



River restoration as an adaptation to climate change:

Towards a definition of socio-ecological resilience, the case of Flume river in Brittany

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Context of the research

Research project MORPHEUS :

« From rivers hydromorphology restoration to rivers uses : involving multiple stakeholders and local expectations and practices »

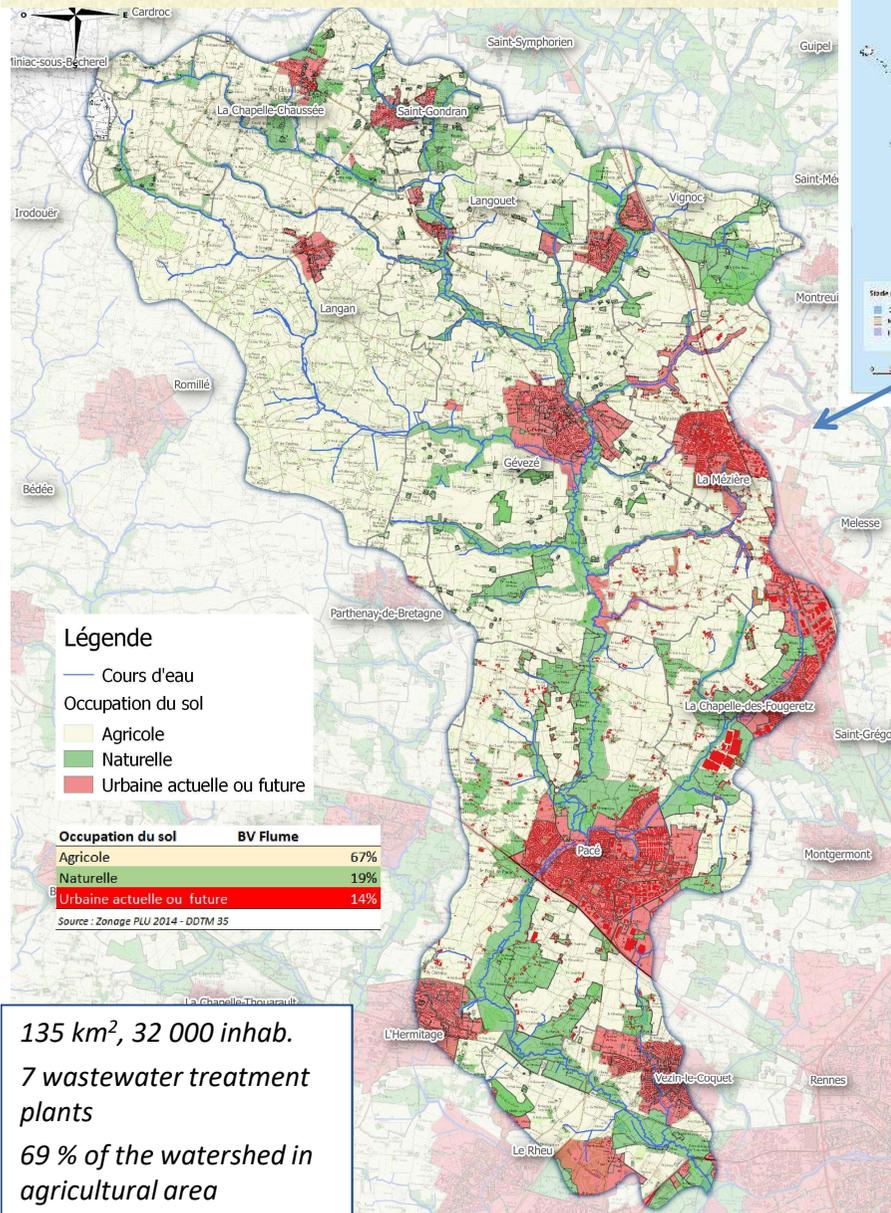
Objective : to understand how restoration practitioners can design and implement ambitious river restoration projects, by involving multiple local stakeholders.

A collaborative research with practitioners : 4 case studies and workshops

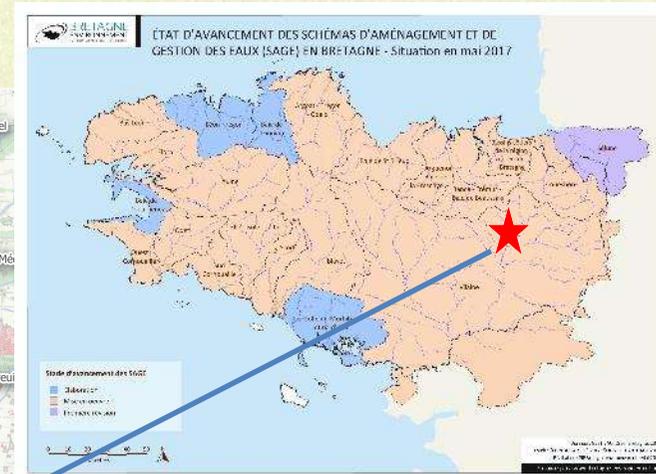
Funders : Brittany region and Water agency of Loire-Brittany
2 years (2017-2018)



Watershed issues to climate change



135 km², 32 000 inhab.
 7 wastewater treatment plants
 69 % of the watershed in agricultural area



→ A significant increase in urbanization :
 + 22 % in population between 2009 and 2016

→ Pollutant discharges :
 Wastewater treatment plants (phosphorus, ammonium), diffuse agricultural pollution (pesticides, phosphorus)

→ Highly degraded aquatic environments :
 Only 20 % in good quality with respect to hydromorphology

Watershed issues to climate change

■ Human pressures disturb watershed functioning and reduce their resilience to climate change :

- River's hydrological regime
- Water quality
- Rivers morphology



→ How to make urban and economic development a lever for the resilience of the territory and its aquatic environments ?

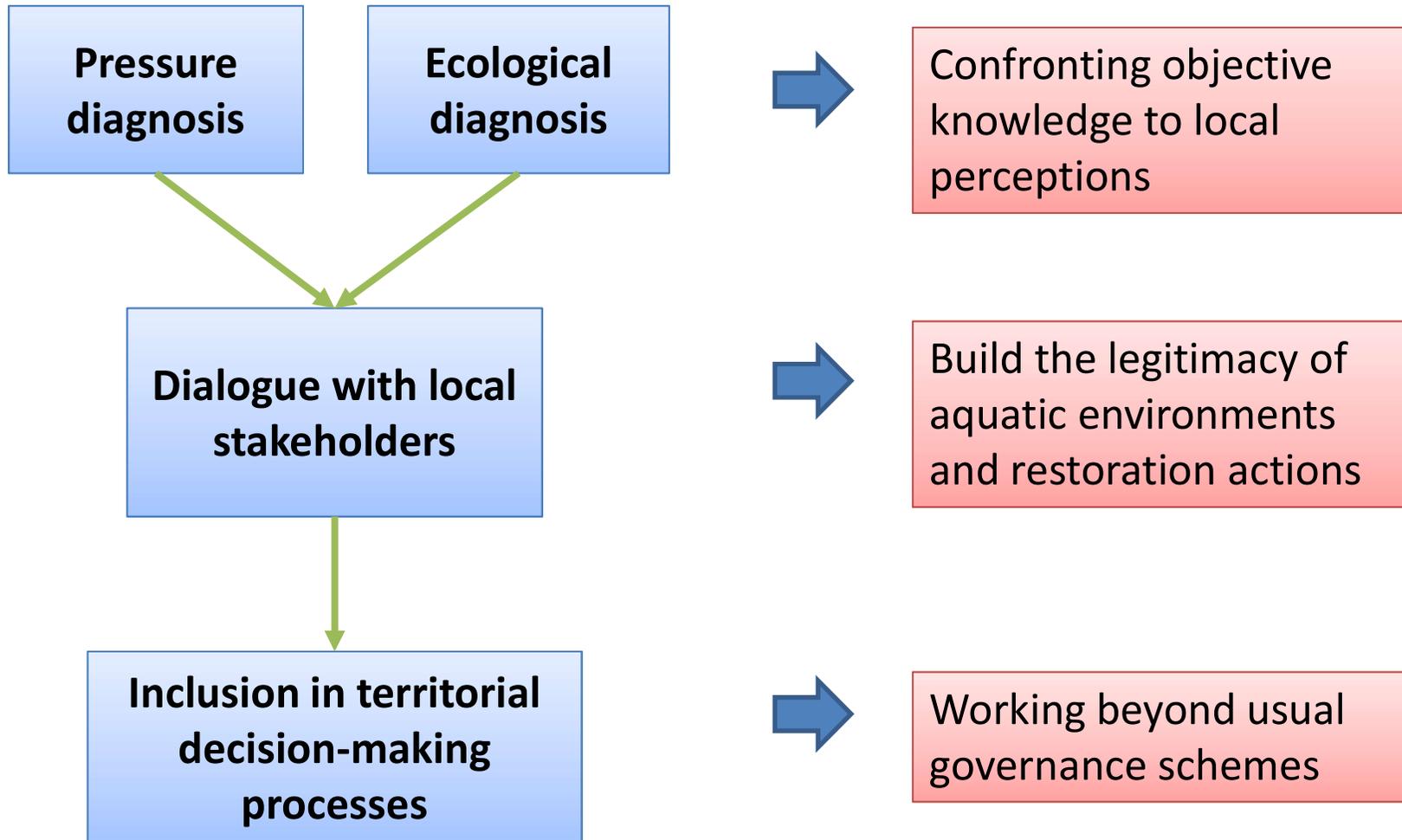
Explore the concept of **socio-ecological resilience** :

“Resilience reflects the degree to which a complex adaptive system is capable of self organization (versus lack of organization or organization forced by external factors) and the degree to which the system can build capacity for learning and adaptation” (Adger et al., 2005)

→ What are the mechanisms that make it up ? How to use them to implement concrete actions ?



A methodological framework

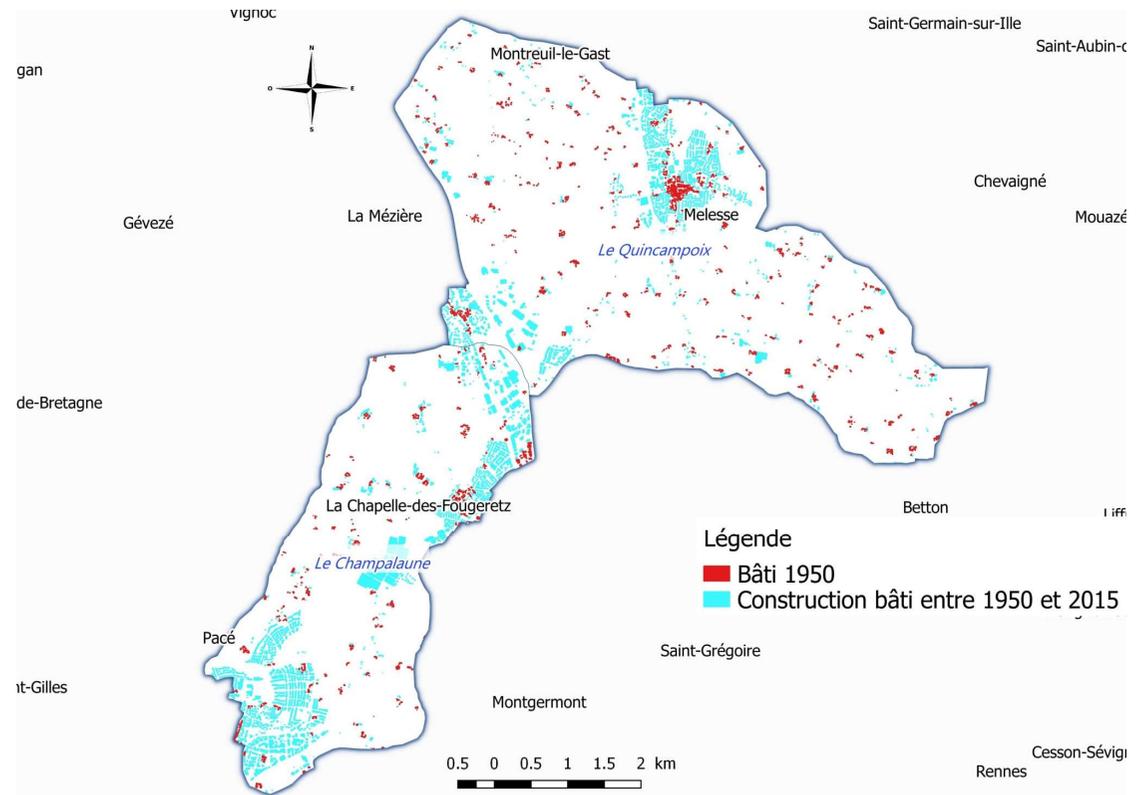


“Framing” : “a cognitive process whereby individuals and groups filter their perceptions, interpretations and understandings of complex situations in ways consistent with their own socio-political, economic and cultural world views and experiences” (Shmueli, 2008, p. 2048).

Confronting objective knowledge to local perceptions

- Local residents and authorities reported spontaneously observations of changes
- Formal interviews

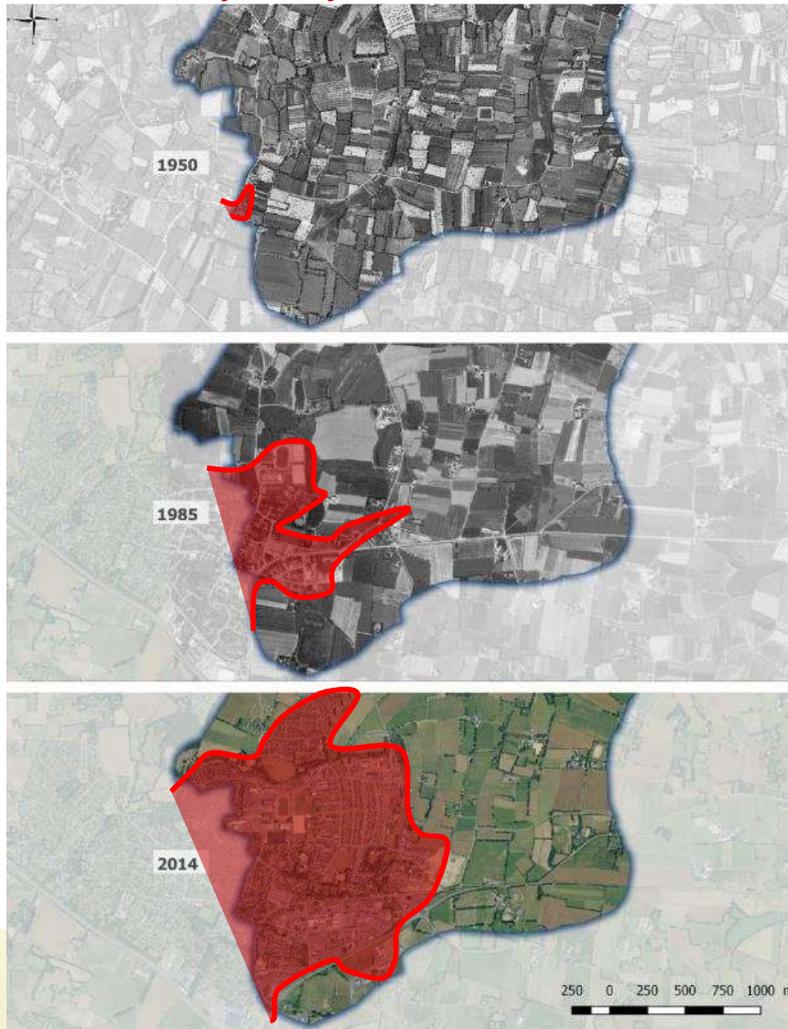
→ A focus on floods increase and on urbanization as the main cause of damages



Confronting objective knowledge to local perceptions

Qualitative temporal analysis

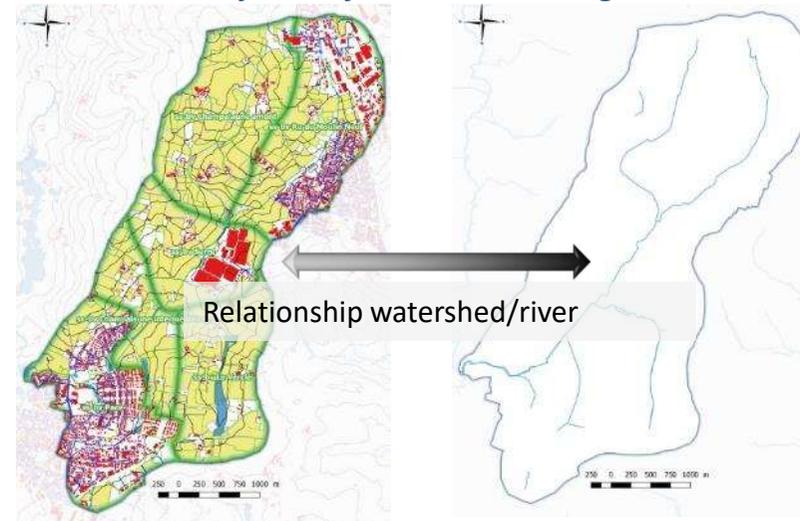
Objective for raise awareness



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Quantitative spatial analysis

Objective for understanding



- **Temporal analysis :**
Understand the evolutions of the territory, past, present and future dynamics – raise awareness
- **Spatial analysis :**
Prioritize the pressures and establish links with revealed physical alterations of rivers

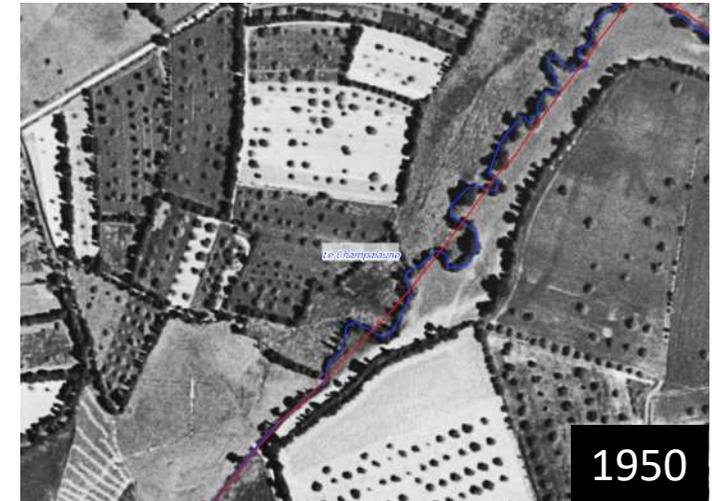
Confronting objective knowledge to local perceptions

- Local residents and authorities reported spontaneously observations of changes
 - Formal interviews
- A focus on floods increase and on urbanization as the main cause of damages

A mechanism of **problem framing** :

Similar problem framing → similar solutions framing
(i.e. river restoration)

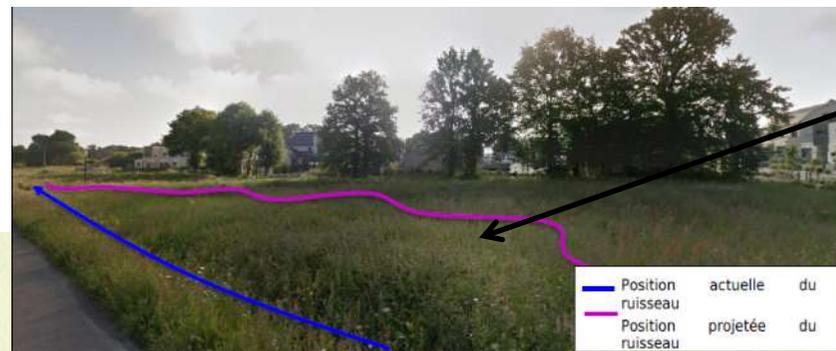
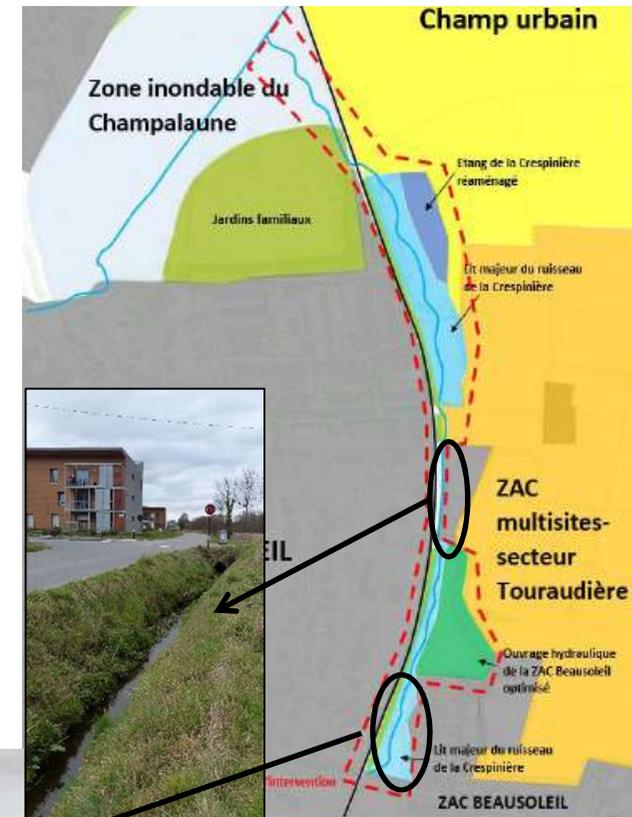
A difficult quest for a « consensus of motives » (Emery *et al.*, 2013, p. 175)



Building the legitimacy of restoration actions

The Crespinière river restored as part of an urban project (La Touraudière, Pacé)

- A first contact with the project designers : an expert position.
- Restoration practitioner as a resource and neutral figure : a condition to legitimate restoration actions
- The expression of the protagonists' own positionality
- A « consensus of action » (Emery *et al.*, 2013, p. 175)



Working beyond usual governance schemes

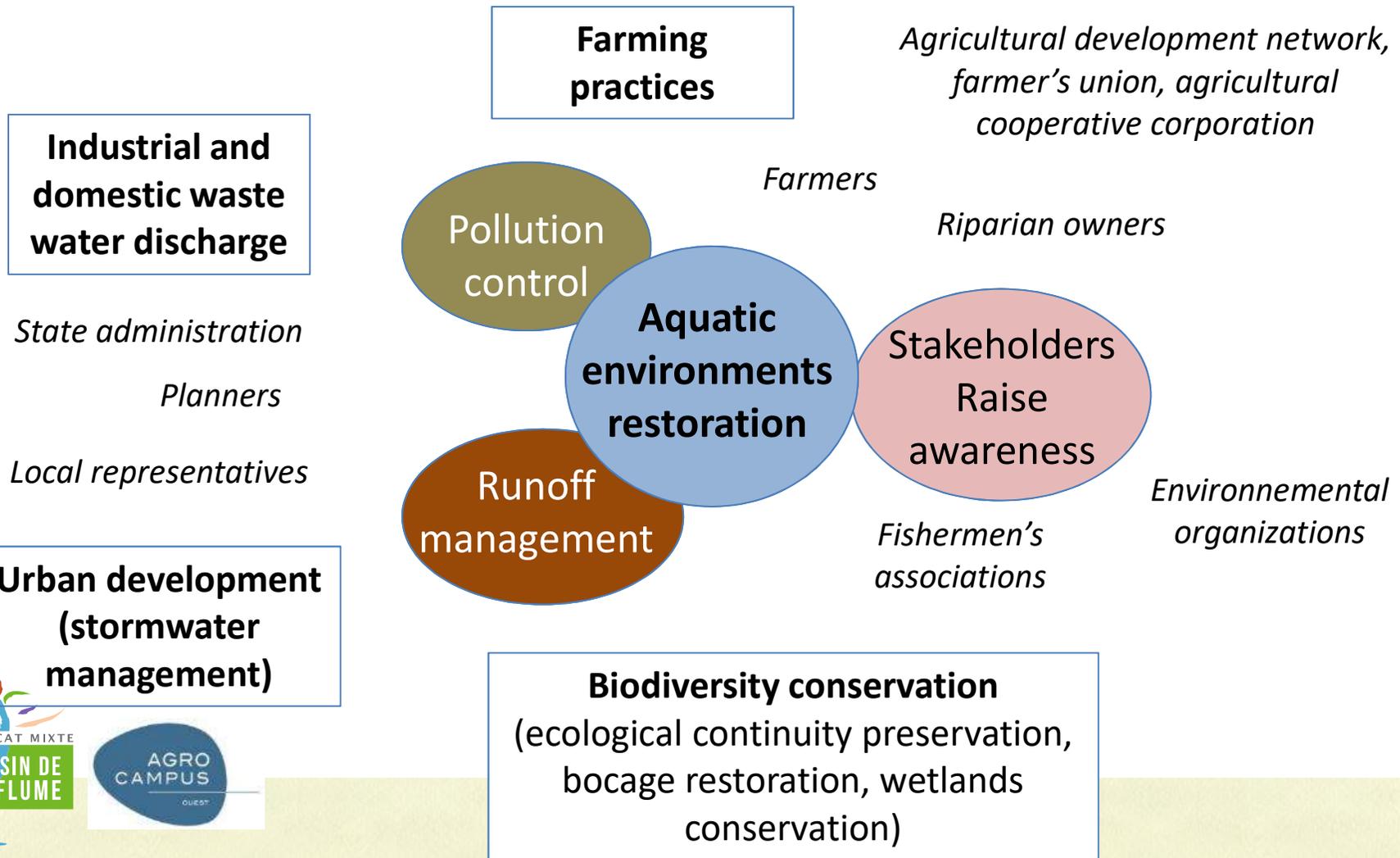


How local stakeholders perceive aquatic environments and river restoration ?

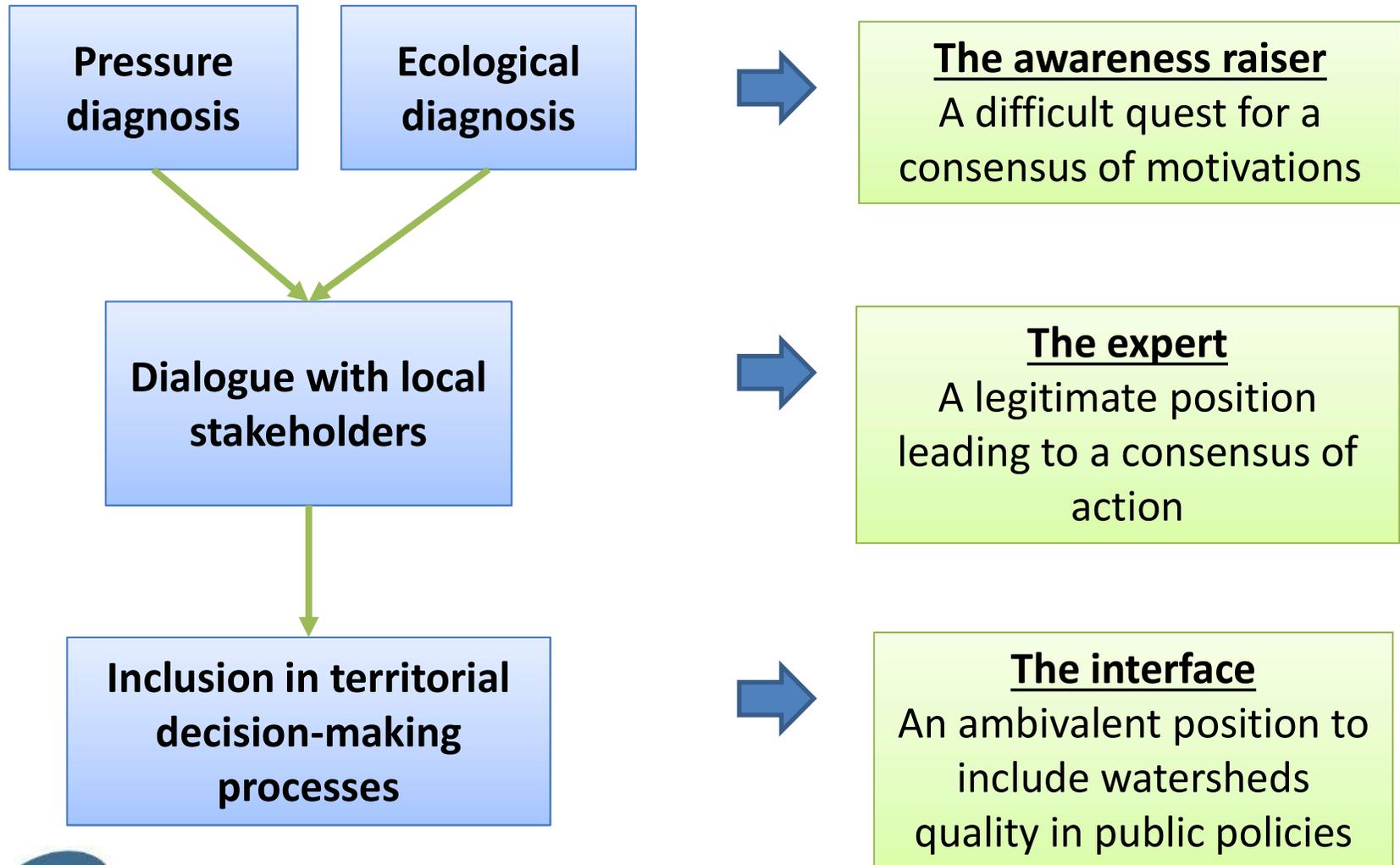
Restoration practitioners as environmental experts and transversal actors

Highlighting other services of the river restoration projects: well-being, new social uses, heat island decrease etc.

Working beyond usual governance schemes



Conclusion



Thank you for your attention

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Bibliography :

Adger, W. Neil, Terry P. Hughes, Carl Folke, Stephen R. Carpenter, et Johan Rockström. 2005. « Social-Ecological Resilience to Coastal Disasters ». *Science* 309 (5737): 1036-39.

Emery, S. B., M. T. Perks, et L. J. Bracken. 2013. « Negotiating river restoration: The role of divergent reframing in environmental decision-making ». *Geoforum* 47: 167-77.

Shmueli, Deborah F. 2008. « Framing in geographical analysis of environmental conflicts: Theory, methodology and three case studies ». *Geoforum* 39 (6): 2048-61.

