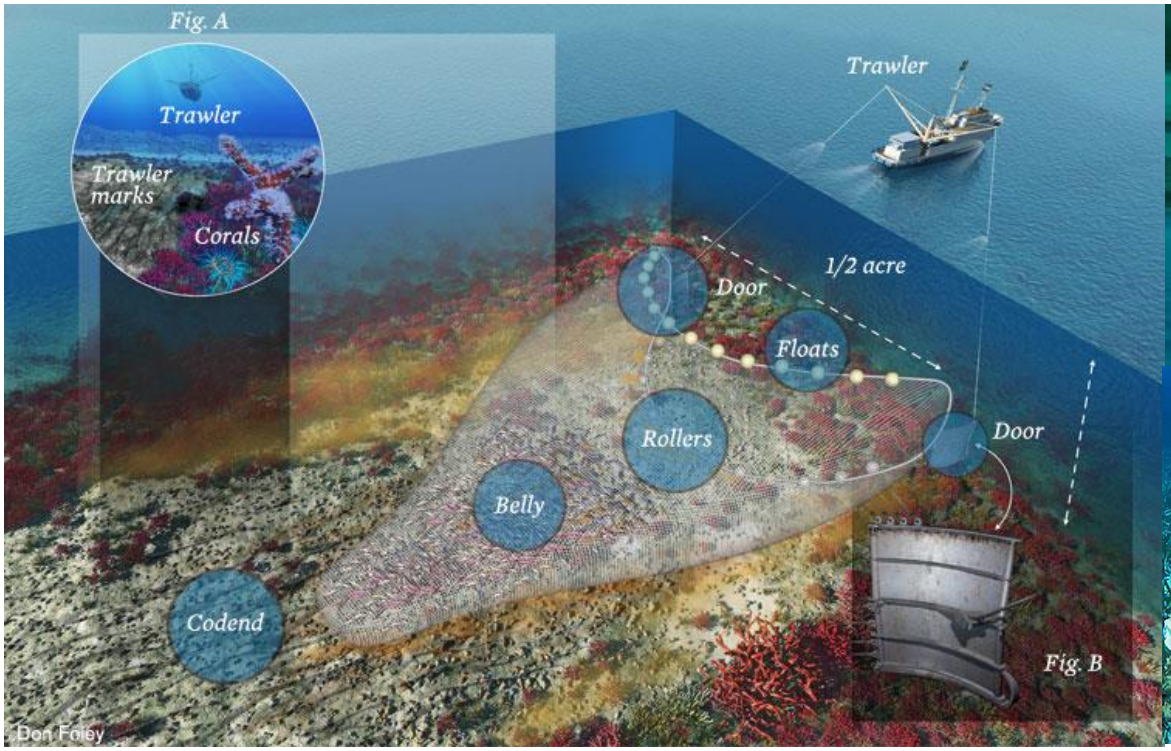
a. OVERFISHING





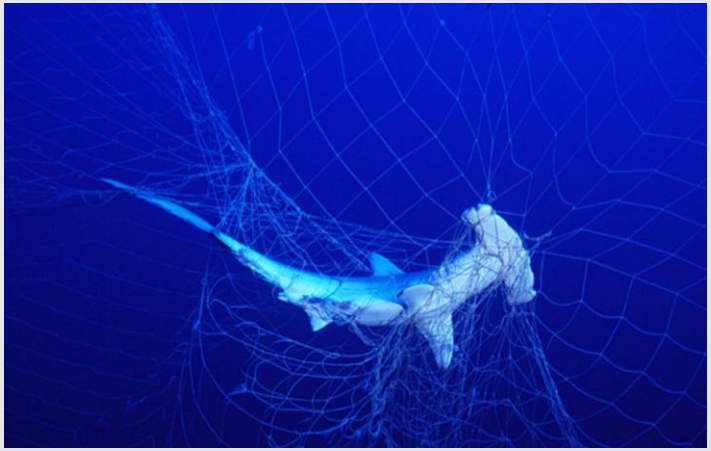
CONSEQUENCES: 1. OVEREXPLOITATION

b. HABITAT LOSS AND DISCARDING:



CONSEQUENCES: 1. OVEREXPLOITATION

c. BYCATCH



Olhão, Portugal
August 1st 2019

SOME CURRENT KEY FISHERIES MANAGEMENT PROBLEMS:

- **Inadequate fisheries rules and regulations**

SOME CURRENT KEY FISHERIES MANAGEMENT PROBLEMS:

- Inadequate fisheries regulations
- Lack of implementation/enforcement

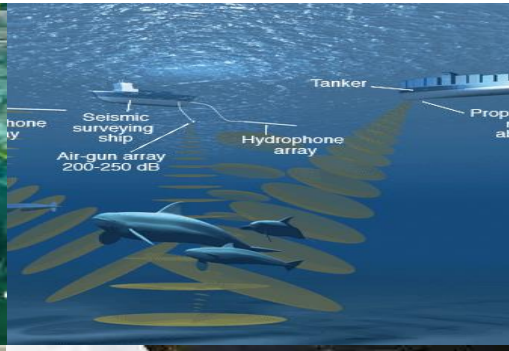
SOME CURRENT KEY FISHERIES MANAGEMENT PROBLEMS:

- Inadequate fisheries regulations
- Lack of implementation/enforcement
- Lack of transparency and traceability

SOME CURRENT KEY FISHERIES MANAGEMENT PROBLEMS:

- Inadequate fisheries regulations
- Lack of implementation/enforcement
- Lack of transparency and traceability
- Failure to follow scientific advice

CONSEQUENCES:



2. CHEMICAL POLUTION; OIL SPILLS
3. SOUND POLLUTION
4. BOAT COLLISION

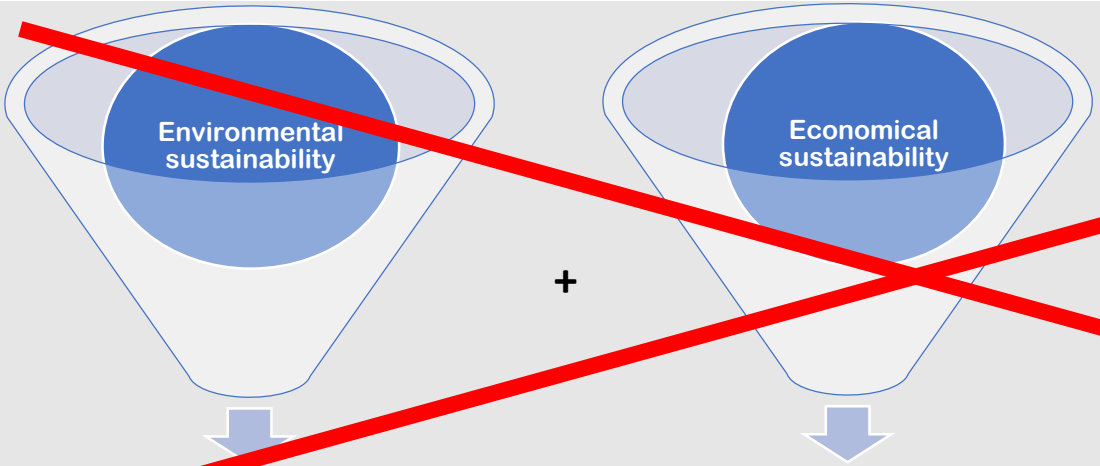
+ Global warming =

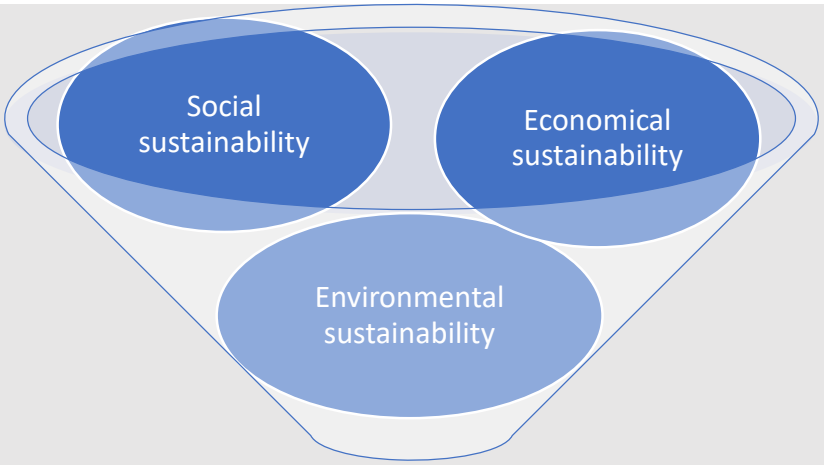
Contents
SUBSCRIBE NOW
The Economist
An ocean of troubles
Overfishing, global warming and pollution threaten to transform the ocean
Cookie Policy
1 / 11

May 12, 2012

DOWN WITH CYANIDE FISHING
NO
NO TRAWLING SCHOOL ZONE
STOP OVER FISHING
NO TO BLAST FISHING
NO TRAWLING HERE
DO NOT ABUSE FISH RESOURCES
KEEP OUT!
How to work this out?

APPROACHES TO SOLVE FISHERIES PROBLEMS





Good environment + Good economy

APPROACHES TO SOLVE FISHERIES PROBLEMS

Integrative = Balance = Co-Management

VALUES IN THE WORLD OF FISHERIES

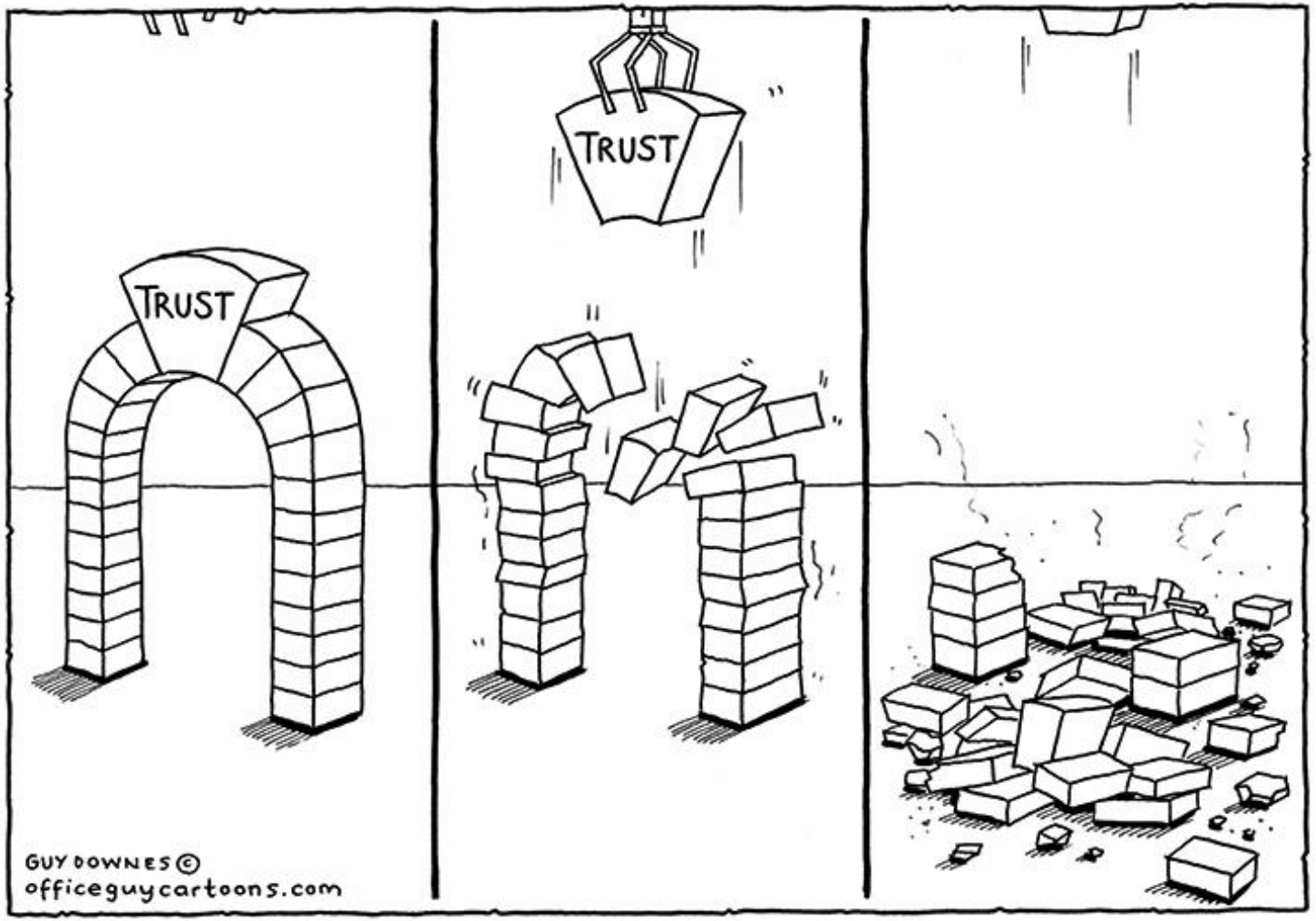
- **Who are the stakeholders?**
- **What are their values?**

Scientists, Environmental NGO´s, Maritime Governamental Entities = CONSERVATION

Fishermen, Fishermen associations= ECONOMIC (PROFIT)

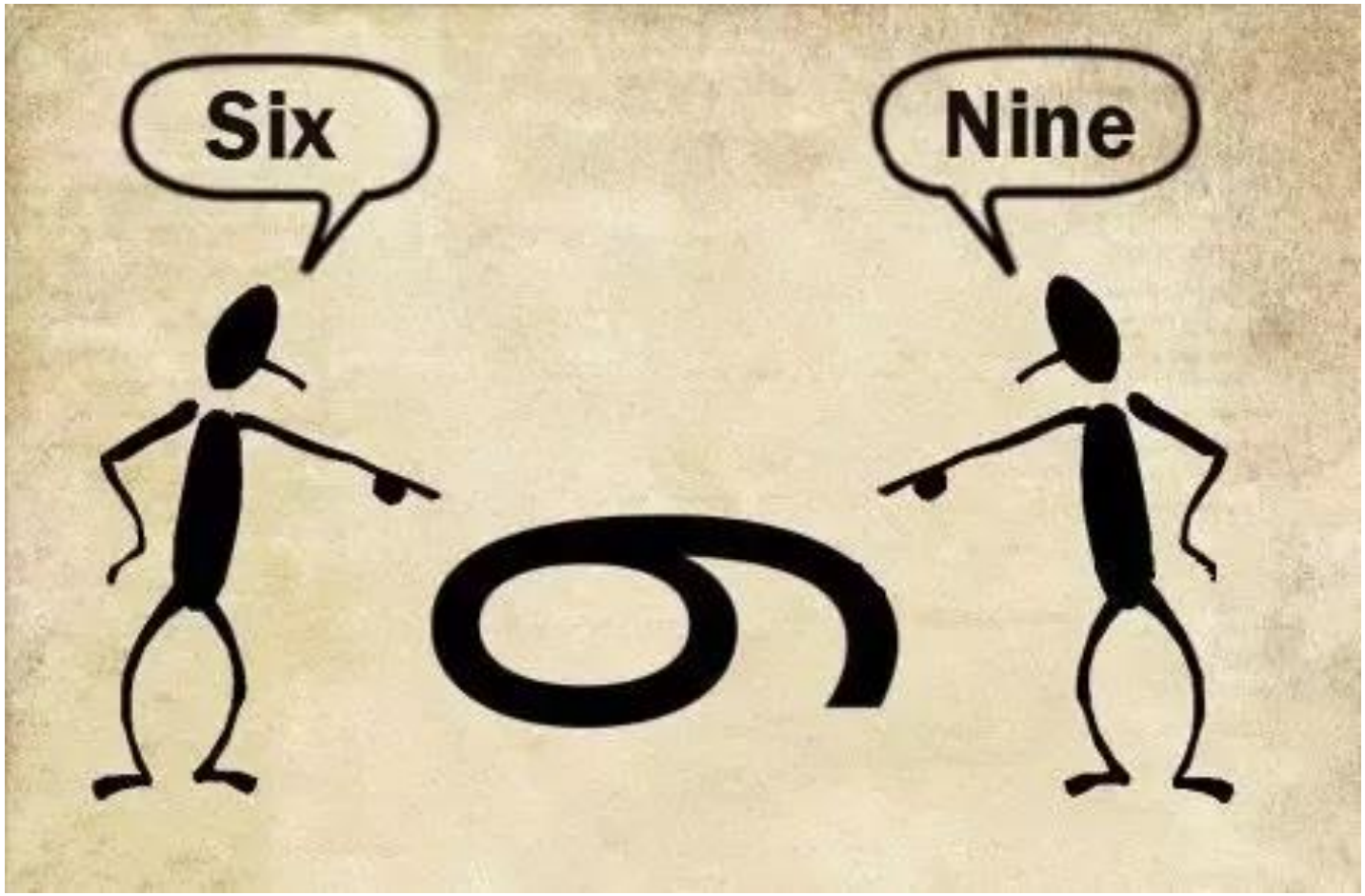
HOW CAN WE MAKE IT HAPPEN?

Trust bonds between stakeholders



HOW CAN WE MAKE IT HAPPEN?

Respect/listen others opinions = accept different social backgrounds, education, experience and circumstances



STAKEHOLDER'S INVOLVEMENT

- Gaining momentum since the 2002 reform of the Common Fisheries Policy

Stakeholder´s participation leads to:

- Integration of **local knowledge**
- Increasing of **transparency** in the management processes
- **Reduction of conflict** situations
- **Compliance** with rules and regulations
- **Inclusion** of different points of view and values
- **Legitimates** the management processes

Integrating knowledge among fishermen and scientists for better marine conservation and management: A running example in Southern Portugal (Algarve)

CCMAR Centro de Ciências do Mar | UAlg UNIVERSIDADE DO ALGARVE

Fisheries, Biodiversity and Conservation Group: Coastal Fisheries Research Group

Team Leaders: Prof Karim Erzini (PhD) & Jorge Gonçalves (PhD)
Team members: Ana Marçalo (PhD), Mafalda Rangel (PhD), Adriana Ressureição (PhD), Bárbara Hcosta (PhD), Pedro Monteiro (MsC), Frederico Oliveira (MsC), Luís Bentes (MsC), Inês Sousa (PhD student), Carlos Afonso (Research assistant), Nuno Henriques (MsC), Flávia Carvalho (MsC), Adela Belackova (MsC student), João Pontes (MsC Student), Alexandra Pires (MSC student), Rúben Gregório (MsC Student), Isidoro Costa (CCMAR Skipper)

Integrating knowledge among fishermen and scientists for better marine conservation and management: A running example in Southern Portugal (Algarve)

PARTICIPATORY APPROACHES
(since 2011)

EXAMPLE PROJECTS:

MINOUW

MINOUW - May 2015 to May 2019
MITIGATION OF DISCARDS AND BYCATCH- test (with the fishers) new and innovative techniques proposed by them using **participatory approaches**

iNOVPESCA

iNOVPESCA – 2017 -2020; in progress
MITIGATION OF BYCATCH - Reduction of interactions of marine protected species and coastal Algarve Fisheries using **participatory approaches**

DISCARD

BYCATCH

Discards = not used catch that is thrown back to the sea

Bycatch = any organism caught unintentionally (not targeted)

MINOUW

Science, Technology, and Society Initiative to minimize Unwanted Catches in European Fisheries

Part 1 Mitigation of discards

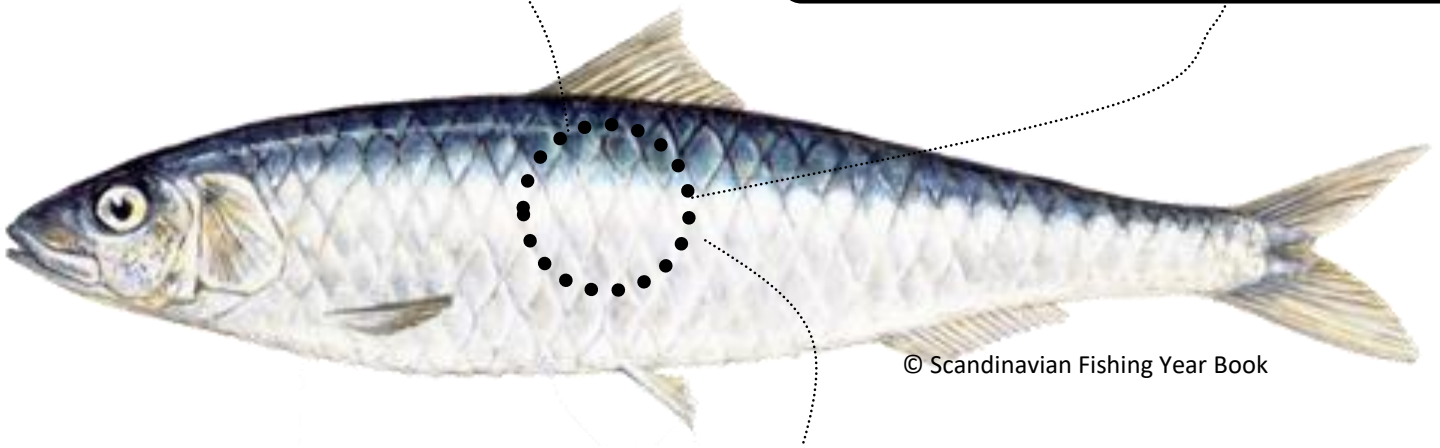
Case study: Algarve Purse seine
Modifying existing fishing practices and assessing and promoting survival of discards and bycatch

- ✓ Up to 2020 most European fisheries have to follow the "Landing obligation"- as described in the new *Common Fisheries Policy*
- ✓ Exemption– "species for which scientific evidence demonstrates high survival rates"
  - ✓ **Example: Sardine in the Portuguese Purse seine Fishery**

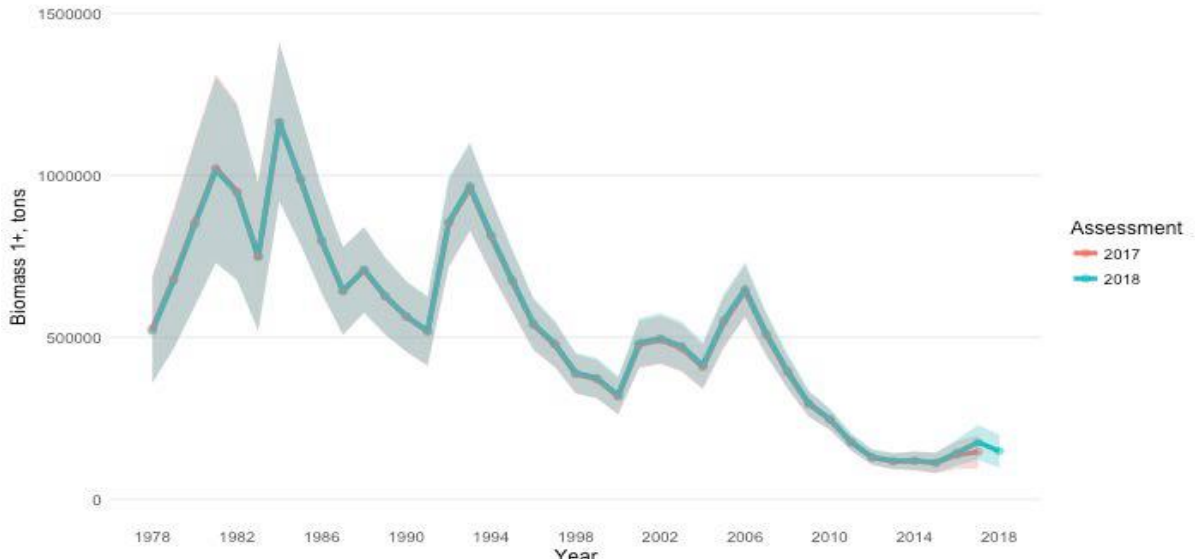
Background Purse seine fishery in Portugal: General

✓**High socio-economic importance (> 50% of the fish caught in weight)**

✓**Sardine is the target species.**
✓**Other pelagic species** (Atlantic chub mackerel, Horse mackerel,Blue jack mackerel, European anchovy)



© Scandinavian Fishing Year Book



Recent sardine stock biomass @ historical low

Background Purse seine fishery in Portugal: General

Operations: 1. Shooting - 2. Net closing into a purse – 3. Hauling - 4. Fish transfer

(School detection - school encirclement - gradual decrease of purse volume - capture never leaves the water)

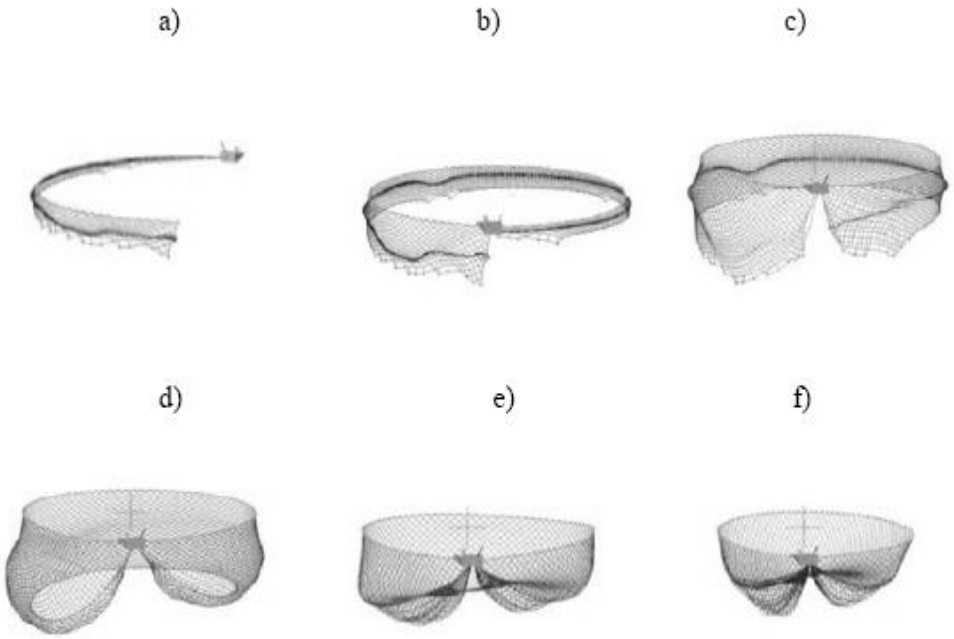


Figure 1.2 – Details on net shooting (a-b), closing-up of the net into a purse (c-d) and net hauling after the purse is formed (e-f). Adapted from Kim et al. 2007.

Discards through slipping

Background Purse seine fishery in Portugal: General

Sardine ban

usually in place October to May

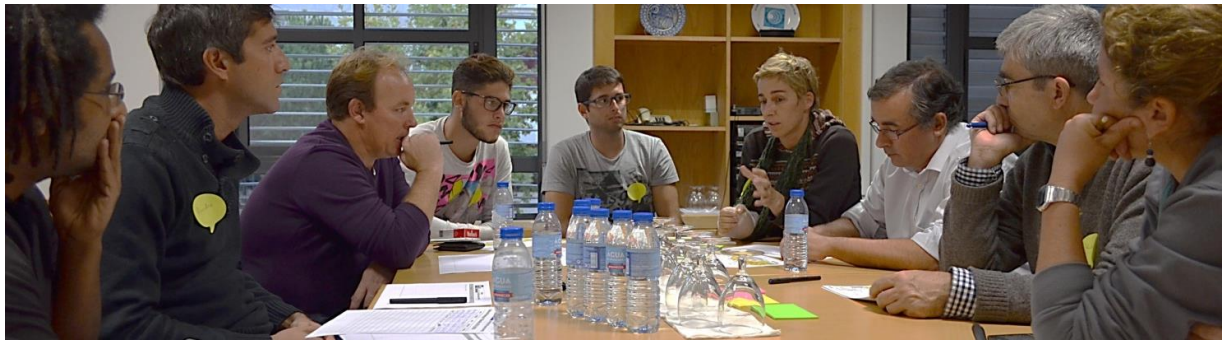
Discard/Slipping problem

Main reasons:

1.Quota limits for the sardines; 2. Seasonal demands;
3. Undersized fish; 4. No commercial value.

Objectives

Participatory methods: workshops with stakeholders



PARTICIPANTS

12 Skippers
2 OPs

8 MINOUW

1 DGRM
2 DRAP
1 Captain
1 Docapesca

1 FACILITATOR

QUESTION 1

Characterize (at a spatial level) the unwanted catches problem for this fleet

QUESTION 2

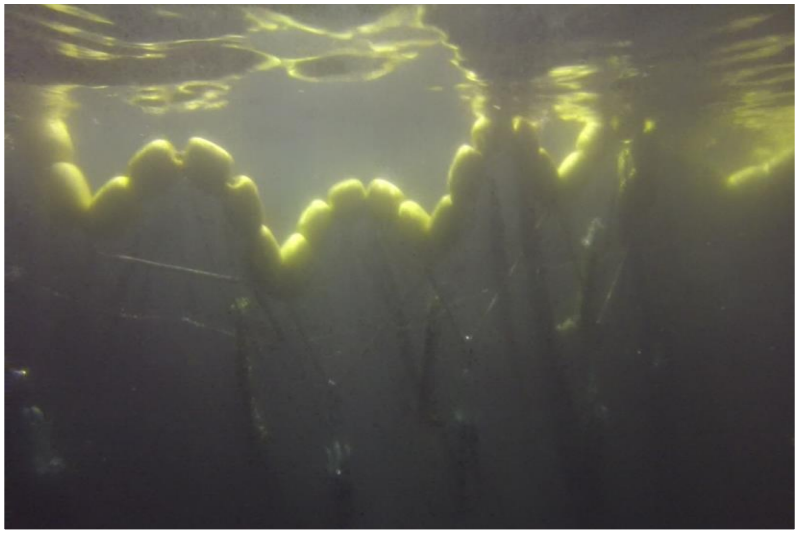
Identify existing / new solutions to avoid / reduce unwanted catches to <u>be tested in the project</u>

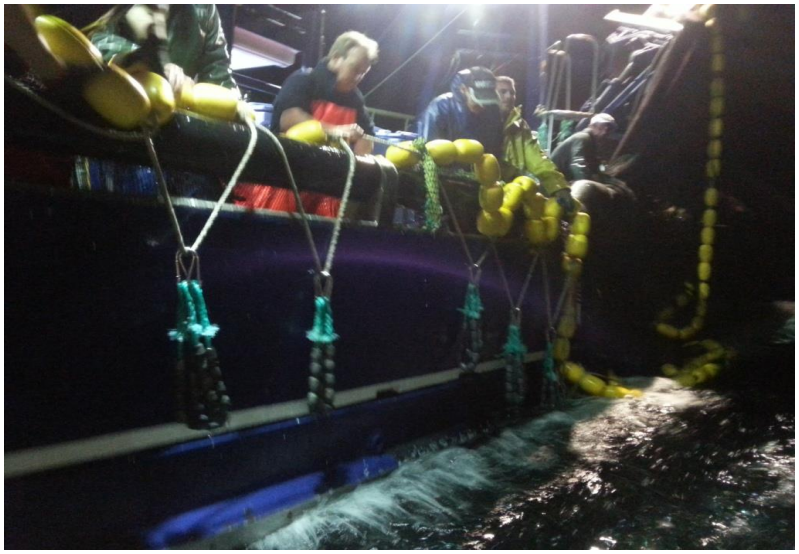
Case study: Compare the efficiency of two different methods of slipping sardines in the purse seine fishery

<u>PURSE SEINE EXPERIMENTAL SURVEY 2016</u>

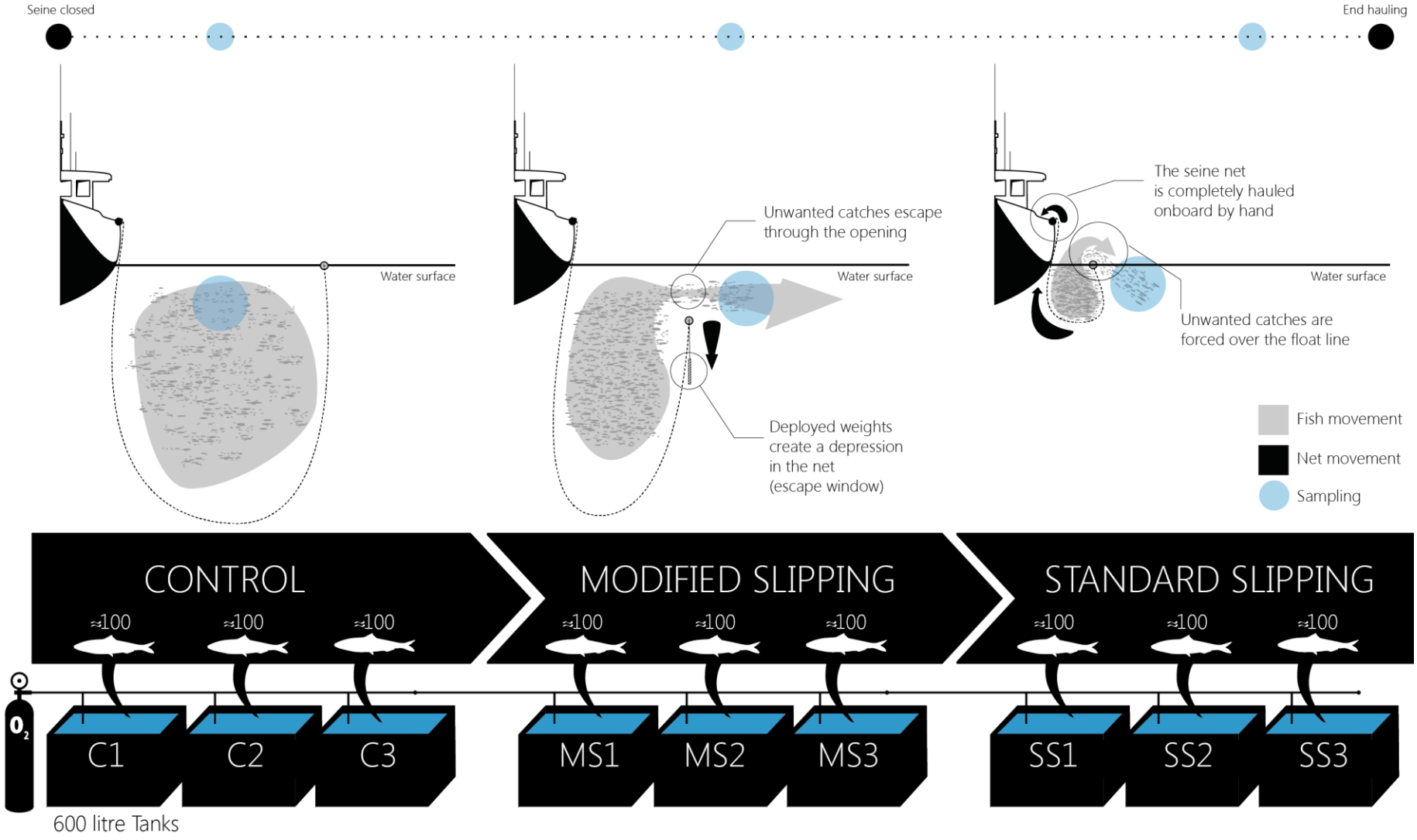
Methodology

Sampling at sea – Modified slipping details





Methodology: Sampling at sea

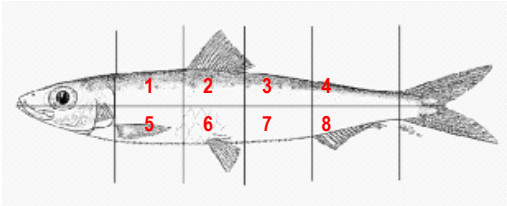


In Marçalo et al. 2018

Methodology: Monitoring

- ✓ **Sea and land transport to captivity**
  - Acclimation/monitoring tanks (3000L)
  - Monitor survival, physiology and scale loss/physical damage for 28 days
- ✓ **Survival**
  - Collect dead fish daily
- ✓ **Physiology**
  - Day -1=Fishing; Day 0 = Arrival at station; Days 2, 7, 15, 28
- ✓ **Physical damage**

In Marçalo et al. 2008

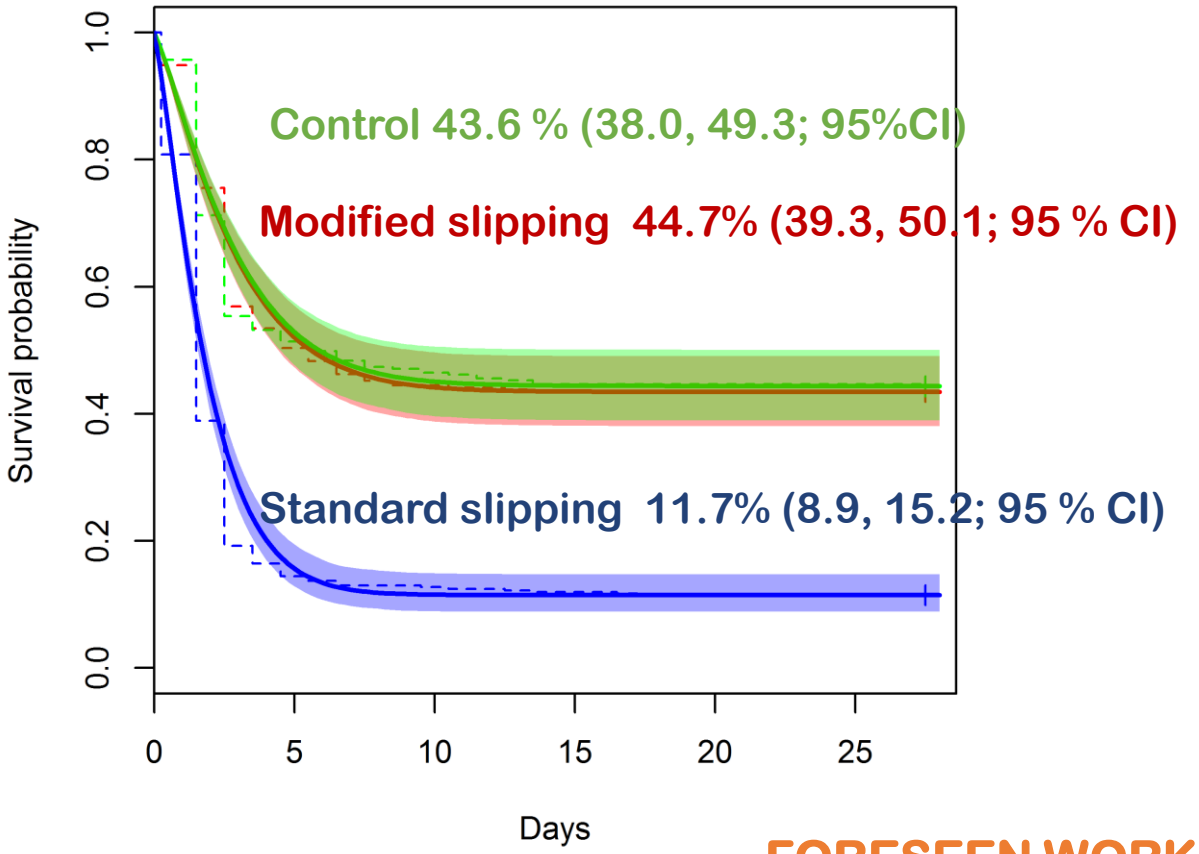


  - Scale loss of dead fish and alive fish

In Marçalo et al. 2018

Results Survival

In Marçalo et al. 2018



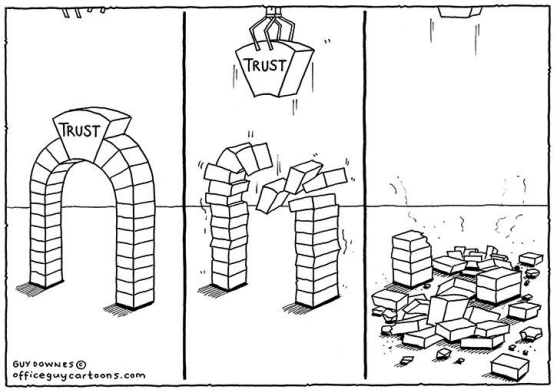
- ✓ Sardine **survival using <u>Modified Slipping</u> technique is 3 times higher** than using the standard slipping
- ✓ Scale loss was significantly higher for Standard Slipping;
- ✓ Physiology affected during fishing for the standard slipping treatment

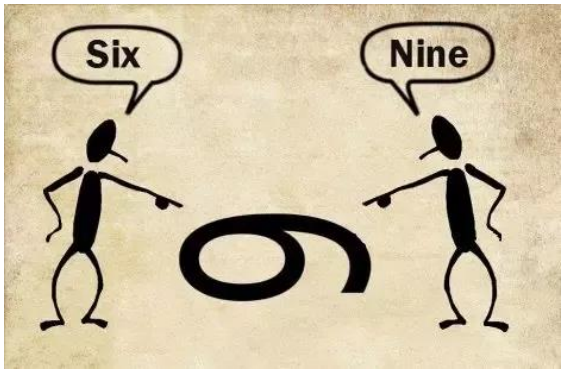
FORESEEN WORK:

- Disseminate this MS procedure
- Production of a Manual of good practices

Takeaway message: Mitigation of discards

- **Fishers knowledge** = development of a quick & easy mechanism/device to reduce post capture mortality of slipped fish
- **Scientists knowledge** = development of an experimental design to <u>prove fishers knowledge</u>

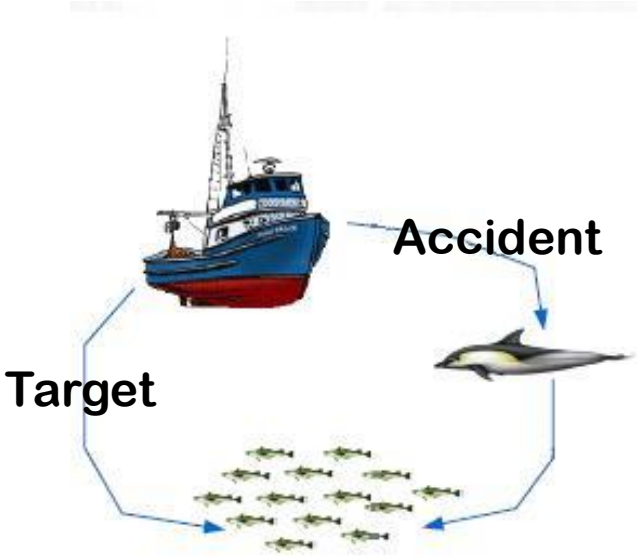




CO-MANAGEMENT =
Reduce mortality of discarded fish
=
FISHERIES SUSTAINABILITY

Part 2 Mitigation of Bycatch

- **High abundance of cetaceans along the Portuguese mainland coast**
- **Cetaceans are protected species in Portuguese waters by national and international legislation**



Silva 1999 & Marçalo et al 2018
- Diet of **common dolphin**

Silva and Sequeira 2003
- Stranding patterns of **common dolphin**

Wise et al 2007 & Marçalo et al 2015
- Interactions of cetaceans and **purse seine fishery**

Background: Dolphin interactions with fisheries

Favorite dish = target species of fisheries

Fishermen = Economical
Fish school detection or gathering

Dolphins = Biological
Food

Fishermen = Economical
Loss of time; net & catch damage/loss

Dolphins = Biological
Incidental capture – **DEATH**

OBJETIVES 2017-2020

MINIMIZING PROBLEMS OF ALGARVE COASTAL FISHERIES WITH MARINE PROTECTED SPECIES (FOCUS ON CETACEANS)

CONSERVATION

Reducing the interaction and mortality of the animals in fishing nets

SOCIO-ECONOMIC

Help the coastal fishing community: Avoid catch and gear losses

- **TEST MITIGATION DEVICES**
- **MODIFY FISHING OPERATIONS/PRACTICES**
- **PARTICIPATORY ACTION BETWEEN STAKEHOLDERS**
- **VOLUNTEER PARTICIPATION OF THE FISHING COMMUNITY**

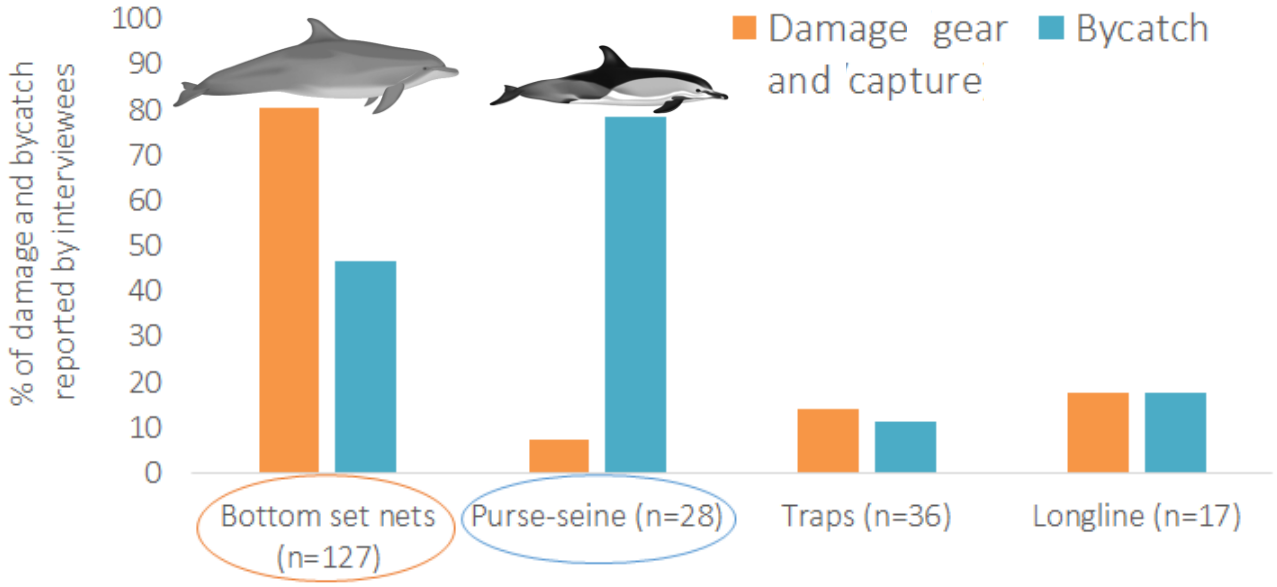
IMPROVE THE SUSTENTABILITY OF THE COASTAL FISHERIES IN THE ALGARVE

ACTIONS - FINISHED

1 DEFINE LEVELS OF INTERACTION AND BYCATCH:

Detect problematic areas – harbour interviews

March – July 2018; N= 207 interviews



ACTIONS - FINISHED

1

DEFINE LEVELS OF INTERACTION AND BYCATCH:

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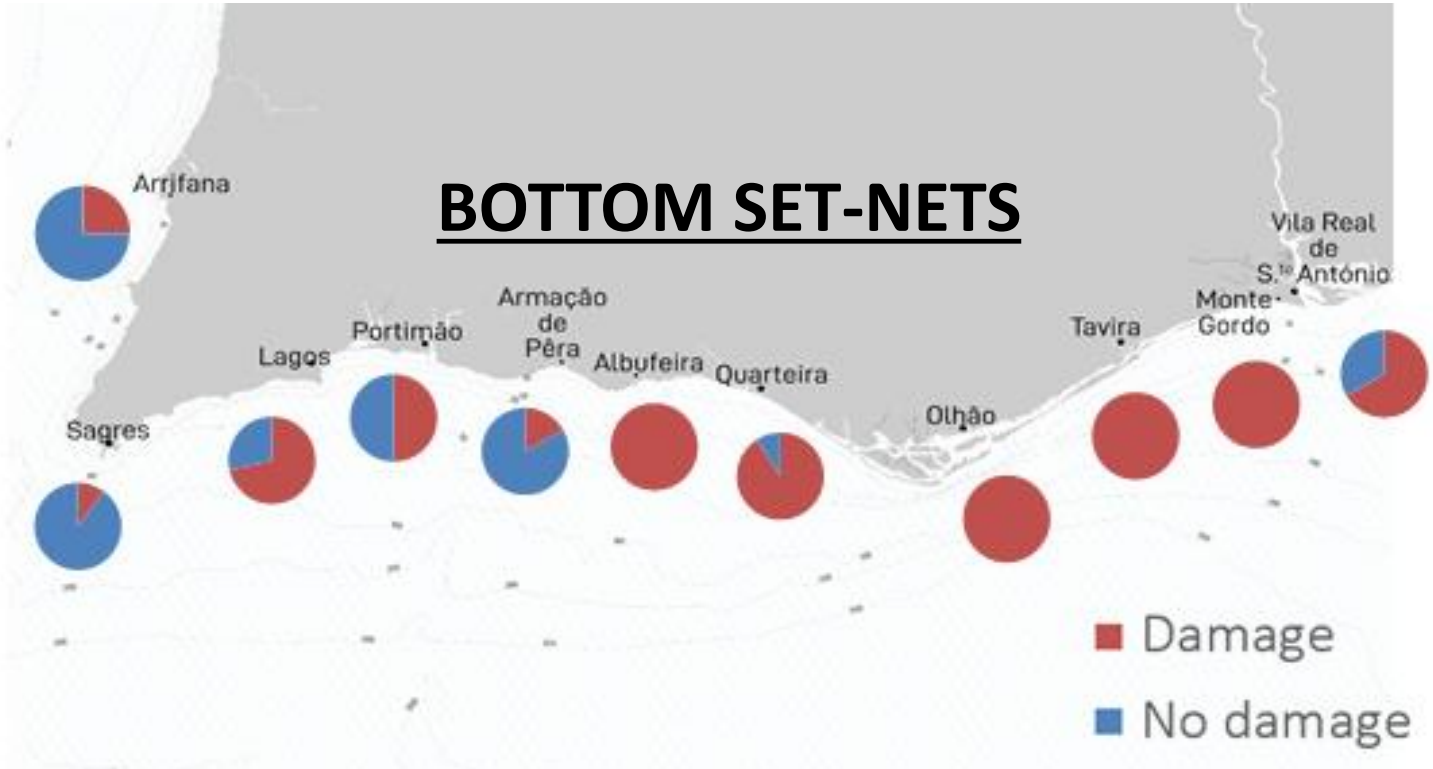
March – July 2018; N= 207 interviews



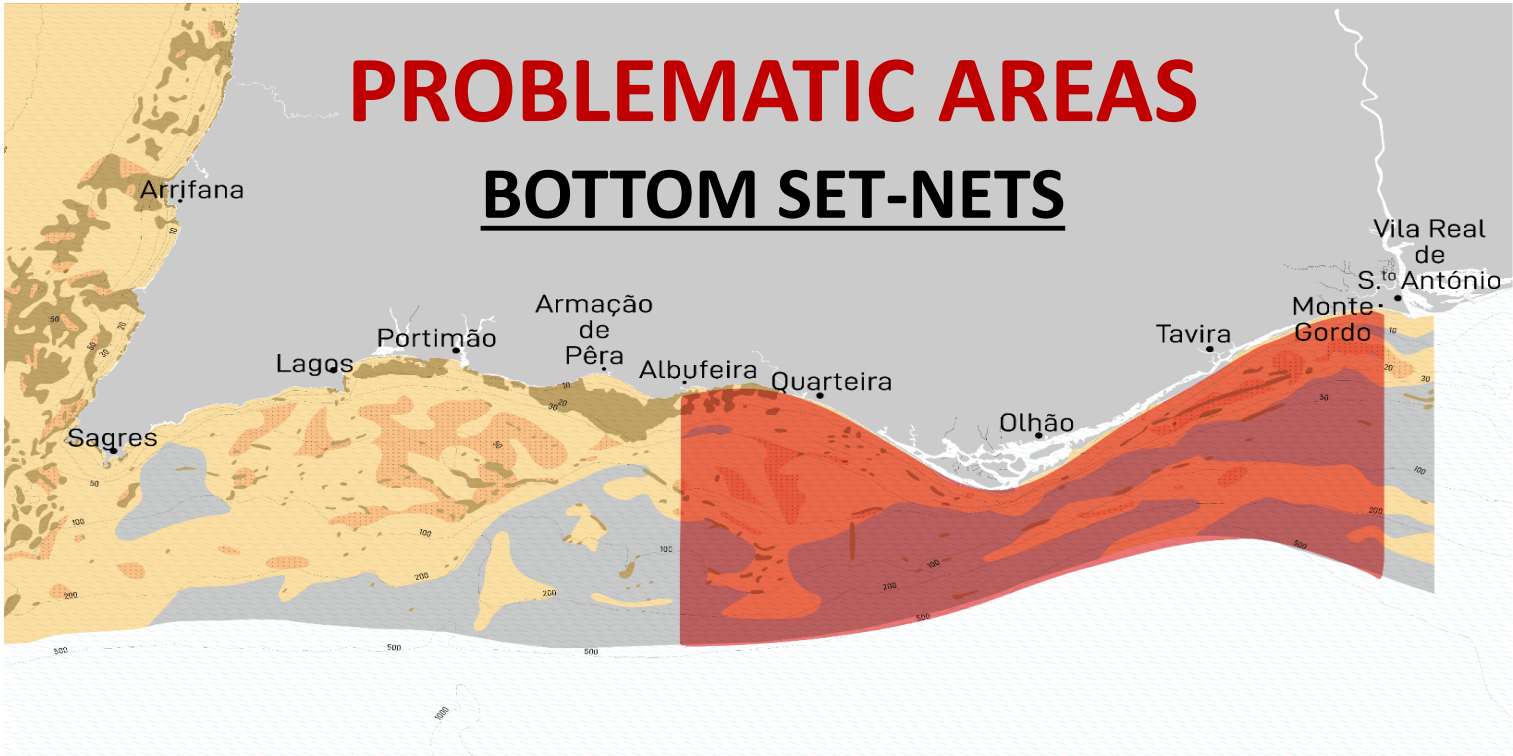
ACTIONS - FINISHED

1

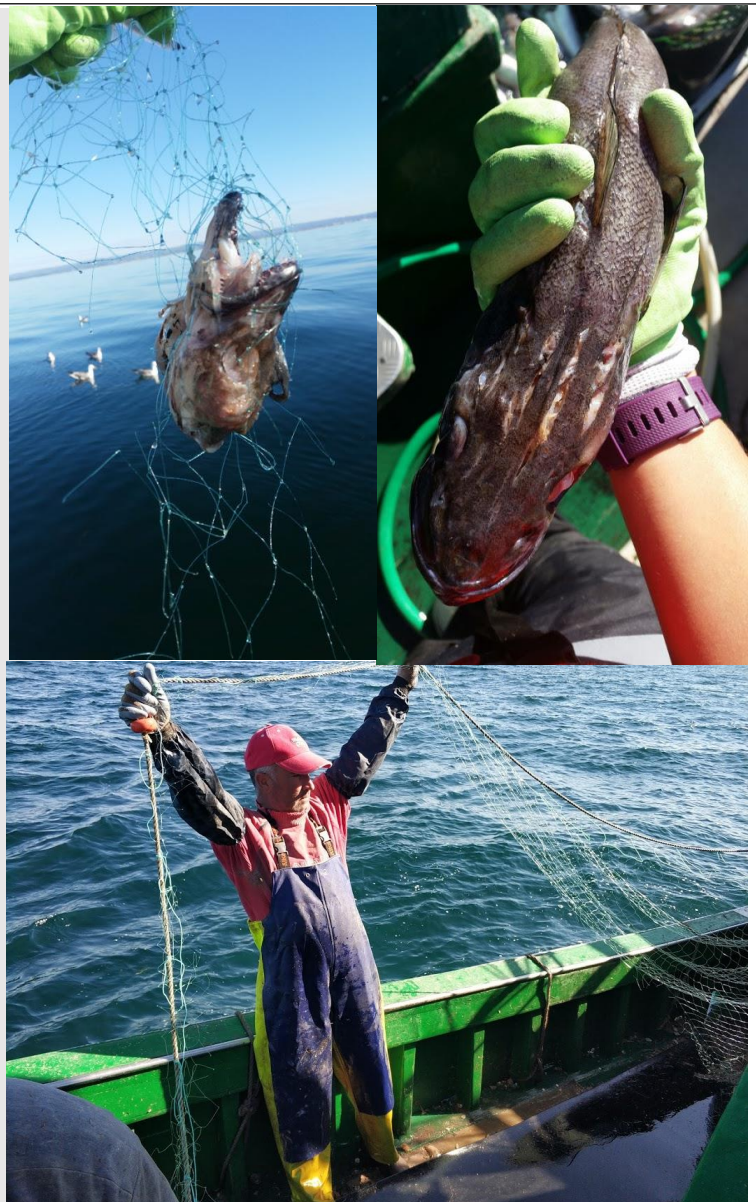
DEFINE LEVELS OF INTERACTION AND BYCATCH:

Detect problematic areas – harbour interviews

March – July 2018; N= 207 interviews



THE PROBLEM



ACTIONS – IN PROGRESS

2

PARTICIPATORY MEETINGS WITH STAKEHOLDERS

(Fishers, Fishing associations, Scientists, Govenmental entities)

Present goals and results along the project

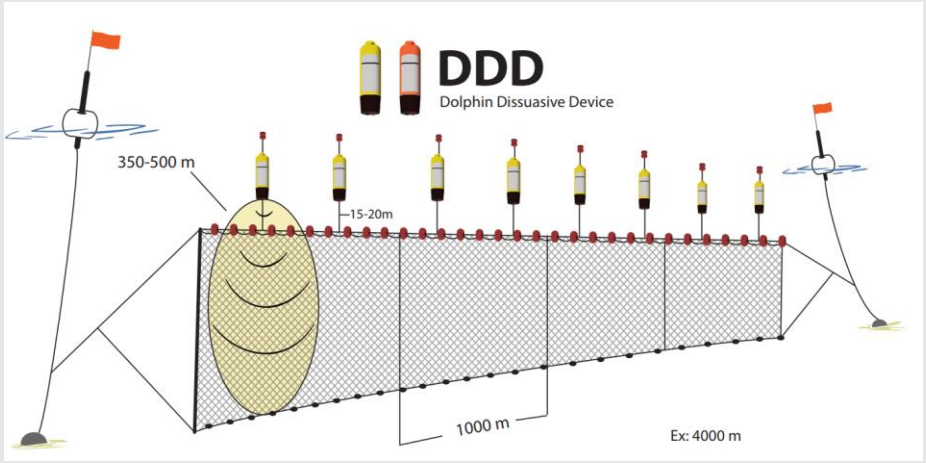
ACTIONS – IN PROGRESS

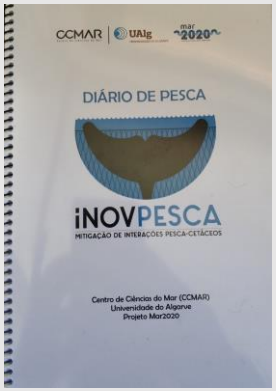
3 TEST AND DEVELOP MITIGATION MEASURES IN COLLABORATION WITH THE FISHING SECTOR

Started Spring 2019

METHODS

- Compare sets with alarms vs sets without alarms (control)
- Gill nets
- 1 vessel Olhão & 1 vessel Quarteira
- Onboard observation & logbooks
  - Interaction Rate; CPUE; Income loss





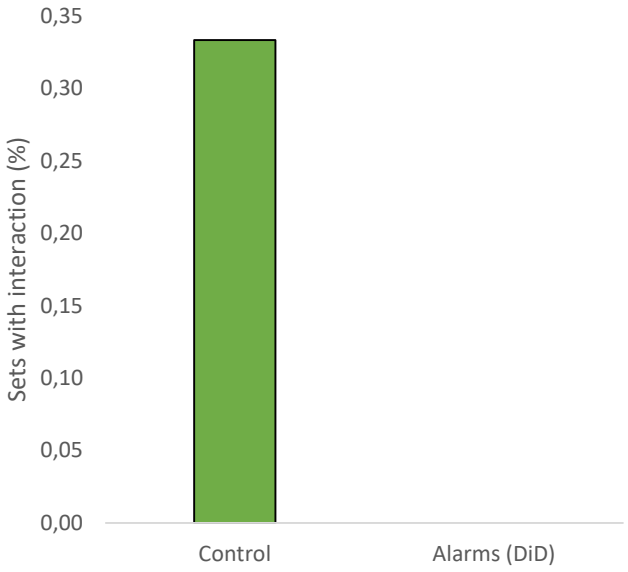
ACTIONS – IN PROGRESS

3

TEST AND DEVELOP MITIGATION MEASURES IN COLLABORATION WITH THE FISHING SECTOR

Started Spring 2019

Interaction Rate = Net and catch loss



ACTIONS – IN PROGRESS

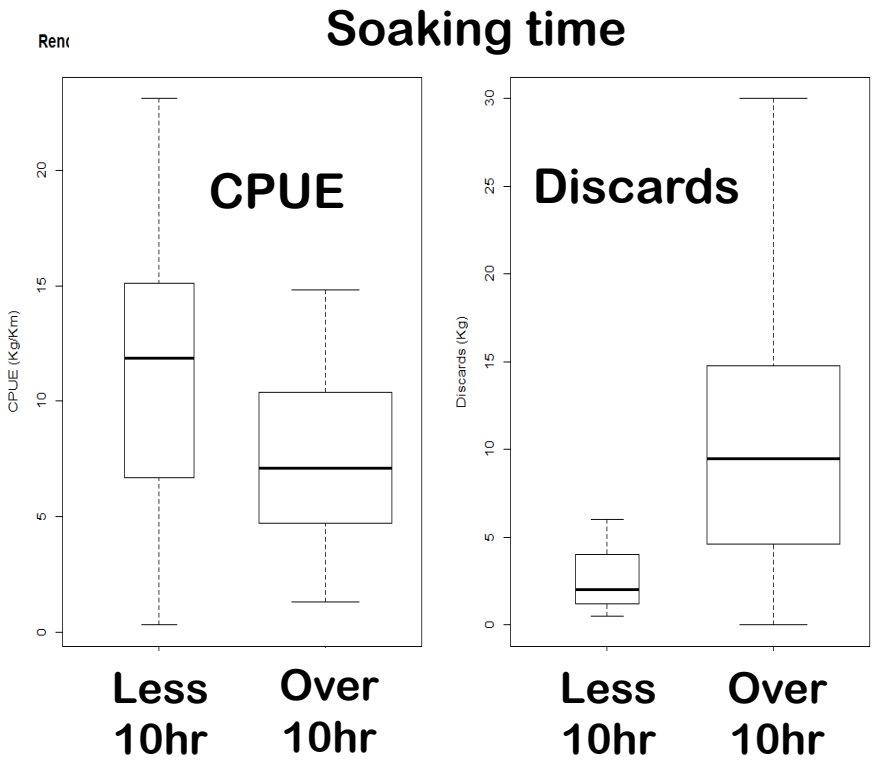
3

TEST AND DEVELOP MITIGATION MEASURES IN COLLABORATION WITH THE FISHING SECTOR

Started Spring 2019

OTHER OUTCOMES FROM THE STUDY

- Reducing soaking time improves CPUE and reduces discards
- Less time the net is in the water = less risk of bycatch of cetaceans



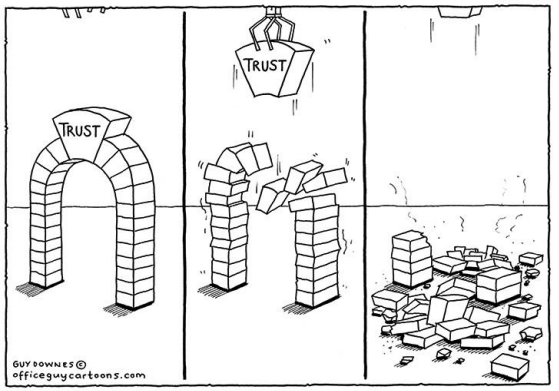
Take away message: Mitigation of bycatch

- **Fishers knowledge** =

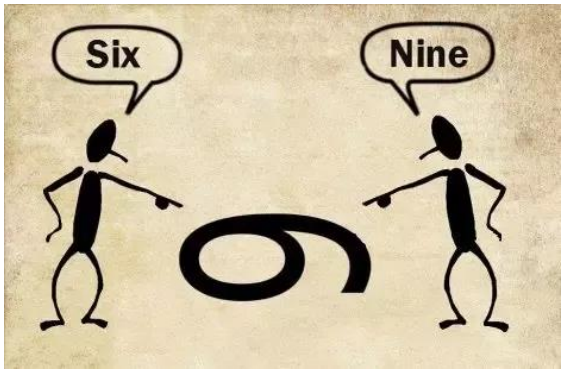
fishing practices provide valuable information on application of mitigation measures/tools; changes of fishing behavior and practices

- **Scientists knowledge** =

development of an experimental design to prove fishers knowledge



CO-MANAGEMENT =
Increase profit + Decrease discards
+
Decrease bycatch
=
FISHERIES SUSTAINABILITY



ACKNOWLEDGMENTS

Volunteer fishermen

CFRG team

IPMA-EPPO team

Associação de Moradores da Ilha da Culatra

OlhãoPesca

Quarpesca

OBRIGADA
GRACIAS
THANK YOU