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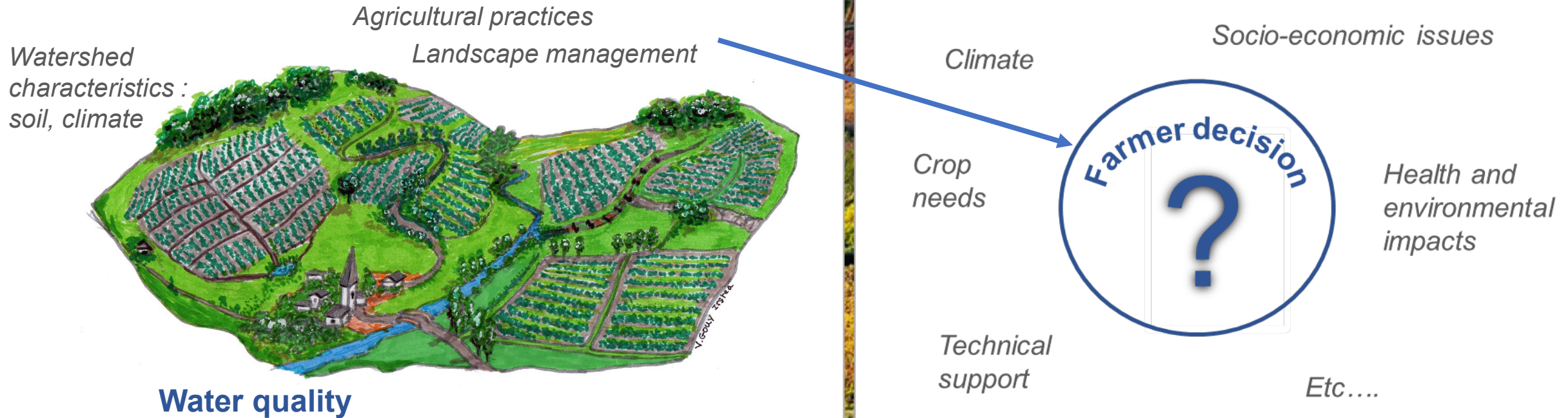
XVIII Symposium – Cremona 2-4 September 2026

➤ A Participatory Approach to Encourage Collective Action within Catchment Areas to Limit Pesticide Contamination of Watercourses

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➤ 01. Context, hypothesis and objectives

➔ How to reconcile water quality and agriculture?



➔ **Coordinated action across the catchment** area is essential to enhance the impact of individual efforts to preserve water quality

➤ 01. Context, hypothesis and objectives

A participatory approach
at catchment level
involving a range of key
stakeholders ...



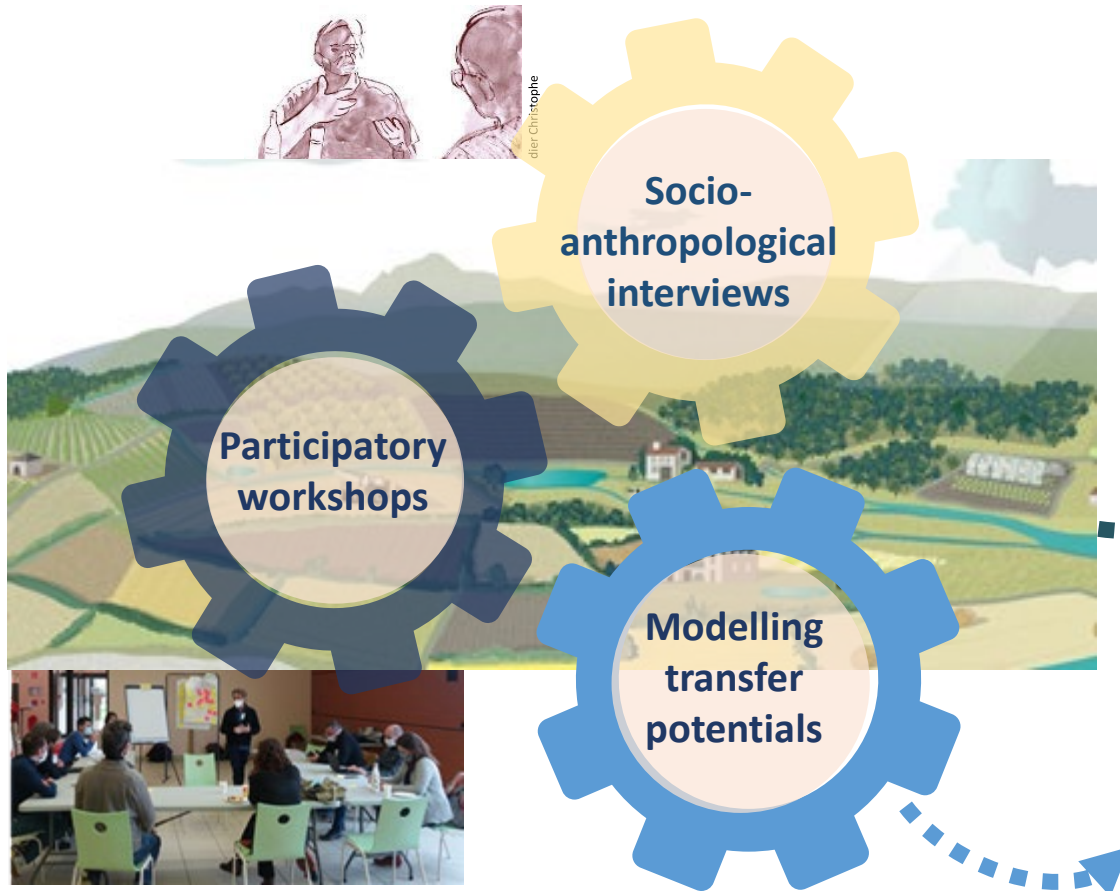
and a simple model
showing the impact of
practices and landscape
on transfers ...

Can help to encourage collective action and improve the effectiveness
of local initiatives to reconcile agriculture and water quality



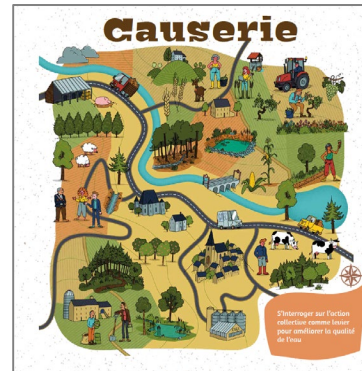
➤ 02. Methodology

Co-construction



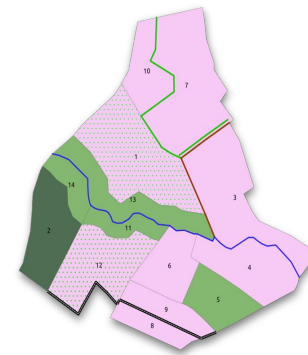
- ➡ Viticulture (Morcille, Beaujolais)
- ➡ mixed farming (Gimond, Monts du Lyonnais)

Final tools



Serious game

GeoMelba



QGIS catchment model

Experimental use cases

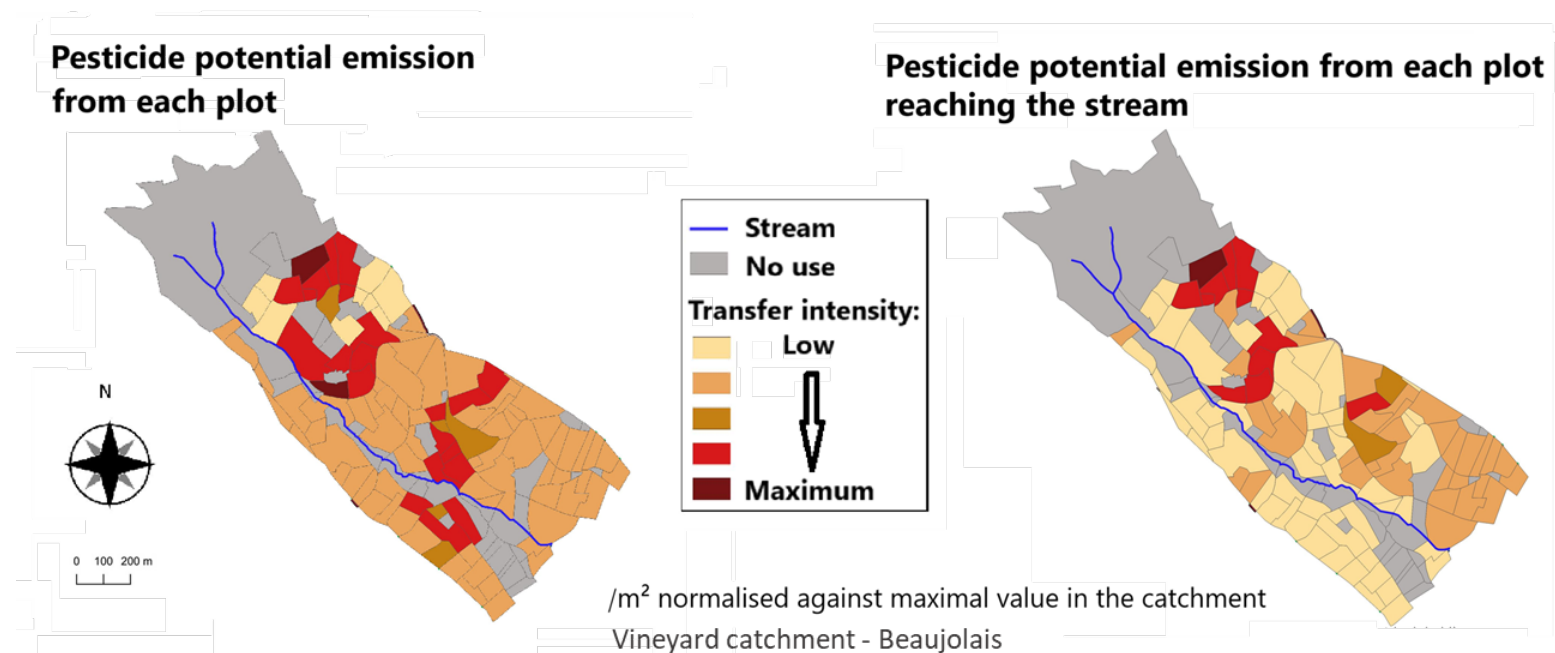
Implement Causerie with local stakeholders and with students

Discuss together the collective actions and ways to enhance their implementation

Develop and discuss future scenarios

➤ 03. Results: GeoMelba

- One-click modification of land use, cropping systems, and landscape features (hedges, ditches, grass cover, etc.),
- Emissions and mitigation potential rates for PPPs, as estimated by experts and the literature,
- Calculation of transfer potential, taking into account plot area, topography and spatial connectivity.

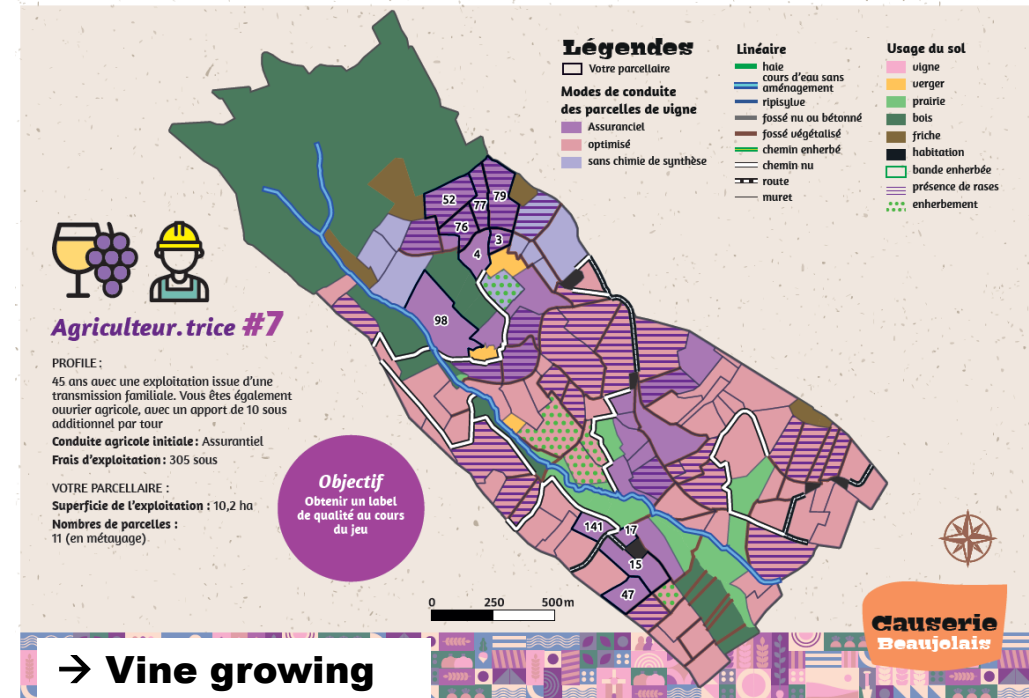
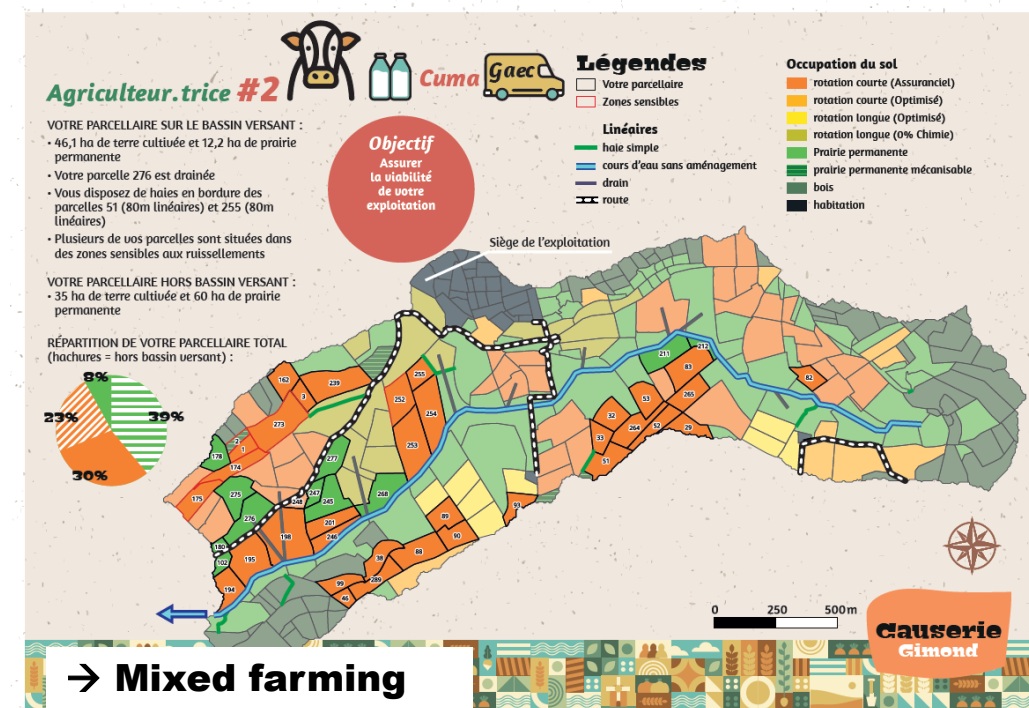


➔ GeoMelba provides maps (land cover, pesticide emission or abatement zones, pesticide transfer pathways to the river, etc.) and an overall water impact indicator at the outlet of the catchment.



➤ 03. Results: Serious game Causerie

- Two virtual catchment areas modelled on real-life study sites.
- 1 game round = 3 years.
- Three types of roles:
 - 7 Farmers (according to local characteristics),
 - 1 Watershed Manager,
 - 1 Agricultural adviser (viticulture) or cooperative supplier (mixed farming).
- Actions and levers:
 - Farmers:
 - Changes in land use, crop rotation, or cropping systems,
 - Installation of landscape features,
 - Best practice certification, secondary activity,
 - Stakeholders:
 - financial incentives or constraints.
- Players can interact and move around freely.



03. Results: Serious game Causerie

At the end of each game round:

- **Impact assessment:**
 - Farm profitability worksheet,
 - Water impact score, using GeoMelba.
- **Random events:** picking cards at the end of the round on climate, market, taxes, development, regulations, etc.

Closing debriefing: putting the results into the context of real-world situations.

Carte évènement

VALORISATION DU BOIS DE HAIE

Les collectivités locales souhaitent encourager la plantation de haies chez les particuliers. Ils mettent à disposition de broyage permet la collecte et la valorisation du bois de haie.

Agriculteurs : votre marge de 0,5 sous / 100m

Carte évènement

METEO HUMIDE

Ces trois dernières années, de fortes pluies ont entraîné le développement des maladies fongiques dans les vignes, ainsi que l'érosion des sols et le ruissellement des intrants (engrais, phytosanitaires) des parcelles vers la rivière.

Viticulteurs.trices : vous remplissez votre feuillet de compte en fonction des marges correspondantes.

Animateur.trice du syndicat de rivière : ces pollutions successives font augmenter l'indice de pollution à l'exutoire de + 5%.

Carte évènement

BAISSE DU PRIX DU VIN

Le prix du vin est en baisse sur les marchés mondiaux.

Viticulteurs.trices : votre Marge de Production baisse de - 10% !

→ Farm profit and loss calculation - Beaujolais

Viticulteur.trice #1

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Causerie Beaujolais

20 ans, exploitation de 3 ha			/	État initial (20.....)	Tour 1 (+3ans)	Tour 2 (+3ans)	Tour 3 (+3ans)	Tour 4 (+3ans)
Densité forte / Pente forte	Assurantiel	Désherbage chimique en plein	27 / 27	0,2 ha 0,2x27= 5,4				
	Optimisé	Désherbage mécanique	27 / 17					
		Enherbement	26 / 16					
	Sans chimie	Désherbage mécanique	27 / 7					
Densité forte / Pente faible	Assurantiel	Désherbage chimique du rang	31 / 31	1 ha 1x31= 31				
	Optimisé	Désherbage mécanique	31 / 21					
		Enherbement	29 / 19					
	Sans chimie	Désherbage mécanique	30 / 10					
Faible densité	Assurantiel	Désherbage chimique	40 / 40	1,8 ha 1,8x40= 72				
	Optimisé	Désherbage mécanique	40 / 30					
		Enherbement	39 / 29					
	Sans chimie	Désherbage mécanique	40 / 20					
Marge de Production					108,40			
Marge additionnelle	Activité Complémentaire	Vinifier + 5%						
		Gîte + 20%						
	Label	Culture & Nature + 5%						
		Bio + 10%						
Dépenses	Éléments payagers							
	Transition pratique de gestion / enherbement							
	Installation d'activité complémentaire							
	Achat / Vente / mise en Vigne/Friche/Prairie							
Marge Totale (Marge de Production + Marge Additionnelle – Dépense)					108,40			
Frais fixes					96			
Solde (Marge Totale – Frais Fixes)					12,4			



➤ 03. Results: Feedback on Causerie implementation experiences

➤ ‘Validation’ of the game through experimental participatory workshops with professionals:

- ➡ The game was deemed realistic by the participants,
- ➡ The model GeoMelba is a source of motivation for testing new practices,
- ➡ The game facilitates participant mutual understanding,
- ➡ It can help to facilitate dialogue in situations of tension.

But

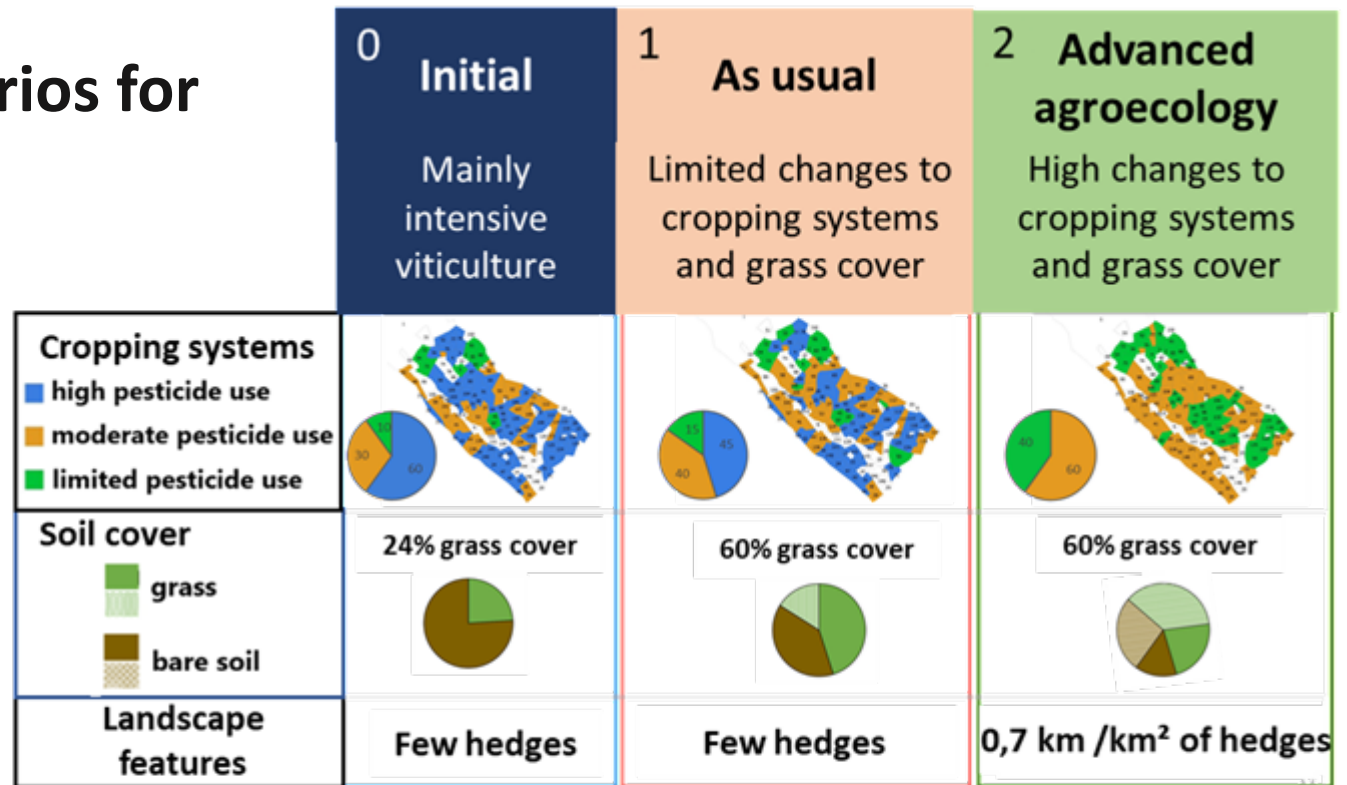
- ➡ The ability of the game to generate collective action depends heavily on the participants,
- ➡ Some professional players have been unable to overcome their principles or personal barriers as risk aversion,
- ➡ Farmers’ participation in this type of workshop remains limited.

➤ The game has been successfully incorporated into training modules for young apprentices.

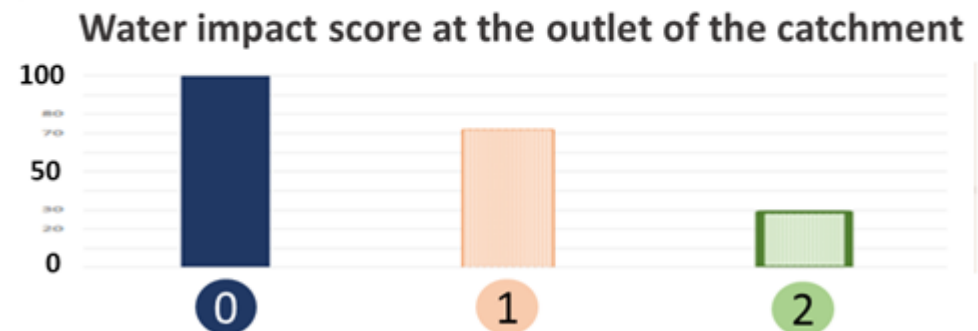


➤ 03. Results: Lessons from debating prospect scenarios with GeoMelba

Exploratory 50-year scenarios for farming systems and the landscape:



Watershed discussed indicators: water impact score at the outlet





➤ 03. Results: Lessons from debating prospect scenarios with GeoMelba

 Factors that could facilitate the adoption of practices more respectful of water quality:

- ➡ **The setting out of viable transition pathways** – tailored to the diversity of farming situations and including a cost-benefit analysis,
- ➡ **The implementation of appropriate support for farmers** (technical training especially through farmers' groups, protection against climatic or economic uncertainties, etc.),
- ➡ **Consider global issues** such as soil fertility, water management for crops or the farm's energy strategy.

➤ Final conclusion and perspectives:

- ➡ Both GeoMelba scenarios and Causerie game permit to question and encourage collective action.
- ➡ Their transfer to stakeholders needs to be improved.

• Areas for improvement:

• **GeoMelba software, version 1.2:**

- Include indicators meaningful to farmers: erosion, biodiversity (as natural control agents),
- Provide water managers with a guide for integrating new catchment areas.

• **Causerie Game:**

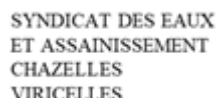
- Organize a session with different groups of farmers (conventional, organic, agroforestry, etc.),
- Provide stakeholders with a methodology enabling them to adapt the game to their contexts,
- Train facilitators in the use of Causerie.



Partners and funding

Partners for research: **INRAE**

And professionals:



SPIRIT project: Shared collective solutions to limit the impact of pesticide residues on aquatic environments at the territorial level

DIALECTIC project: An Interdisciplinary Approach to Supporting Collective Engagement in Agricultural Areas

CAUSERIE project: Concertation Autour d'Un jeu Sérieux pour limiter Le tRansfert des pestIcidEs: Roundtable discussion on a 'serious' game to limit the transfer of pesticides

In link with stakeholders:



National research funding:



Regional research funding:



→ Mixed farming site

National funding for transfer:



→ Dissemination and transfer of GeoMelba and Causerie



Participatory approach at catchment scale

XVIII Symposium in Pesticide Chemistry – Cremona 2-4 sept. 2026

➤ Thank you for your attention !



Workshop 1 Beaujolais, 20 oct. 2020,
Viticulture.



Workshop 1 Gimond, 23 feb. 2021,
Mixed farming.



Workshop 3 Gimond, 10 feb. 2022,
Mixed farming.



Workshop 3 Beaujolais, jun. 2021,
Viticulture.



Discussion on the results with professionals,
Beaujolais 6 dec. 2023,
Viticulture.



Round table during a conference of the French
Pesticide Research Group, 22 may 2024,
Viticulture.



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Participatory approach at catchment scale

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