

EXPLORING TRADE-OFFS BETWEEN IRRIGATION AND OTHER WATER-RELATED SERVICES IN A MEDITERRANEAN WATERSHED: A DELIBERATIVE VALUATION APPROACH



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Introduction

Context

- In France, concentration of water abstractions for irrigation during low flow periods → tensions between uses
- Objective of good ecological status imposed by the Water Framework directive → revision of water abstraction authorizations, based on standardized approaches to assess environmental flows
- Multiplicity of water uses and values of local communities → conflict between water users and water management authorities

Objective

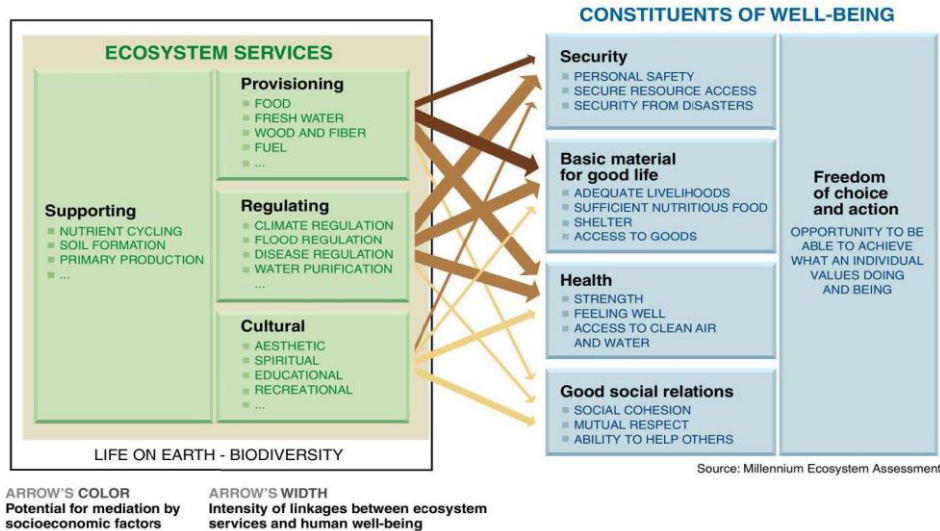
Improving the knowledge about the values people hold for the various services provided by aquatic ecosystems to support their management

Approach

An **ecosystem services approach** adopted to assess current and potential benefits of aquatic ecosystems and identify trade-offs and synergies between them

Accounting for the **plurality of values** that people held for aquatic ecosystems by combining **conventional economic valuation** technique with a **deliberative process**

Ecosystem services approach and Water Framework Directive



Ecosystem services =
contribution of ecosystems
to human well-being

Convergence between the WFD objectives and an ES approach:

- Good ecological status necessary for ecological functions at the basis of water related-ES
- Taking into account temporal and spatial dynamics of ES
- Assessing competitions and complementarities of water uses
- Moving from management focus on legal compliances to effective supply of ES
- Improving economic justification of water management plans



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No, river users are not only individualistic utilitarians!

Neoclassical theory

- Value = utility derived from direct or indirect use
- Preferences are strictly individual and rational
- Utility can be measured
- Money is the common metric
- Trade-offs between values

Multiple dimensions of values

- Multiplicity of values
- Understanding processes of choice
- Role of attitudes and social norms
- Preferences constructed during social interaction processes
- Social representations → shared values

Why deliberative valuation?

What is deliberative valuation?

A process during which participants are invited to argue in an opening way about their perceptions of ES and express the plural values they hold for them

- Communication
- Contextual and transcendental values (worldviews)
- Social learning about ecosystem functioning and respective values

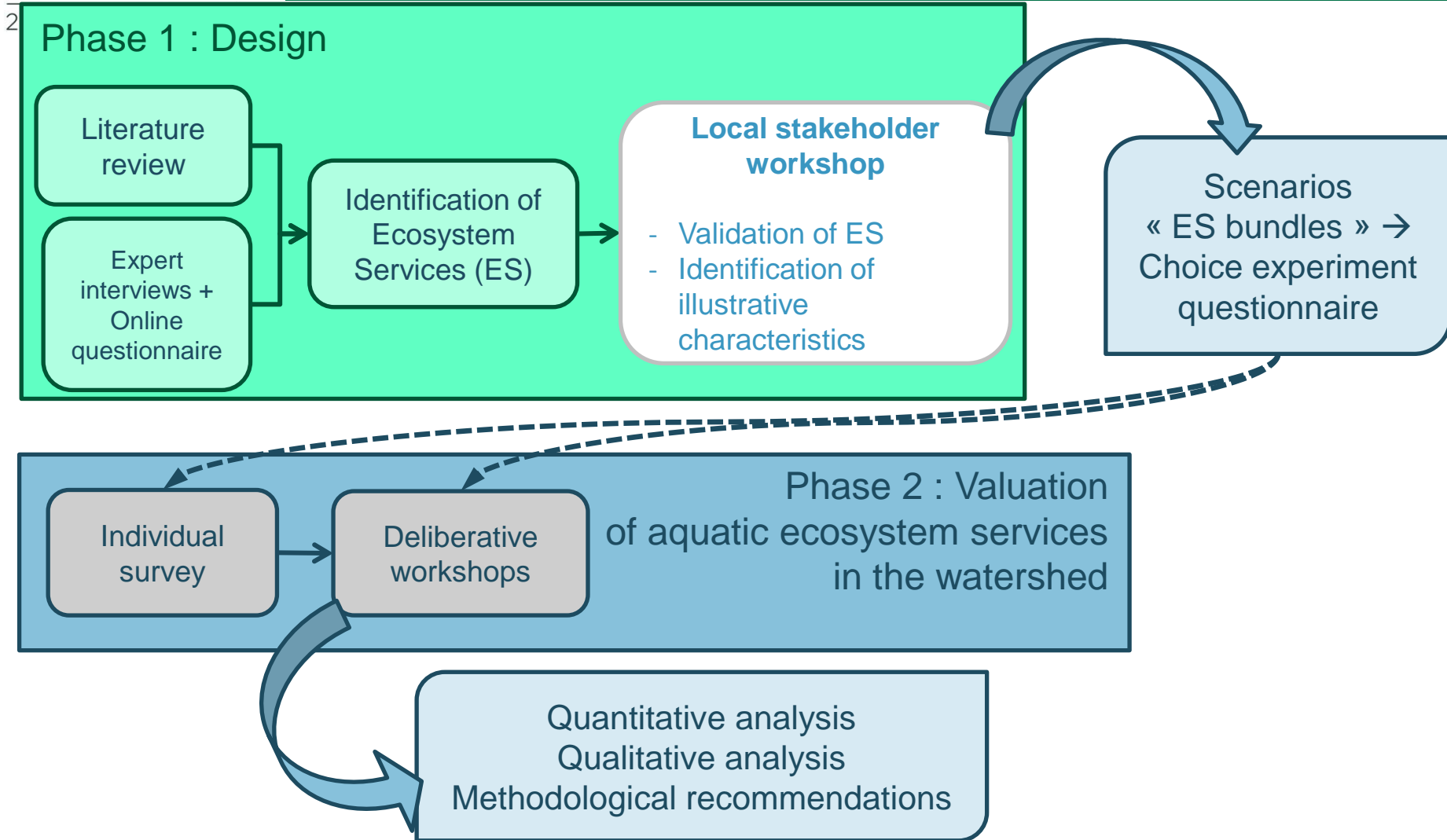
Why ?

- To make more explicit the norms and ethical views related to nature
- To identify the group shared values, including socio-cultural identity attached to some ecosystem components of functions
- To provide more legitimacy to environmental actions



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The proposed deliberative valuation approach

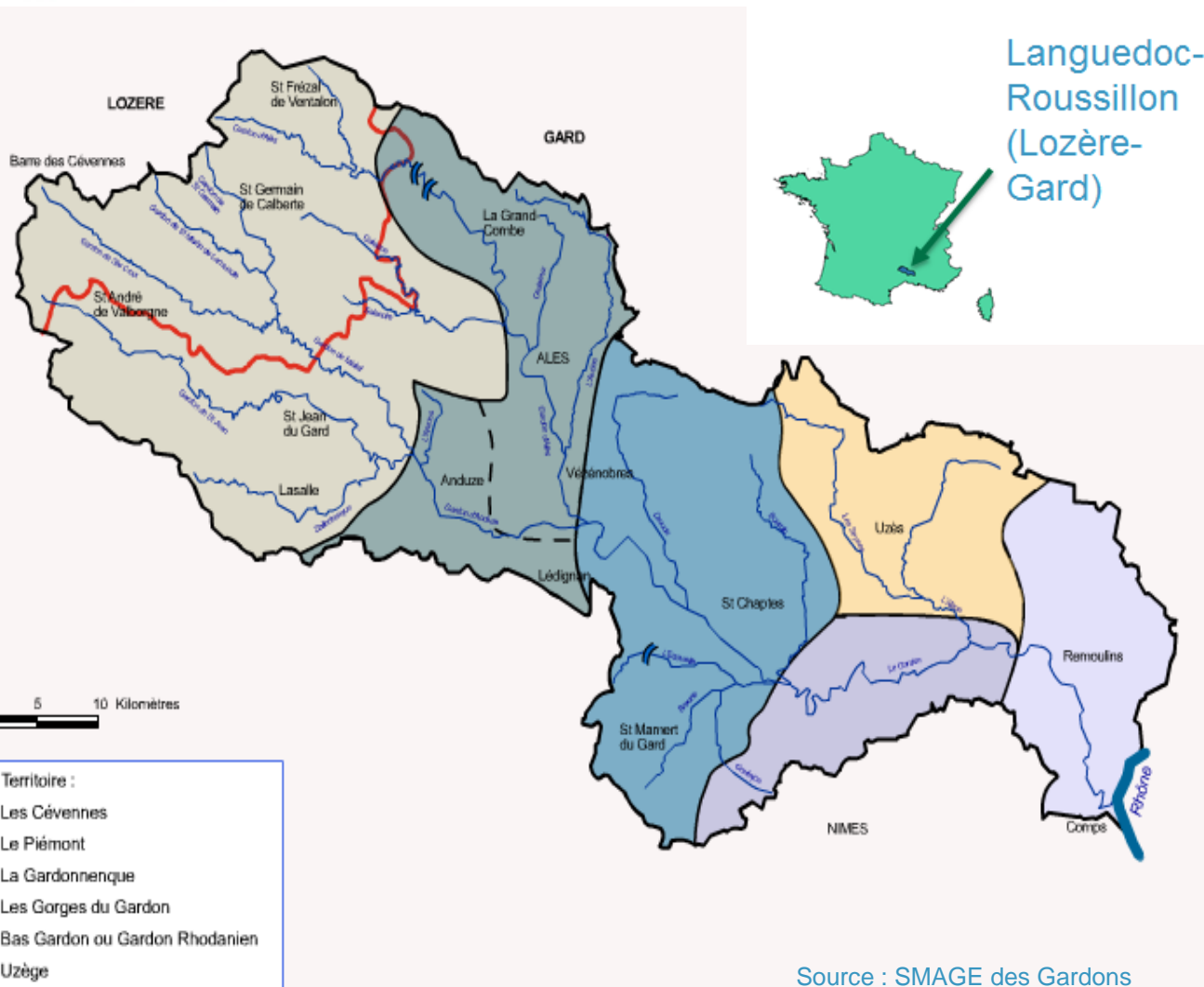




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The Gardons' watershed: a territory with multiple stakes



- 144 km
- 2030 km²
- Various land uses
- 203,255 inhabitants
- 7 waterbodies
- 3 zones



Limite de Territoire :

Light Green	Les Cévennes
Medium Green	Le Piémont
Blue	La Gardonnenque
Purple	Les Gorges du Gardon
Light Blue	Bas Gardon ou Gardon Rhodanien
Orange	Uzège

Source : SMAGE des Gardons



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ES in the Gardons' upstream watershed (1)

Provisioning Services

Domestic water

- Drinking water and amenities (swimming pools, ornamental and vegetable gardens)
- Increased use in summer due to tourism



“Water provision and waste water treatment are always highly ranked in political programmes of local councillors ”

Picture: <http://addict.cevennes-tourisme.fr/category/photos/>

Irrigation and livestock

- Surface irrigation using hundred years old canals (béals) to produce forages
- High value crops (onions, protected designation of origin)



“Agriculture , it's peanuts in terms of consumption”

“Upstream, farmers are using béals and are subjected to (irrigation) restriction or banning, which penalizes their farms. Their area is not sufficient to make large investment in other irrigation systems”

Picture: Chambre d'Agriculture de Lozère

ES in the Gardons' upstream watershed



Source des photos: et

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Cultural Services

Recreation / Tourism

- Water-related recreational activities :
 - Trout fishing,
 - Canyoning,
 - Bathing & swimming

« The river, we need it in Cévennes. (...) If you remove tourism from Cévennes, there is nothing left. Tourism, for me, is the most important. ».



Picture: Tourisme Cévennes : <http://addict.cevennes-tourisme.fr/category/photos>

Cultural landscape

- Highlight of natural features:
 - Rural landscape
 - Natural vegetation, forests
 - Terraces, century old irrigation infrastructures
 - Soothing character



“Tourism is especially looking for (the landscape), but in the same time , it is an outstanding living environment for people who live there all year round”

“The agricultural use (of water) is also what makes beautiful landscape “

Picture:: Smage des Gardons

ES in the Gardons' upstream watershed (3)



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Regulating services

Water purification	Good water quality for drinking and bathing, No (or little) algal blooms
Natural flood regulation	Steep slopes → important runoff, high speed Dense vegetation « <i>Floods? We live with them, we manage. We don't worry</i> »
Limited natural drought regulation	Natural low flows in summer Limited groundwater resources to support low water levels, due to geology (contrary to downstream) « <i>(aquatic) systems are naturally outlaw and regulation is difficult to implement</i> »



Restoration of aquatic ecosystems versus water users' satisfaction

- State representatives in charge of water management underline the **negative impacts of the degraded surface irrigation system** on summer water flows
- Elected representatives, farmers and tourism professionals worried about the **impacts of future water restrictions on economic development**, in a context of high unemployment and agricultural decline
- Specificities of the **Mediterranean hydrological regime**: is Nature outlaw?
- Ancient hydraulic structures and small-scale irrigated farming, **typical features of the Cevennes landscape** and cultural identity



Proposed choice experiment attributes

Attributes	Status quo	Level 1	Level 2
Quality of aquatic ecosystems	Degradation of ecological status Minimum low flow not respected	Good ecological status Minimum low flow not respected	Good ecological status Minimum low flows respected
“Traditional” agriculture	Increased abandonment of agricultural land	Restoration of agricultural landscape and irrigation infrastructures, support to smallholders	Modernization of irrigation system (pressurized system), focus on high value crops
Tourism and recreation	Present tourist number and tourism facilities → present water use	Increased number of tourists and recreational facilities → increased water use and pollution → Higher income	Decreased number of tourists, investment in water saving technologies and practices
Domestic water uses of local residents	Same population Present water uses	Increased population and water uses	Same population Investments in water saving technologies and practices, water storage at household level
Cost at household level	Increase in the cost of the monthly (or annual) shopping basket		



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Conclusion & perspectives

- First phase : identification of main ES and their relevant attributes
 - ES concept not familiar, even for water management experts
 - Focus on main water uses and stakes → regulating services were less mentioned
 - Focus on stakeholders' visions for future water management might prove more efficient to identify important ES attributes

- Perspectives
 - Finalization of the household choice experiment questionnaire
 - Finalization of deliberative protocol
 - Individual survey and deliberative workshops
 - Quantitative and qualitative analysis

- Expected results:
 - Measure the importance given to water-related ES in the Gardon's catchment
 - Link this importance to deeply-held worldviews
 - Role of deliberation in individual preference building



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Thank you for your attention !

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Source: SMAGE des Gardons