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LIFE CYCLE INVENTORY OF FRENCH FISHERIES: AGRIBALYSE FOR SEA PRODUCTS

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OUTLOOK



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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



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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:

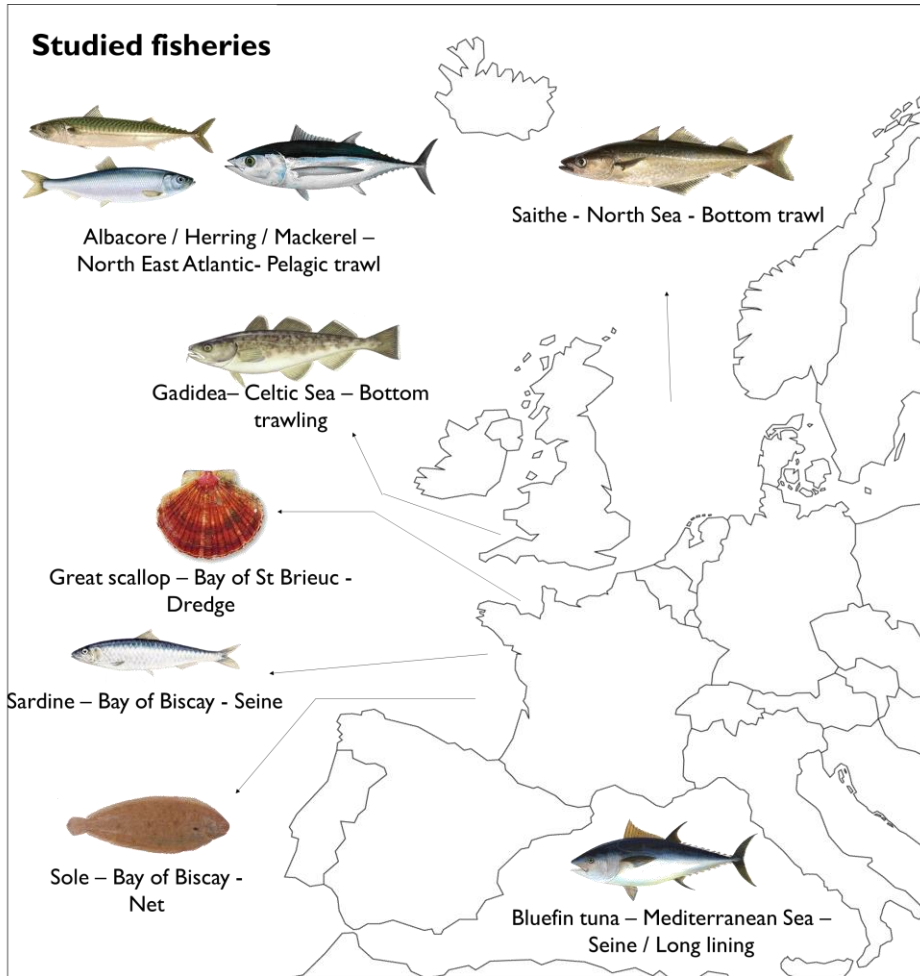
- ADEME
- France Filière Pêche



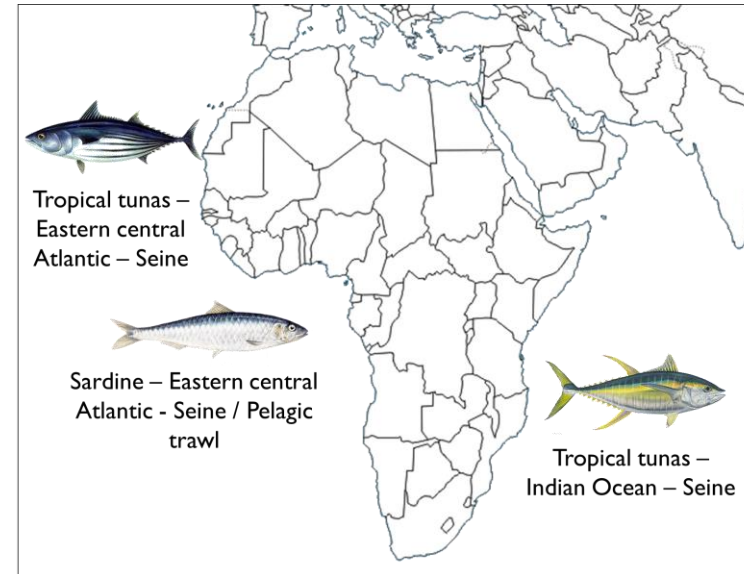
STUDIED FISHERIES



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16 Triplets :
species - fishing gear - fishing area



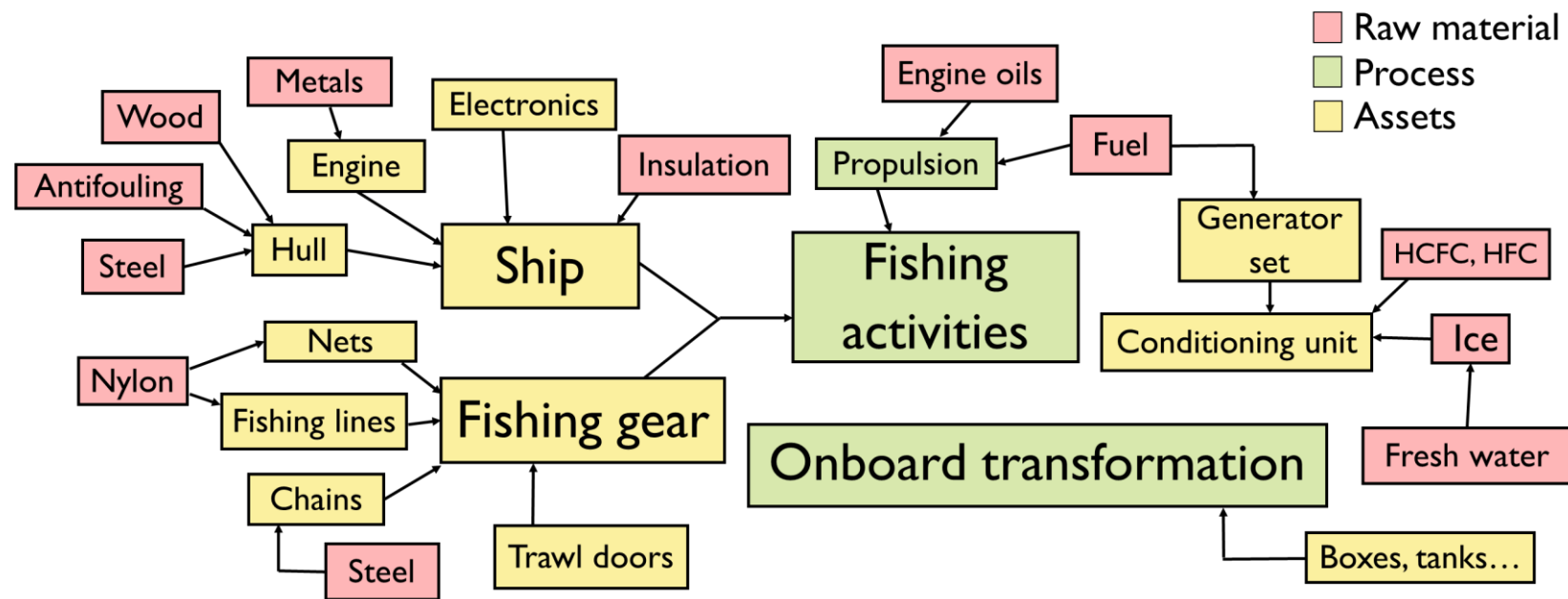
LCA SCOPE AND BONDARIES



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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 Brieuç 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



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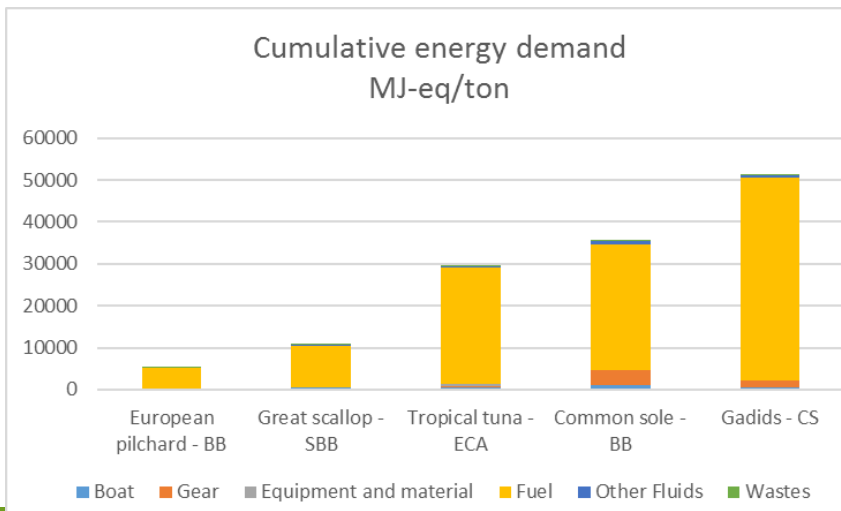
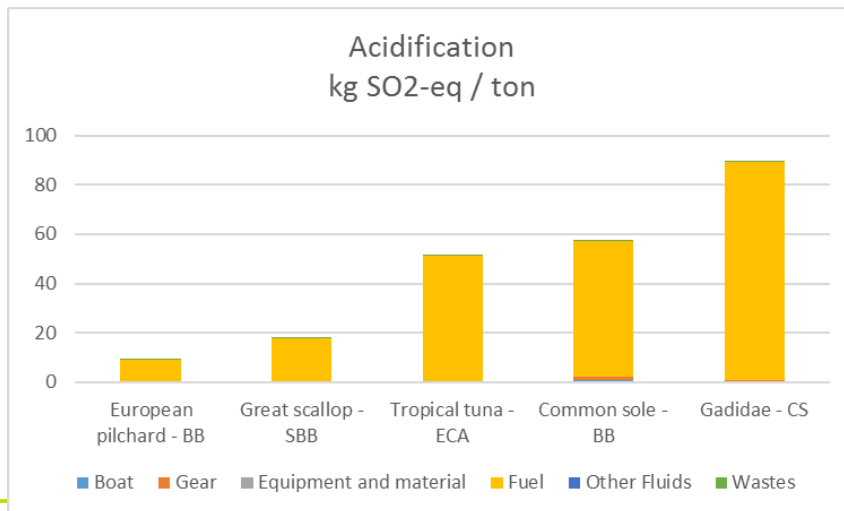
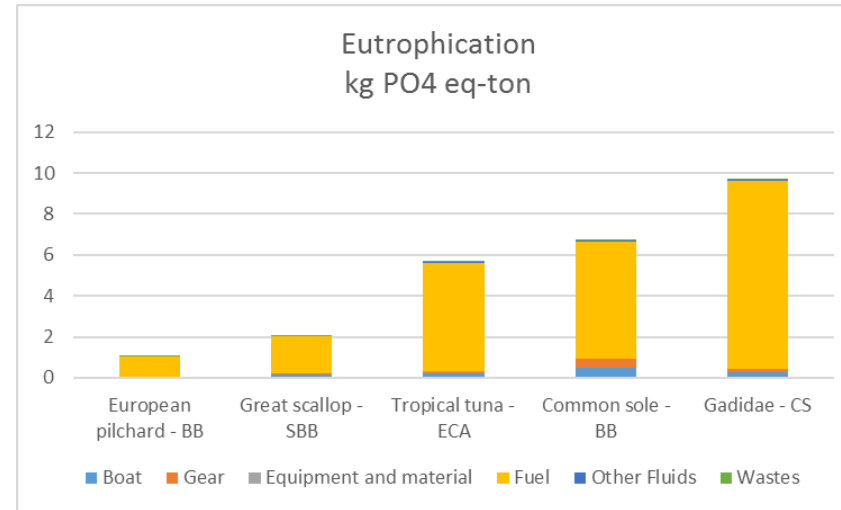
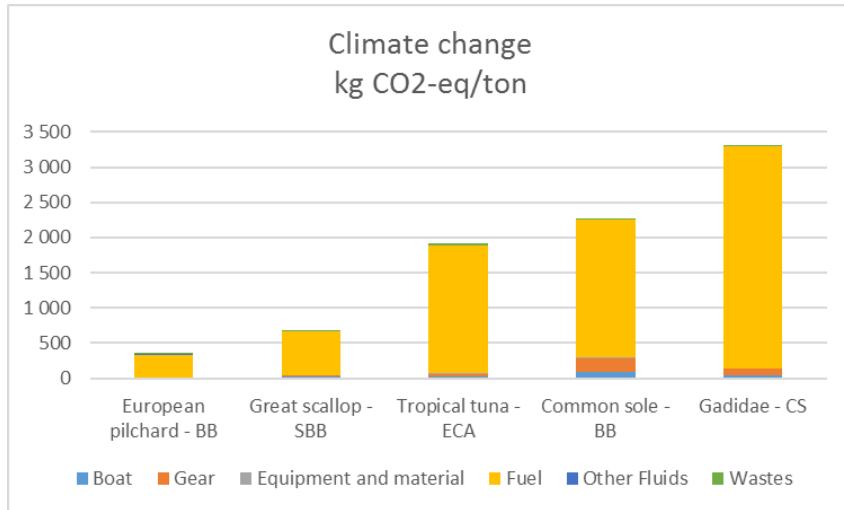
- Survey of 20-30 fishermen per triplet during 2016-2018
- Landings 2011-2015
- Use of national database on landing and by-catch



IMPACT ASSESSMENT FOR 1 TON OF LANDED FISH



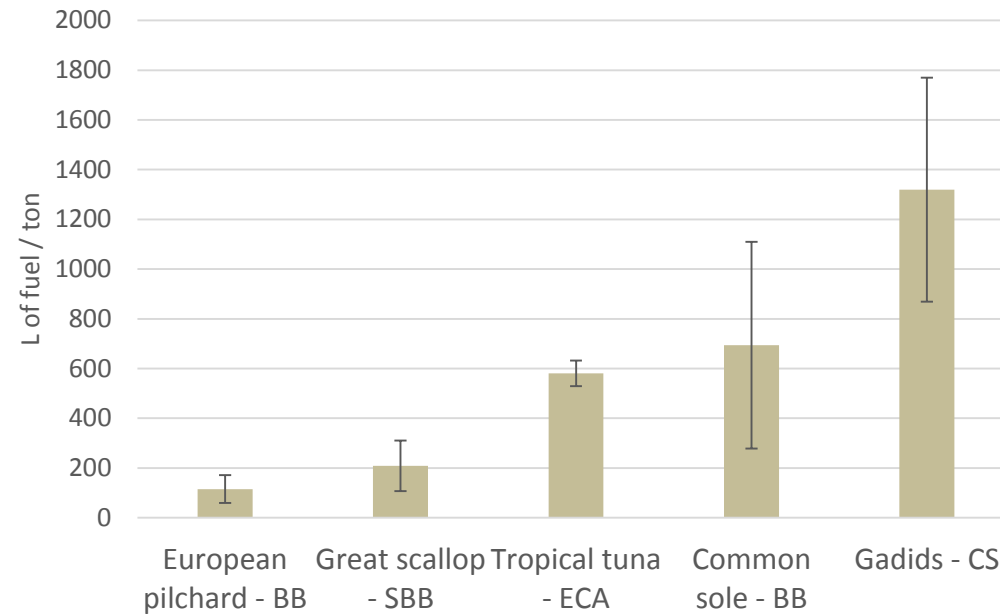
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FUEL CONSUMPTION



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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



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

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

F : Pressure on fish stock

MSY: Maximum Sustainable Yield

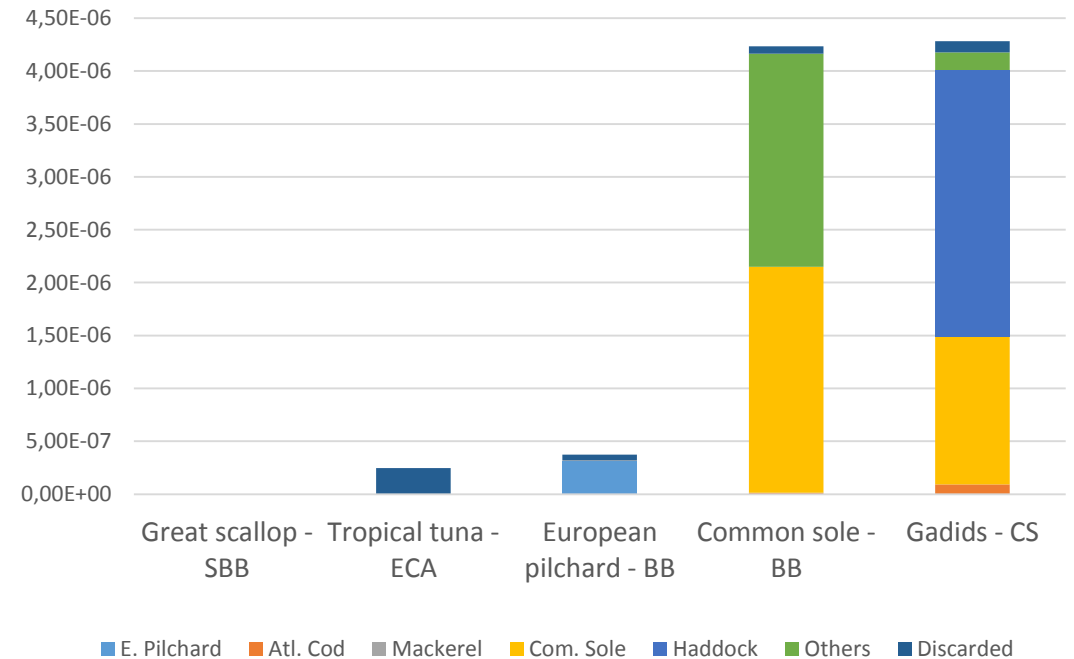
B: Biomass

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.

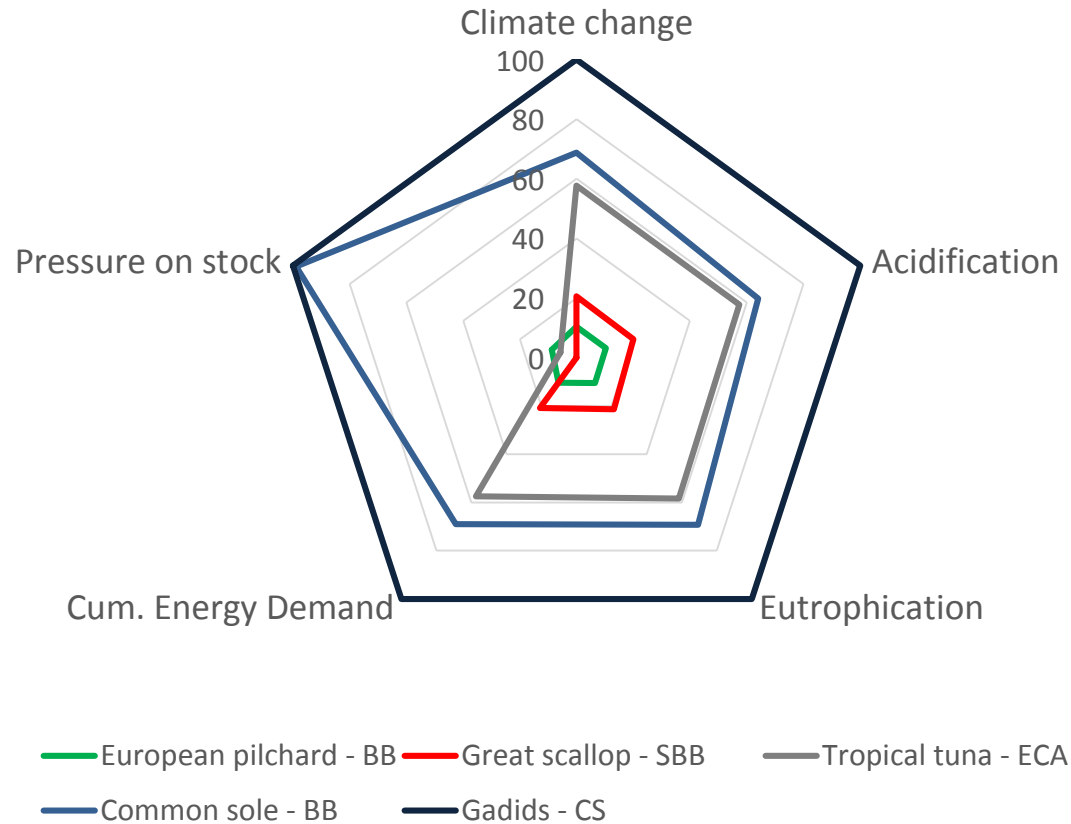
Hélias, A., Langlois, J., Fréon, P., 2018. Fisheries in life cycle assessment: Operational factors for biotic resources depletion. *Fish and Fisheries*. In press.



IMPACT COMPARISON



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COMMENTS



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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

