

# The vulnerability approach as economic analytical framework to assess aquaculture sustainability



Crédits: © huîtres-de-bretagne.

PhD Sudent. Julien Timor<sup>†</sup>  
Dr. H. Rey-Valette\*  
Dr. J.A. Pérez Agúndez<sup>†</sup>  
Dr. S. Girard<sup>†</sup>



<sup>†</sup>Ifremer, Univ Brest, CNRS, UMR 6308, AMURE, Unité d'Economie Maritime, IUEM, France  
<sup>\*</sup>Université Montpellier 1, CNRS, UMR 1135, LAMETA, France

# THE FRENCH OYSTER FARMING SYSTEM IN 'CRISIS'... AGAIN

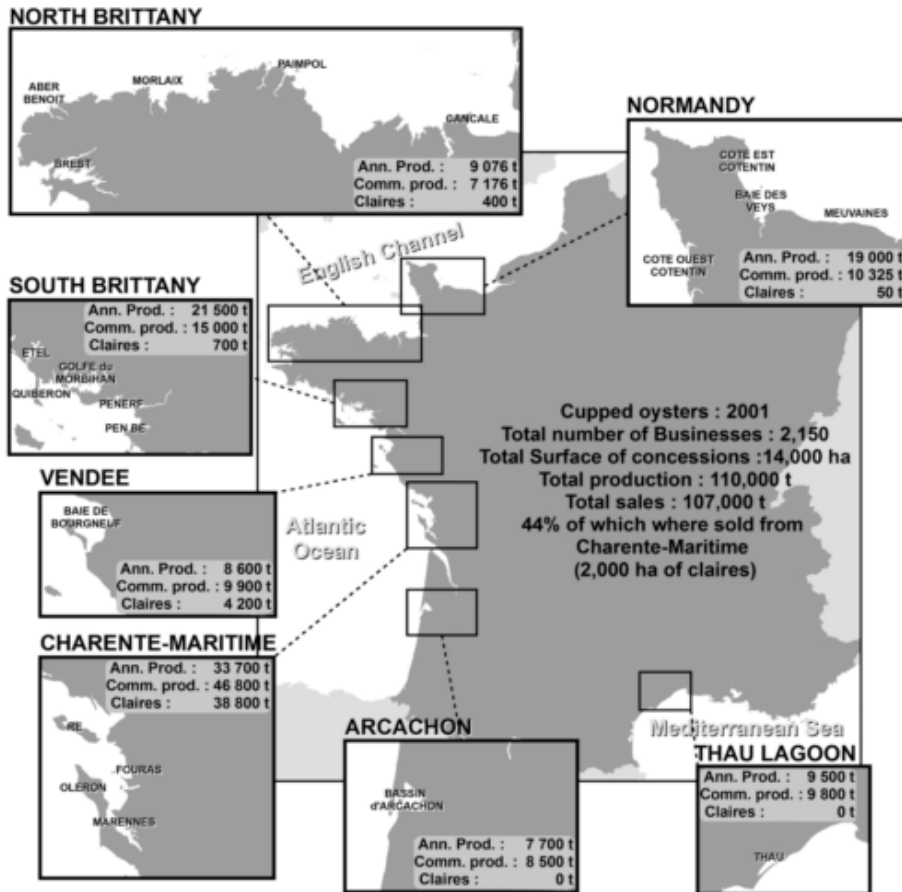


Figure 3. Main characteristics of French oyster rearing areas (data from the 2001 National Census, Girard et al. 2005). All figures are in metric tonnes. Ann. Prod., annual production; Claires, oysters refined in oyster ponds (*claires*); Comm. Prod., commercialized production (amount marketed).

- Seven basins of production
- Some basins have their specialities
- Internal market logic between producers

## Inter-regional dependency

# THE FRENCH OYSTER FARMING SYSTEM IN 'CRISIS'... AGAIN

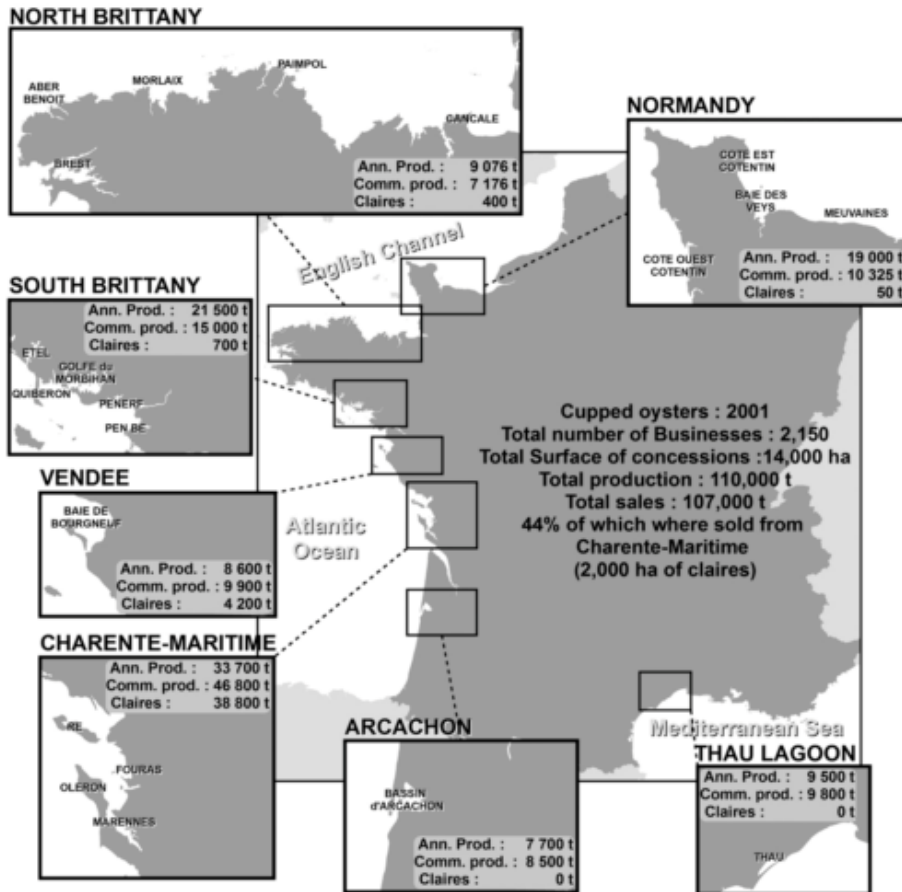


Figure 3. Main characteristics of French oyster rearing areas (data from the 2001 National Census, Girard et al. 2005). All figures are in metric tonnes. Ann. Prod., annual production; Claires, oysters refined in oyster ponds (*claires*); Comm. Prod., commercialized production (amount marketed).

- Small family companies
- Diversity in strategy to produce oyster and sell them.
- Individualist thoughts

**Inter-regional dependency**

**Diversity of strategies / representation**

# THE FRENCH OYSTER FARMING SYSTEM IN 'CRISIS'... AGAIN

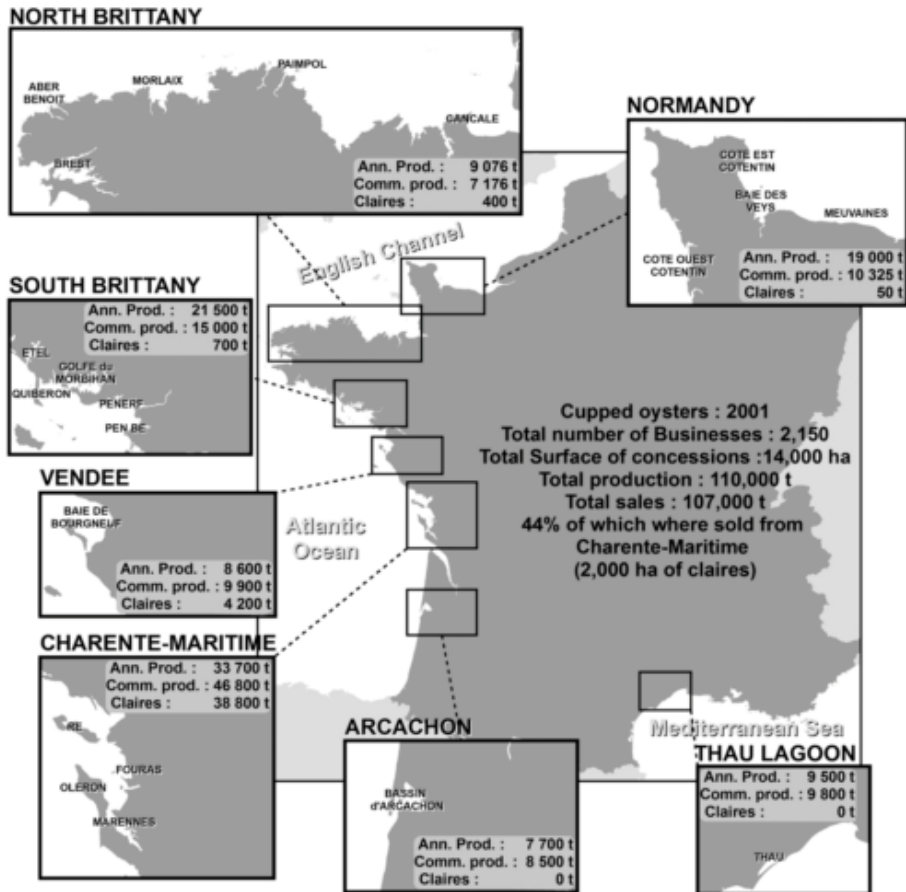


Figure 3. Main characteristics of French oyster rearing areas (data from the 2001 National Census, Girard et al. 2005). All figures are in metric tonnes. Ann. Prod., annual production; Claires, oysters refined in oyster ponds (*claires*); Comm. Prod., commercialized production (amount marketed).

**Inter-regional dependency**

**Diversity of strategies / representation**

**Conflict of interest and hard to get a collective management**

# THE FRENCH OYSTER FARMING SYSTEM IN 'CRISIS'... AGAIN

BUESTEL ET AL.

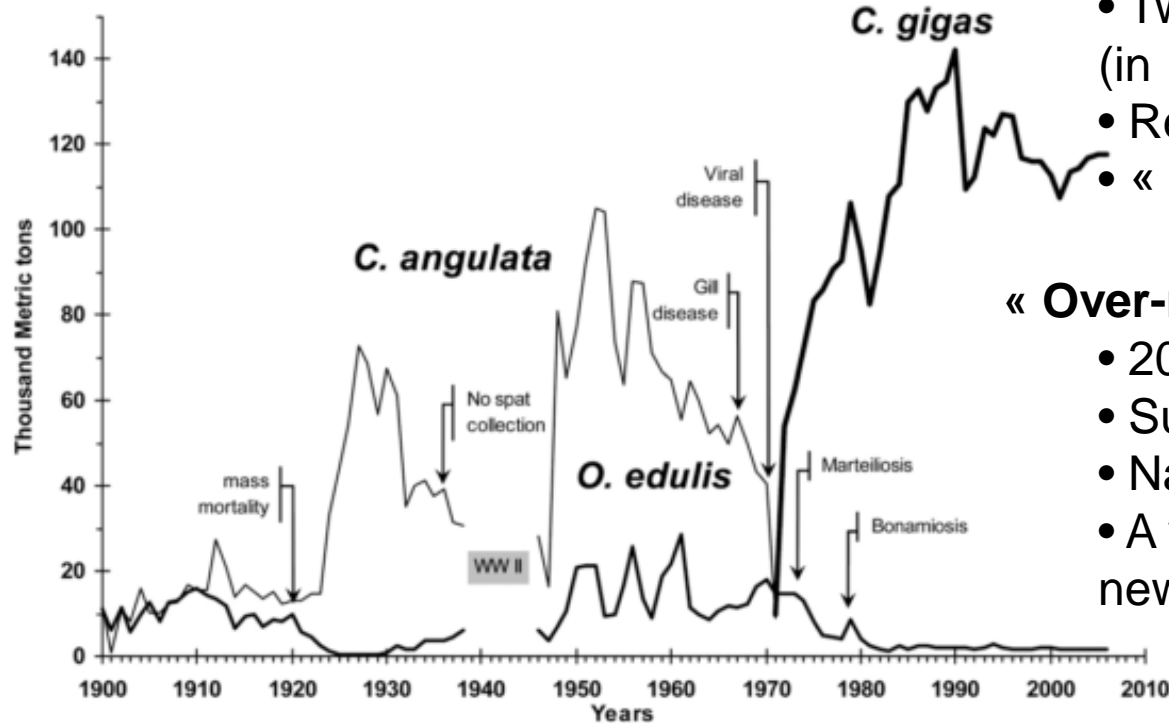


Figure 1. Historical trends of French oyster production (adapted from Héral 1989).

## Mortalities events:

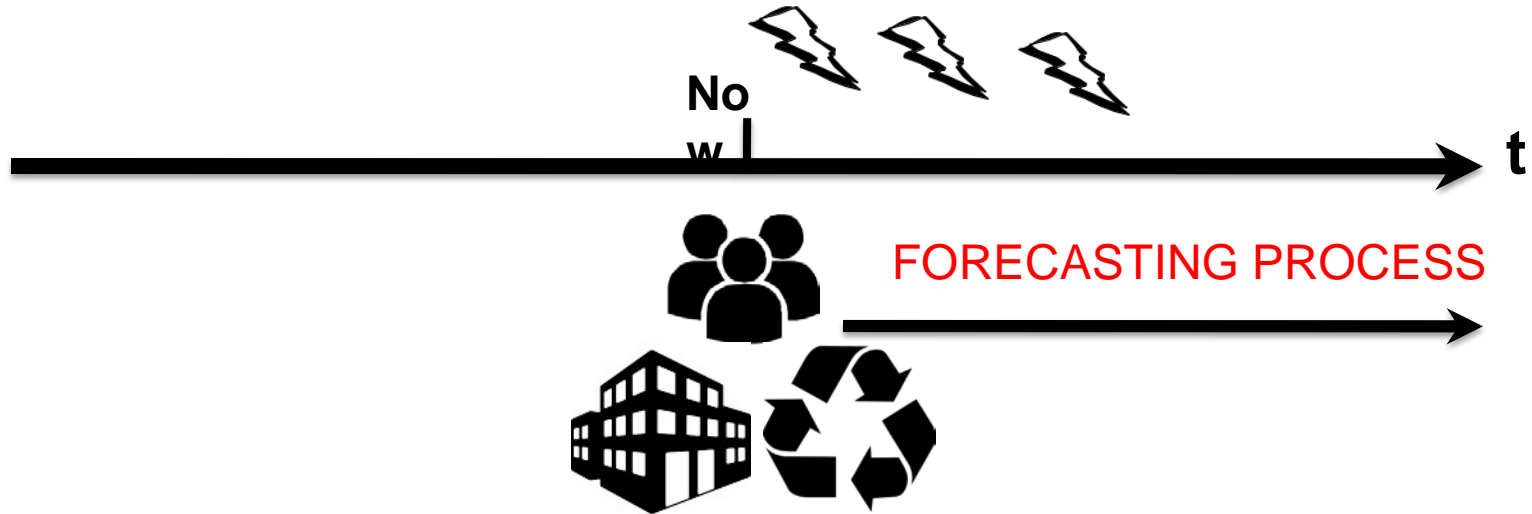
- Two epizootic diseases (in 1920 and in 1970)
- Regional mortalities
- « Normal » mortalities

## « Over-mortalities » crisis:

- 2008 ± 2014.
- Suddenly increase mortality rate
- National phenomenon
- A virus already known but with a new genetic code  $\mu$ var OsHV-1.

Does the oyster farming sector build its own fragility ?

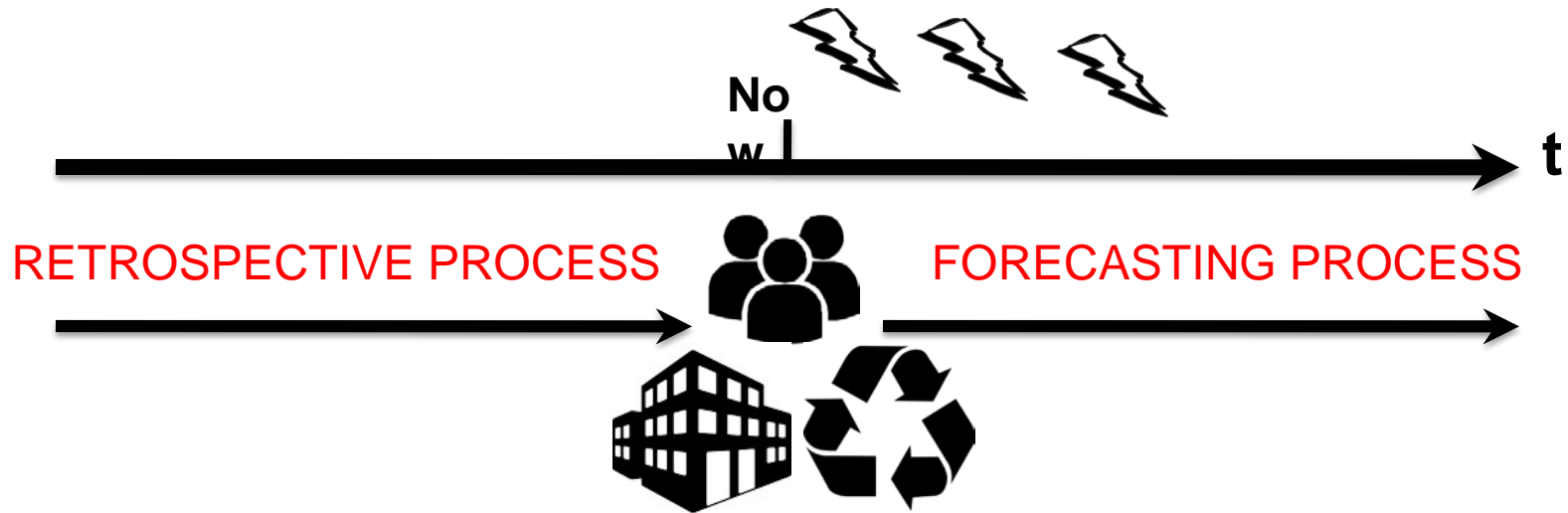
# THE VULNERABILITY FRAMEWORK



FORECASTING PROCESS	
Objectif	Identify criteria of vulnerability
Method	Exposure; Sensitivity; Adaptative capacity (Exogeneous hazard)
Principe	Decision aid To maintain present issues against future changes

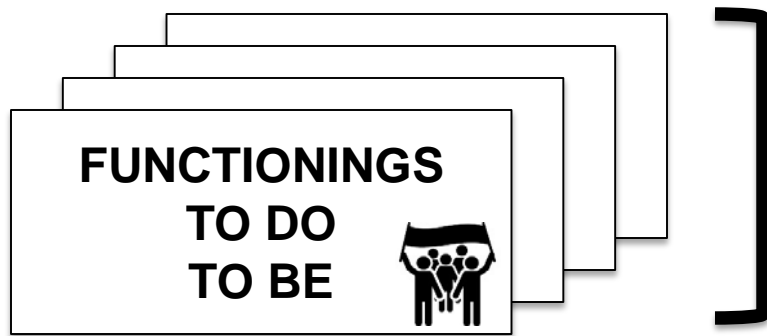


# THE VULNERABILITY FRAMEWORK

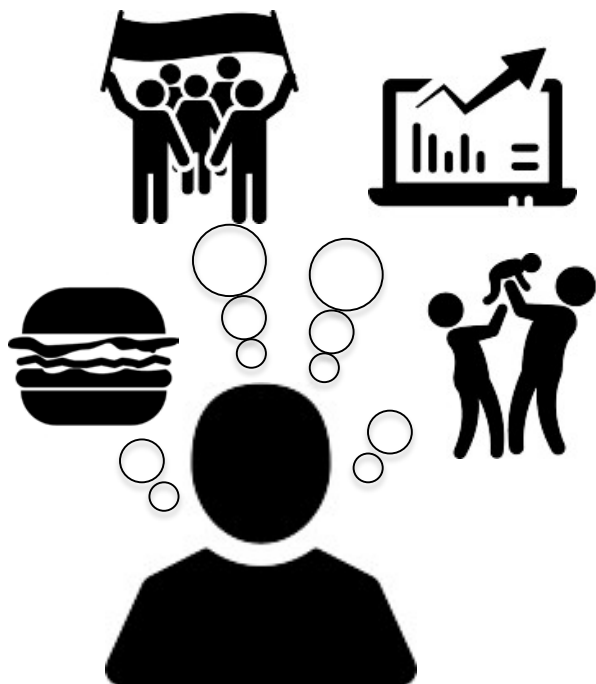


	RETROSPECTIVE PROCESS	FORECASTING PROCESS
Objectif	Identify mechanism of vulnerability	Identify criteria of vulnerability
Method	Adaptative capacity → Implications on context (Endogeneous hazard)	Exposure; Sensitivity; Adaptative capacity (Exogeneous hazard)
Principe	Managing practices Discussing the development of economic activities	Decision aid Keeping present issues against future changes

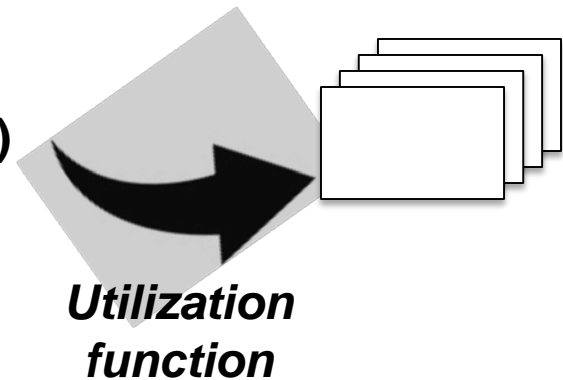
# THE CAPABILITY APPROACH



**CAPABILITIES**  
=  
*Ability to realize, within a set of possibilities, functionings that we wish to accomplish*  
=  
*Freedom to choose*



Goods  
(Means)



---

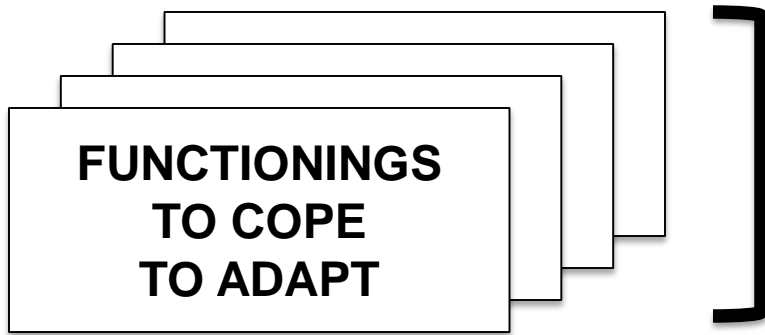
Personal  
Characteristics

Opportunities  
(contextual)

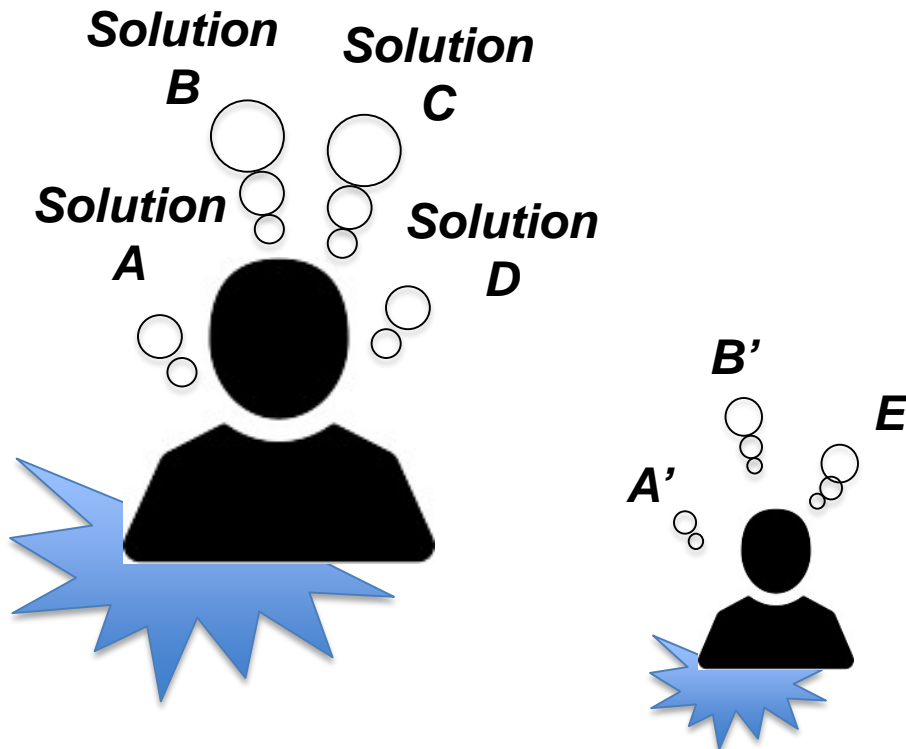
---



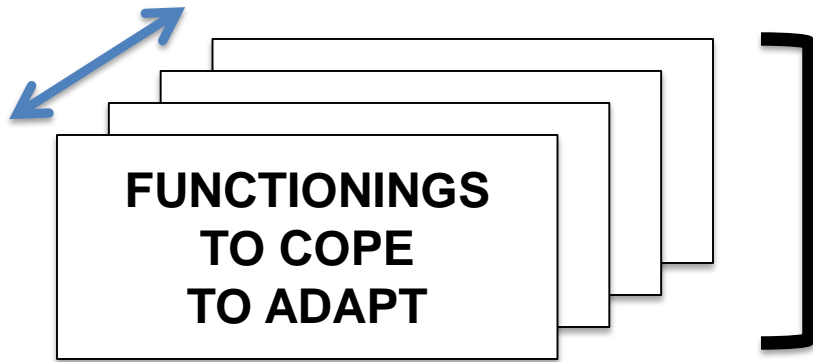
# FRAMEWORK BASED ON THE CAPABILITY APPROACH



**CAPABILITIES**  
=  
*Ability to realize, within a set of possibilities, solutions adapted to the situation*



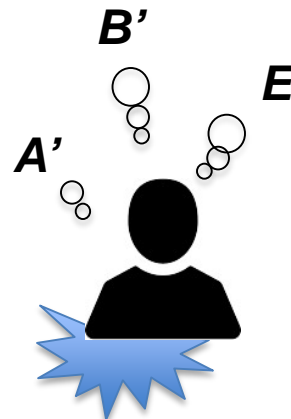
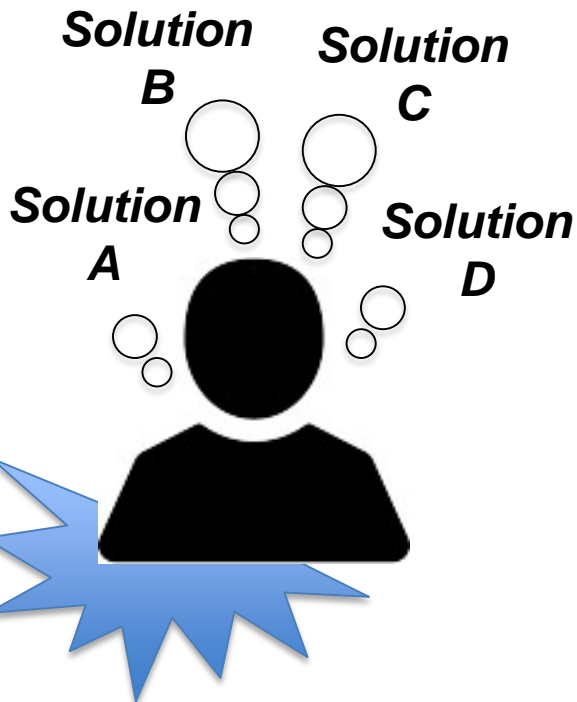
# FRAMEWORK BASED ON THE CAPABILITY APPROACH



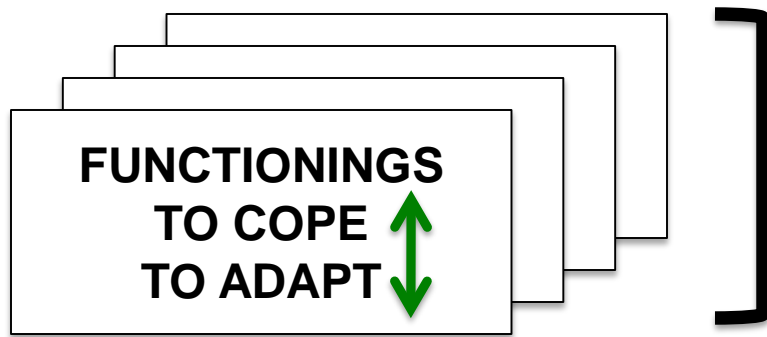
**CAPABILITIES**  
=  
*Ability to realize, within a  
set of possibilities,  
solutions adapted to the  
situation*

**POWER TO  
CHOOSE**

Goods  
(capital)



# FRAMEWORK BASED ON THE CAPABILITY APPROACH



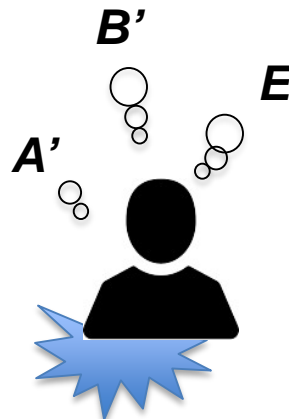
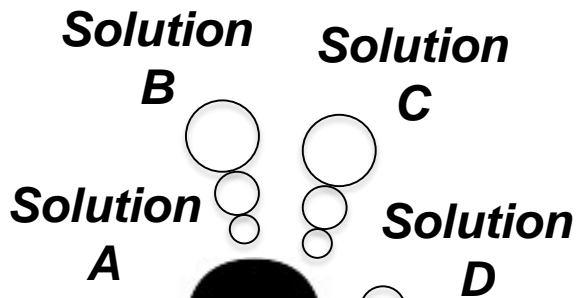
**CAPABILITIES**  
=  
*Ability to realize, within a set of possibilities, solutions adapted to the situation*

**POWER TO CHOOSE**

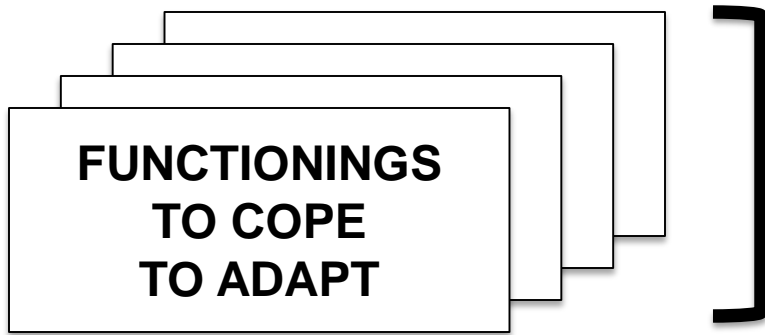
Goods  
(capital)

**SPAN OF CHOICES**

Person. Caract  
Opportunities  
(contextual)



# FRAMEWORK BASED ON THE CAPABILITY APPROACH



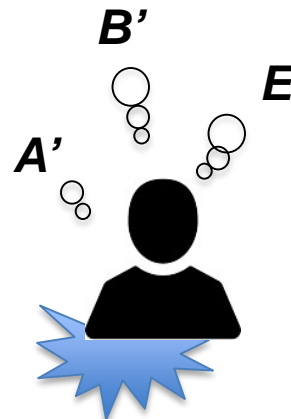
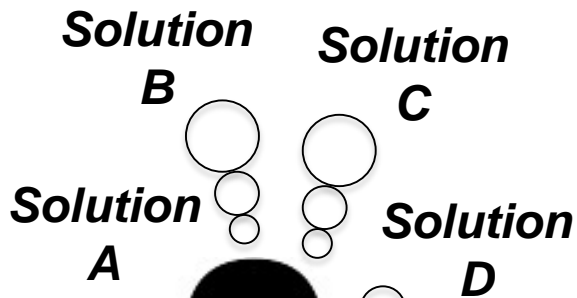
**CAPABILITIES**  
=  
*Ability to realize, within a set of possibilities, solutions adapted to the situation*

**POWER TO CHOOSE**

Goods  
(capital)

**SPAN OF CHOICES**

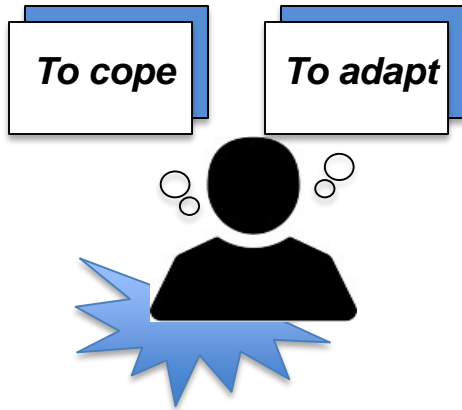
Person. Caract  
Opportunities  
(contextual)



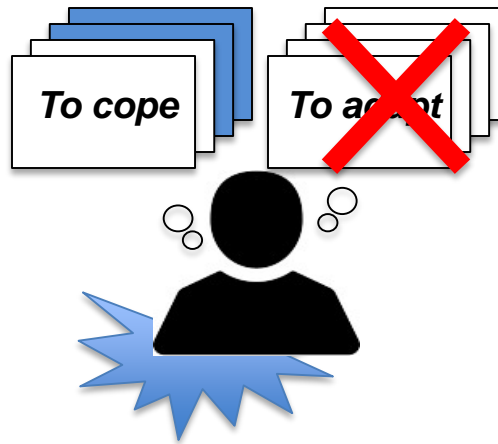
*Weak freedom to choose*  
=  
*Place of vulnerability*

# PLACE OF VULNERABILITY

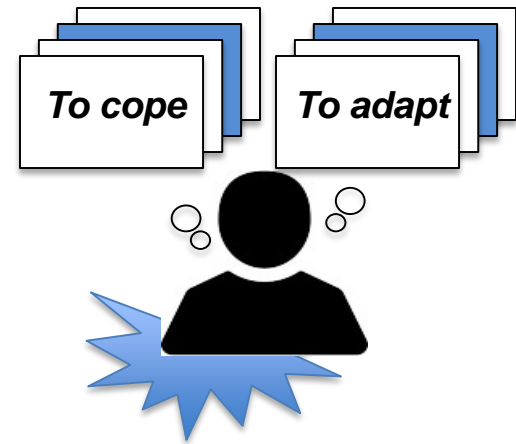
*Lack of solution*



*Lack in type of solution*



*Obligation to choose  
(Dependency situation)*



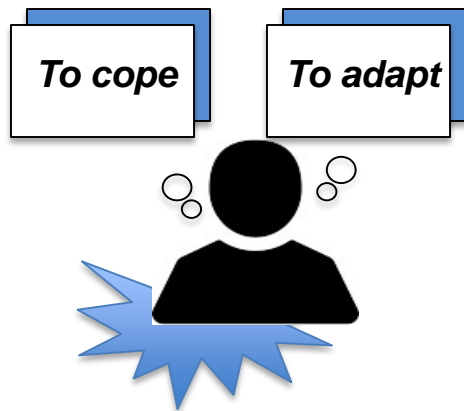
**3 PLACES OF VULNERABILITY**



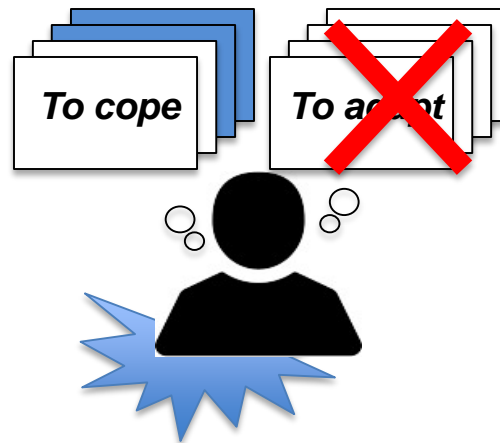
**Practices that increase the dependency level, or decrease the set of possible solutions get the sector more vulnerable**

# METHOD SELECTED

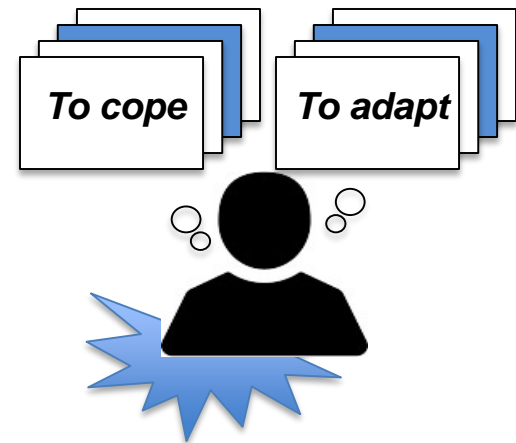
*Lack of solution*



*Lack in type of solution*



*Obligation to choose  
(Dependency situation)*



## 3 PLACES OF VULNERABILITY



---

Lack of solutions (and type of solutions)  
+ track reasons  
+ discussing choices made

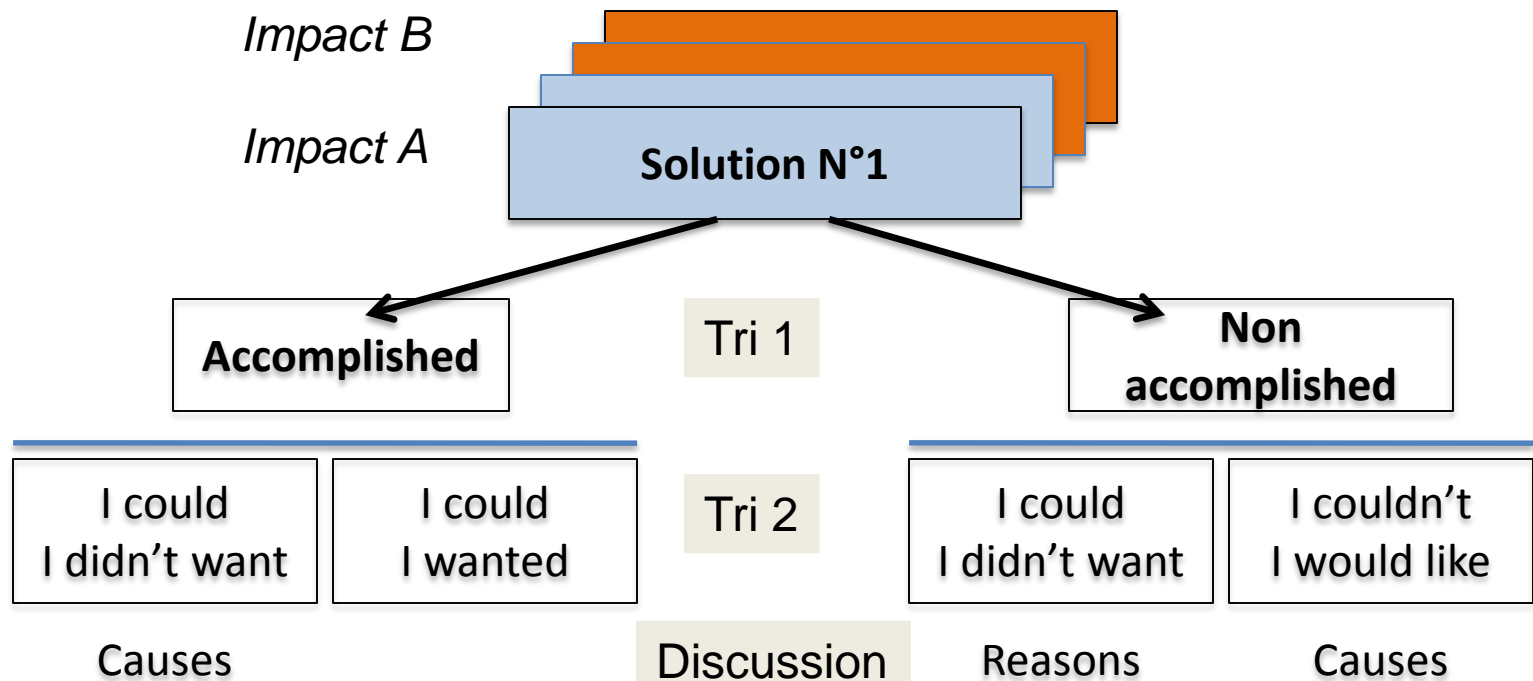
Type of dependency situation  
+ track reasons  
+ discussing choices made

# METHOD SELECTED

Step I: Identification of realized actions by type of impacts

- Open Interview on osyter farmer experience facing mortalities.
- Literature review to complement

Step II: Identification and explanation of the vulnerability places





## Interests to link the concept of vulnerability to the approach of capability:

- It allows to analyze negative adaptative capacity.
- It is relevant to understanding the evolution of the sector and the emergence of paradoxical practices such as oyster tranfers.

## Regarding the sector management:

- This work highlights negative practices that increase situation of dependency or decrease the liberty to choose.
- Decreasing situation of dependency is necessary to guarantee the sustainability of the oyster farming system.

# THANK YOU FOR YOUR ATTENTION



Crédits: © huîtres-de-bretagne.

**Julien.timor@ifremer.fr**  
**Jose.Perez@ifremer.fr**

**Sophie.Girard@ifremer.fr**  
**helene.rey-valette@univ-montp1.fr**

*This work was supported by the "Laboratoire d'Excellence" LabexMER (ANR-10-LABX-19) and co-funded by a grant from the French government under the program "Investissements d'Avenir".*

