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# LIFE CYCLE INVENTORY OF FRENCH FISHERIES: AGRIBALYSE FOR SEA PRODUCTS

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# OUTLOOK



## Introduction

### 1) Building framework- scenarios

- 1) Organisation
- 2) Getting the stake-variables
- 3) Getting the framework- scenarios

### 2) Outputs: the generated scenarios

- 1) 7 scenarios out of the DESIRABLE's scope
- 2) 9 scenarios on artisanal scale
- 3) 7 scénarios on an industrial scale

### 3) Conclusion



# ICV PÊCHE PROJECT

A co-constructed project to improve the environmental impact of French fishery sector



## Objectives:

- improve knowledge and methods for environmental impact assessment of fishery products using LCA
- produce Life Cycle Inventories of representative products of French fisheries to include them in the AGRIBALYSE® database

## 15 Partners:

- Representatives of fishermen organizations
- Scientists from INRA and IRD
- engineering consultants

## Financers:

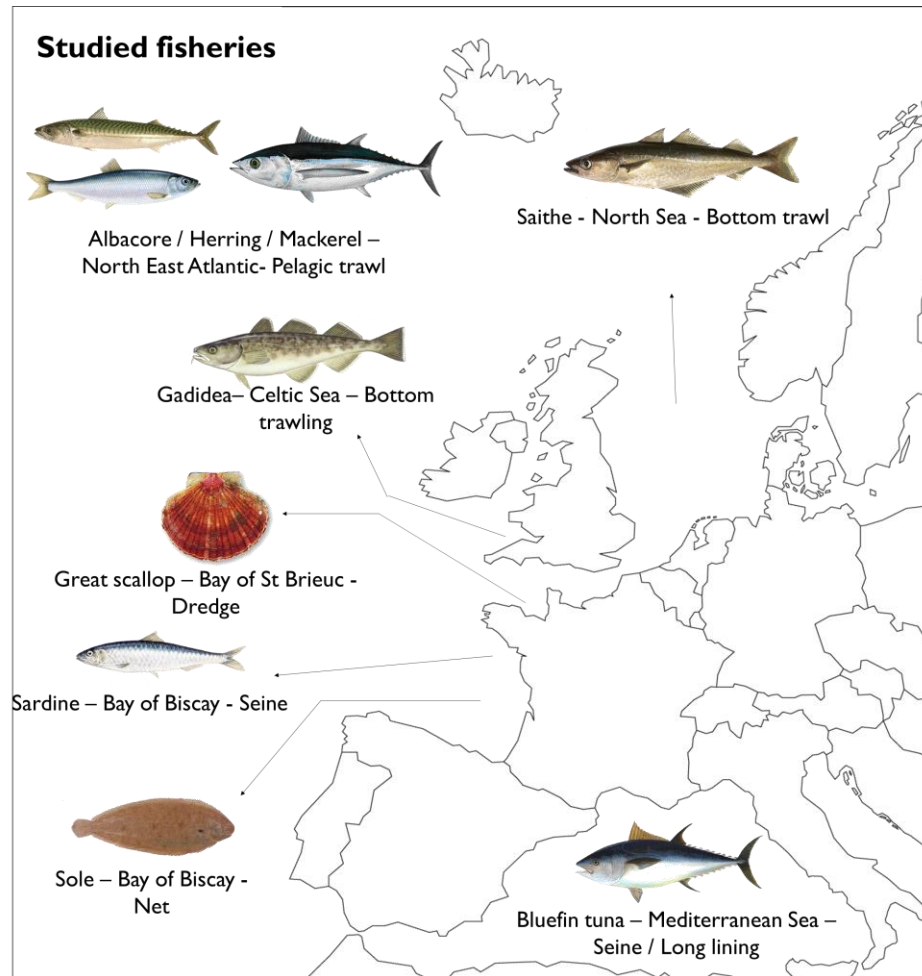
- ADEME
- France Filière Pêche



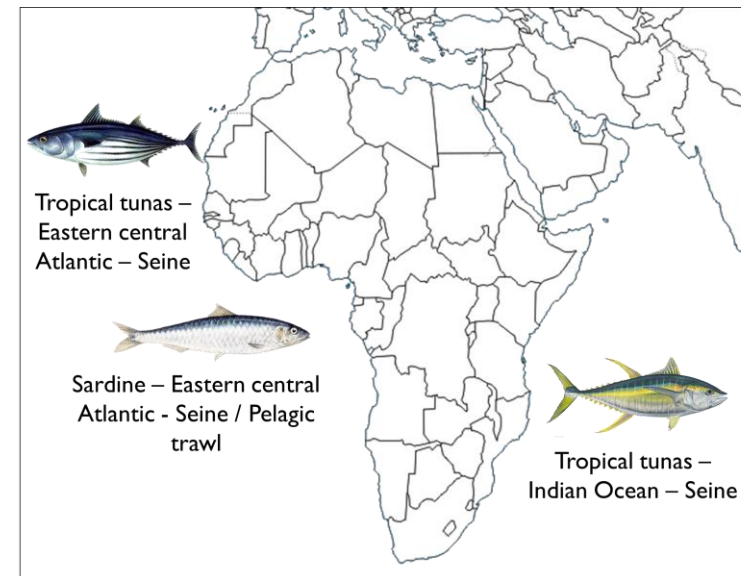
# STUDIED FISHERIES



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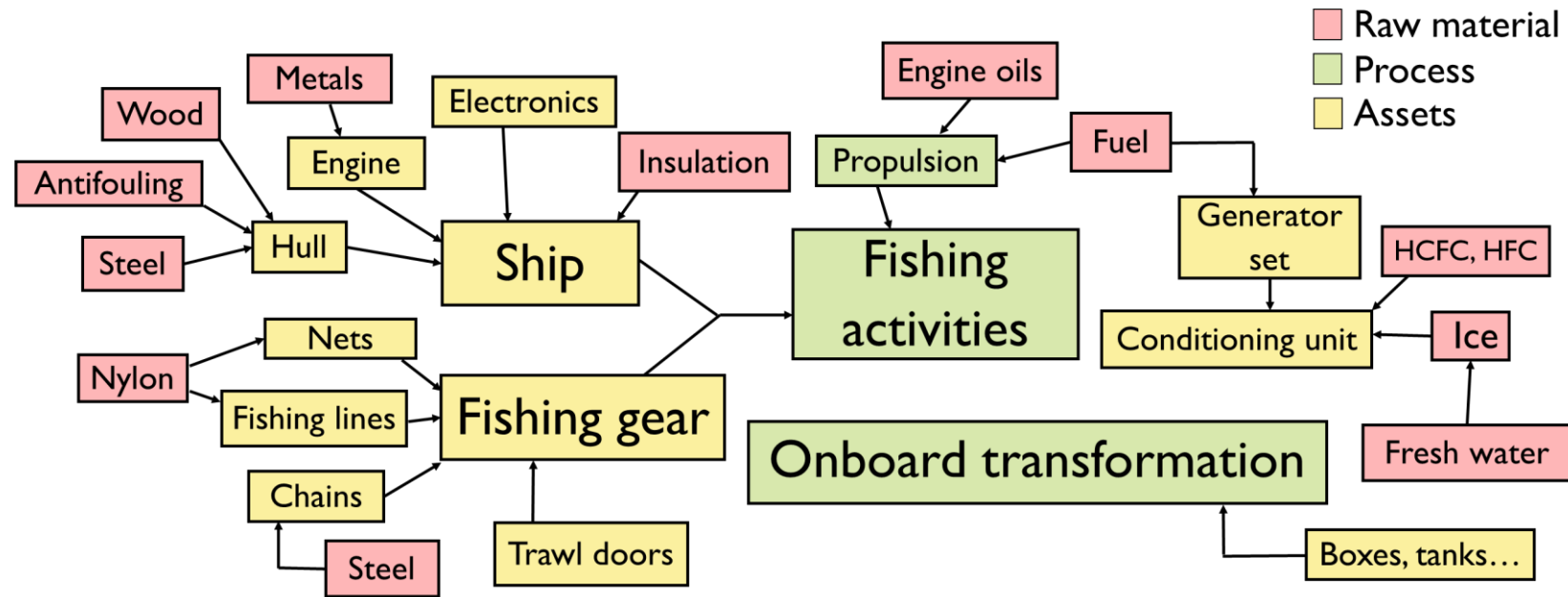
16 Triplets :  
species - fishing gear - fishing area



# LCA SCOPE AND BONDARIES

**Objective : Follow the PEF recommendations and ILCD framework**

- Cradle to gate
- FU : 1 ton of landed product
- Allocation between species : mass basis



# AS AN ILLUSTRATION : 5 TRIPLETS



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- European pilchard (*Sardina pilchardus*) fished in the Bay of Biscay by seine,
- Great scallop (*Pecten maximus*) harvested in Saint Brieuc Bay by dredge,
- Tropical tuna (*Katsuwonus pelamis* and *Thunnus alalunga*) fished in the Eastern-Central Atlantic sea by seine,
- Common sole (*Solea solea*) fished in the Bay of Biscay by trammel net
- Gadids (*Merlangius merlangus*, *Gadus morhua*, *Melanogrammus aeglefinus*) fished in the Celtic Sea by benthic trawl



# LIFE CYCLE INVENTORY



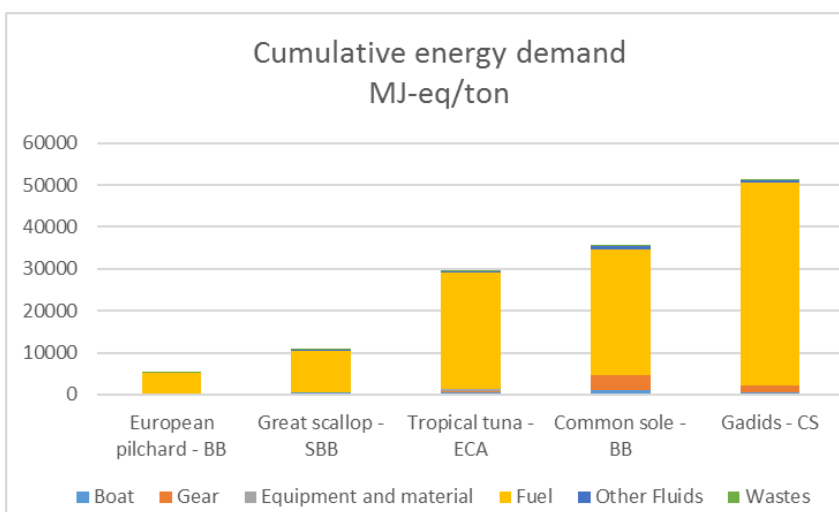
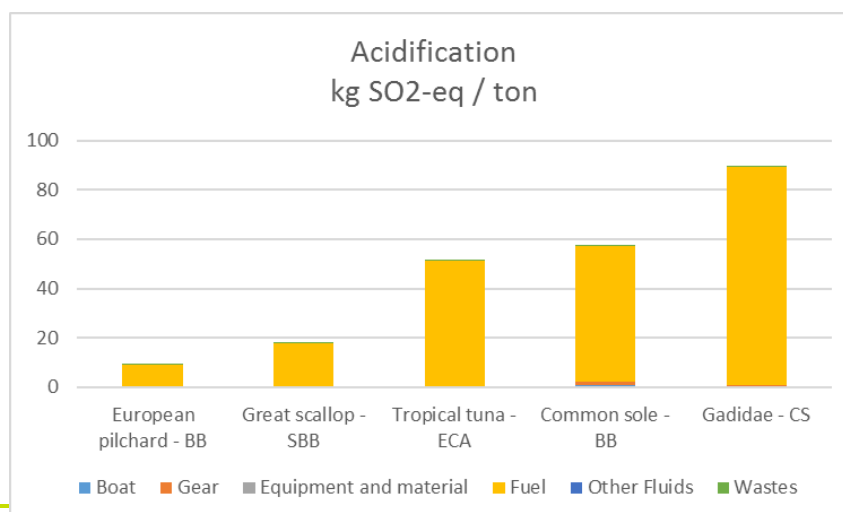
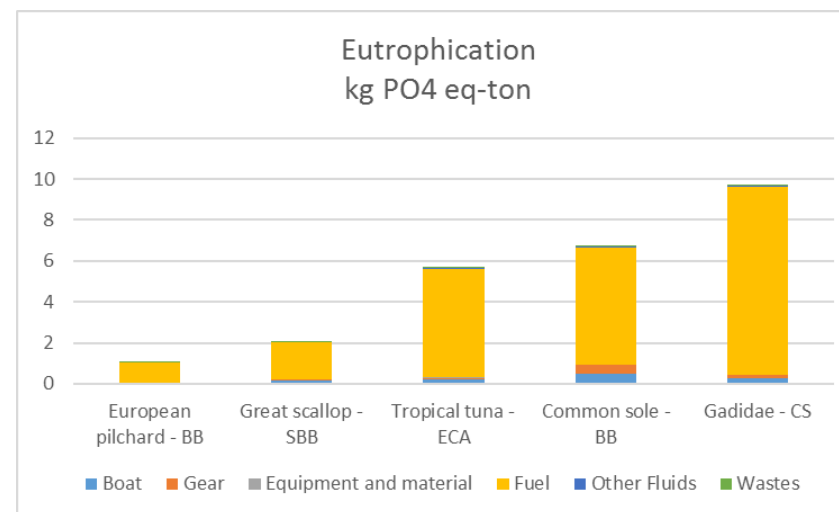
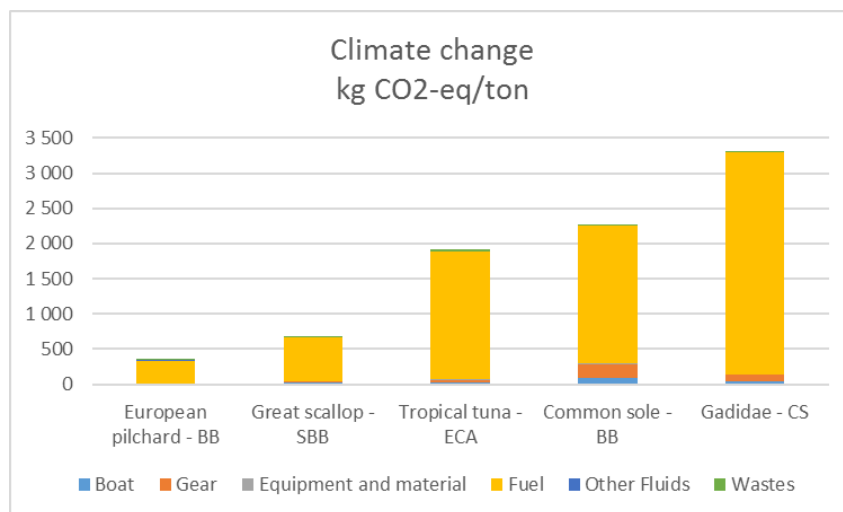
- Survey of 20-30 fishermen per triplet during 2016-2018
- Landings 2011-2015
- Use of national database on landing and by-catch



# IMPACT ASSESSMENT FOR 1 TON OF LANDED FISH



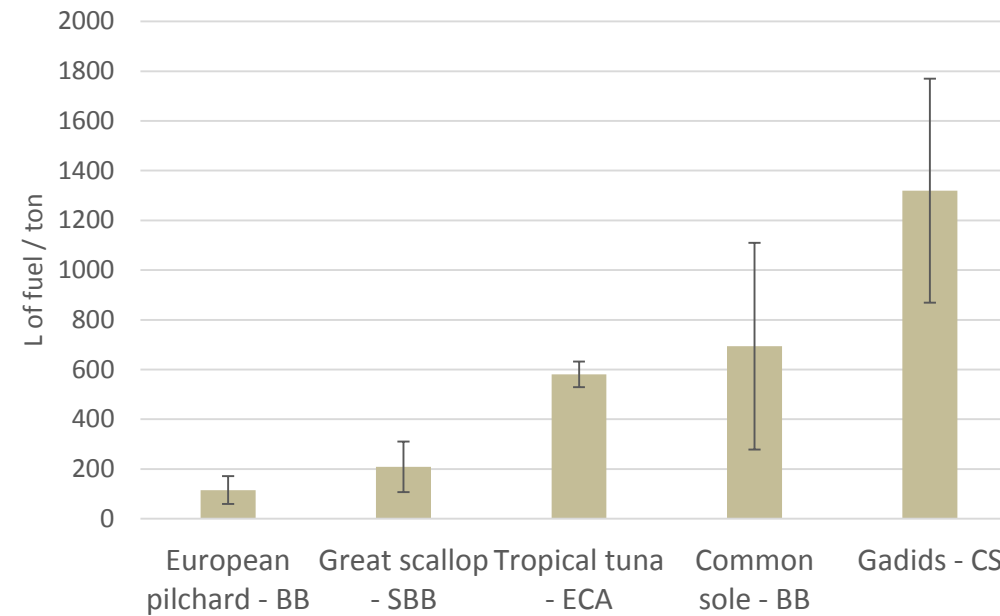
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# FUEL CONSUMPTION



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# CHOICE OF BIOTIC IMPACTS FOR FISHERIES



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**Several types of impacts of fishery on marine ecosystem:**

- on **fish stocks** by resource harvesting
- on habitats specifically benthos
- on species equilibrium and trophic chains
- On marine biodiversity

**Indicators:**

- Availability in littérature
- Sensitivity
- Equity (relevant for all types of fishery)
- Availability of data
- LCA compliant

Selected with scientists and  
fishery representatives



# PRESSURE ON FISH STOCKS



$$I_{\text{Stocks}} = (\text{Fish mass} \times CF + \text{Discarded mass} \times CF) / \text{Fish mass}$$

$$CF = \left( \frac{F}{F_{\text{MSY}}} - 1 \right) \cdot \frac{1}{B}$$

F : Pressure on fish stock

MSY: Maximum Sustainable Yield

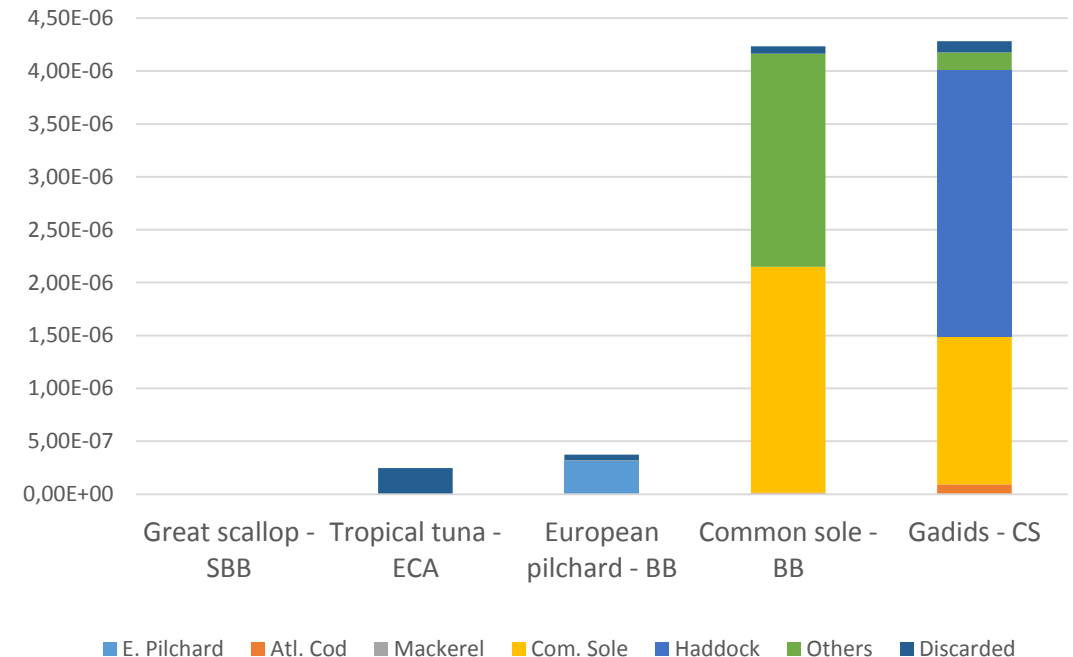
B: Biomass

Based on littérature :

**Emanuelson A., Ziegler F., Pihl L., Sköld M. & Sonesson U., 2014.** Accounting for overfishing in life cycle assessment: New impact categories for biotic resource use. International Journal of Life Cycle Assessment. 19(5). pp 1156-1168. 13 p.

**Froese, R., Demirel, N., Coro, G., Kleisner, K.M., Winker, H. 2017.** Estimating fisheries reference points from catch and resilience. Fish and Fisheries. 18, 506-526.

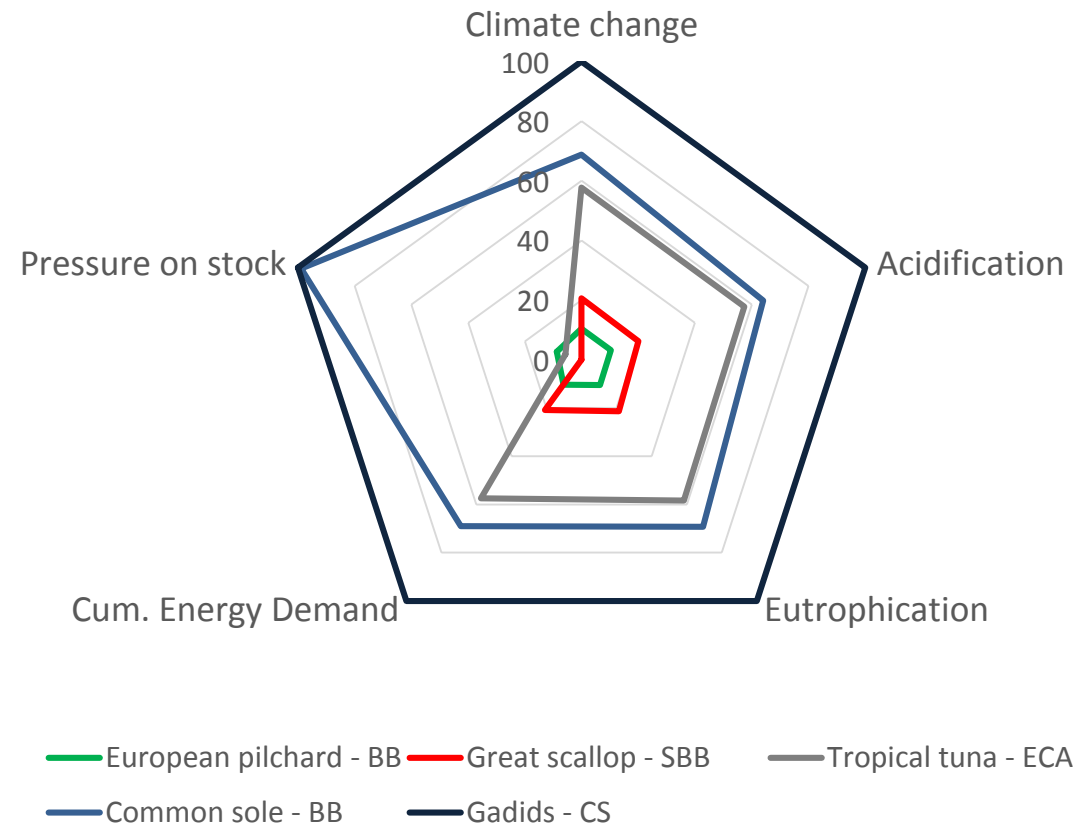
**Hélias, A., Langlois, J., Fréon, P., 2018.** Fisheries in life cycle assessment: Operational factors for biotic resources depletion. Fish and Fisheries. In press.



# IMPACT COMPARISON



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# COMMENTS



## General Trends

- More fuel consumption with benthic trawling
- Less environmental impact for monospecific pelagic fisheries (pilchard)
- The consumable protein yield should be taken into account (Scallops)
- Plurispecific artisanal fisheries have higher pressure on stocks

## Limits

Precise data on landings is difficult to obtain

By-catches and discarded are difficult to evaluate and statistics are scarce

Other impacts on marine ecosystem should be implemented



# CONCLUSION

- A first experiment on French fisheries achieved
- A constructive dialogue between the partners to build perspectives for fisheries
- Tools for data collection, a methodological report with details on practices, are available for further LCA studies
- A database to be implemented in the national Agribalyse database
- A new project to better analyse and exploit data





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**THANK YOU FOR YOUR ATTENTION**

