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Lessons from a Prospective Study on the French wine industry under climate change

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Why do we need prospective study ?

Climate Change (CC) calls for prospective studies

- Socio-economic scenarios for mitigation (IPCC, 2003)
- Short scenarios providing set of inputs for modelling
- Development of sectorial or regional prospective studies (health, water, food, coasts...) : contrasted pictures of future
- Increasing works on adaptation : **exploring pathways**

The wine industry needs prospective studies

- Previous prospective without CC (Sebillotte et al. 2003)
- Perennial crop: today decisions of firms, policy makers, research... may anticipate what could be the 40 next years
- Importance of observed, expected and uncertain impacts
importance of wine in France: export, externalities, culture
- Need of sharing information, vision, questions...

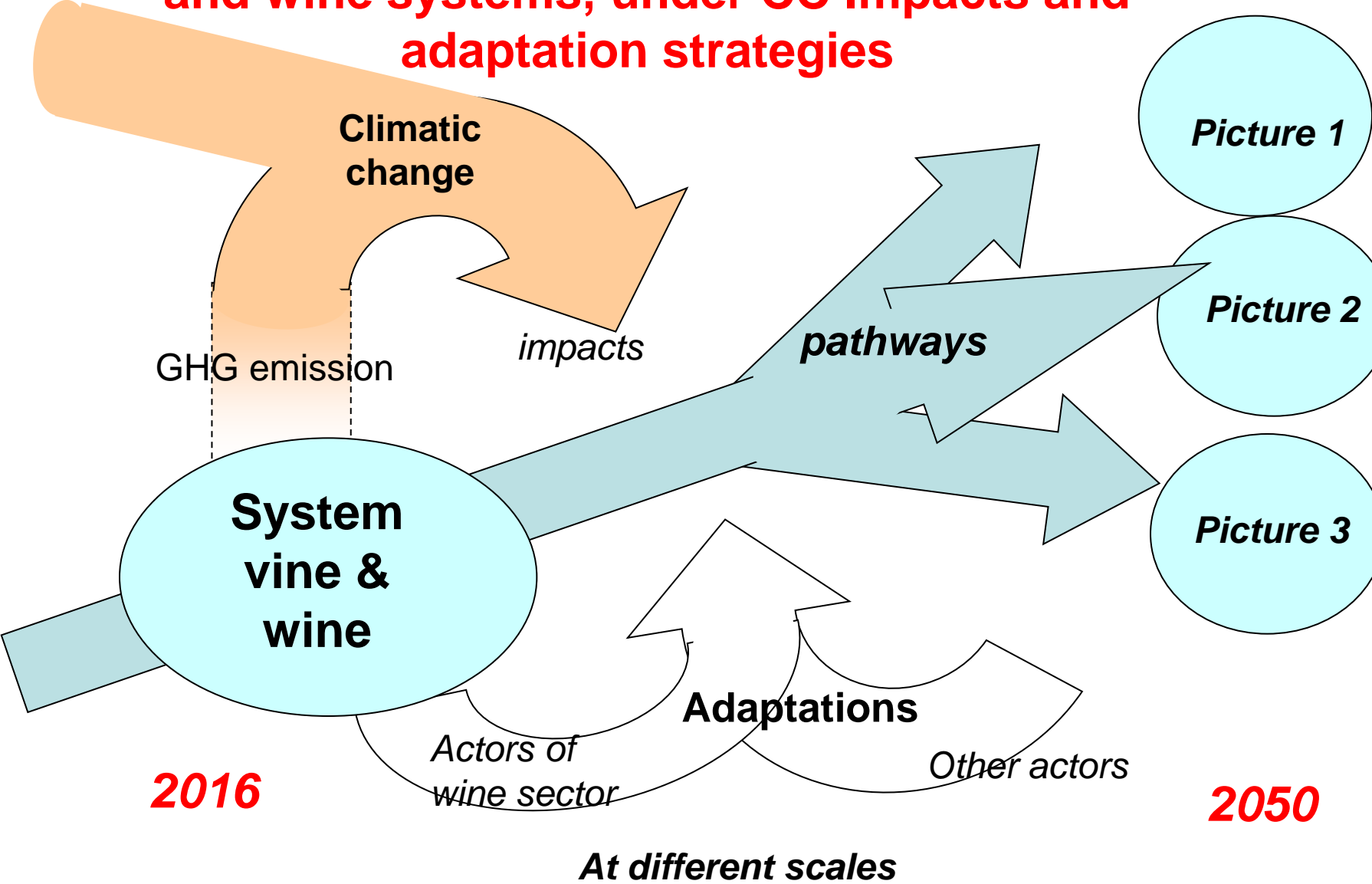
A prospective study in the Laccave project

To capitalise on a multidisciplinary project which covers different French wine regions...

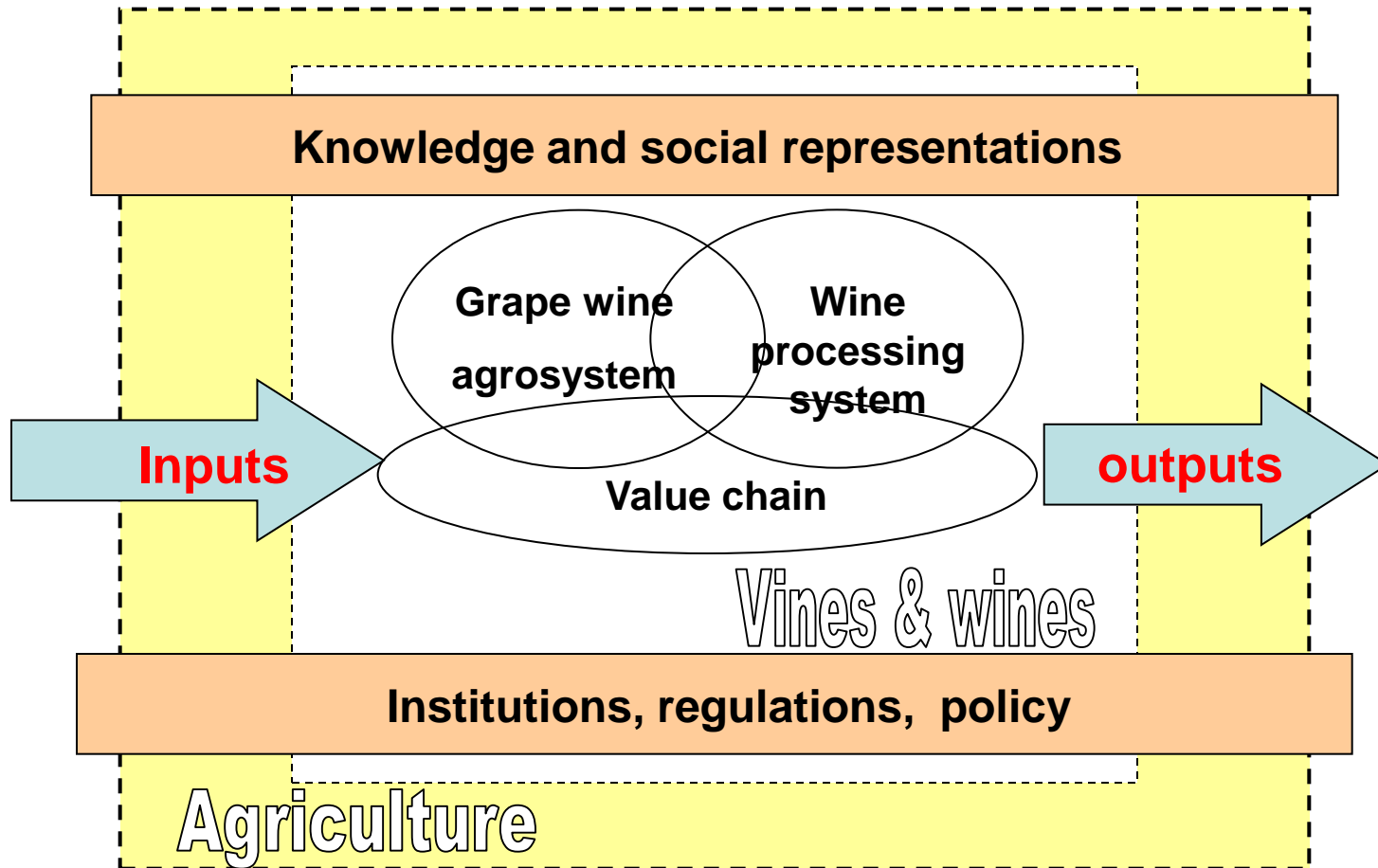
3 main objectives:

- To provide different scenarios and pathways for the French wine industry by 2050
- To test a new prospective methodology focusing on adaptation pathways
- To build common vision and develop cooperative networks between researchers and stakeholders of the wine industry

Methodology (1) : representing pathways of vine and wine systems, under CC Impacts and adaptation strategies



Methodology (2) : Systemic representation of the French wine sector

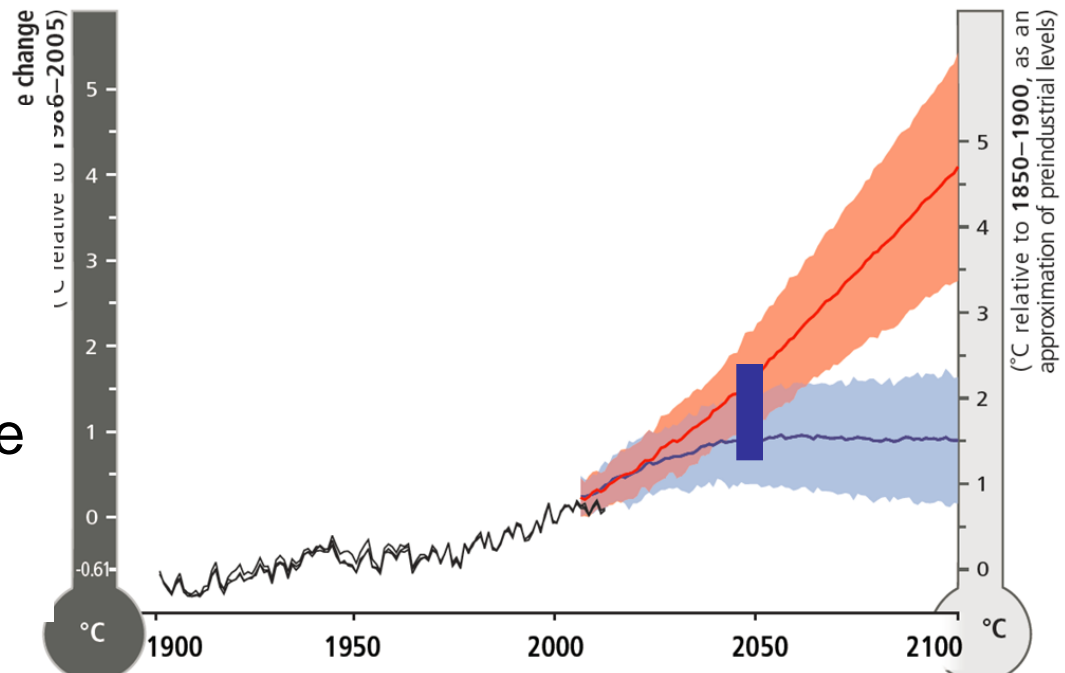


Actors, Technics and product, Flows

Methodology (3). Choice of horizon 2050, assumptions on climatic context, and impacts on vine and wine

Median IPCC climatic scenario for 2050 :

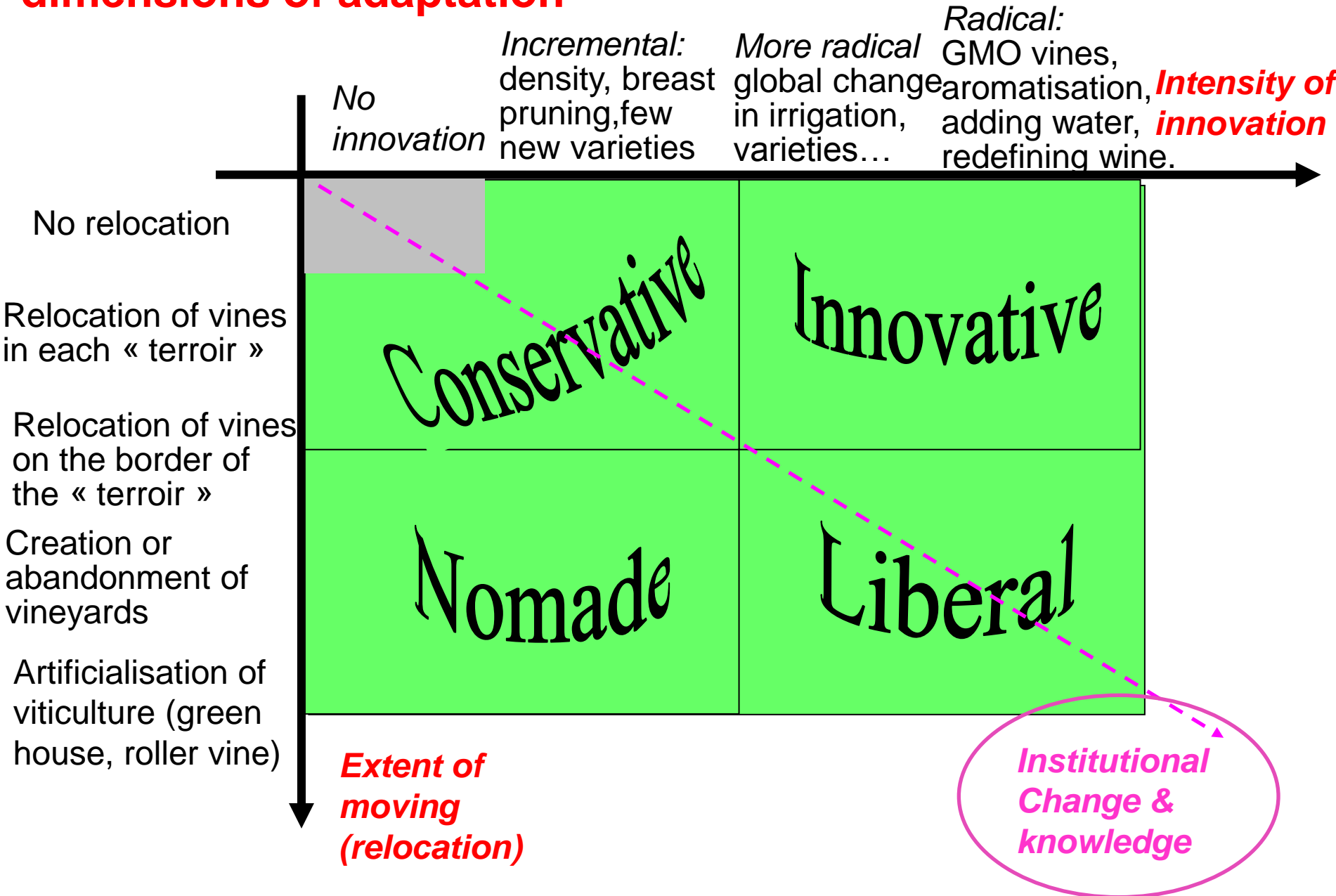
- Between 1,5 and 2°C
- no radical change in rainfall
- increasing water need for vine
- “moderate” increase of variability (extreme events)



Differentiate impacts of CC according to a north-south gradient :

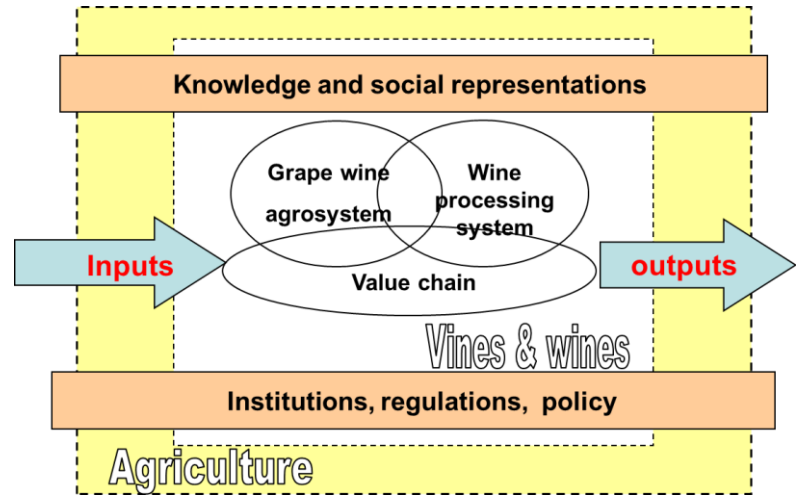
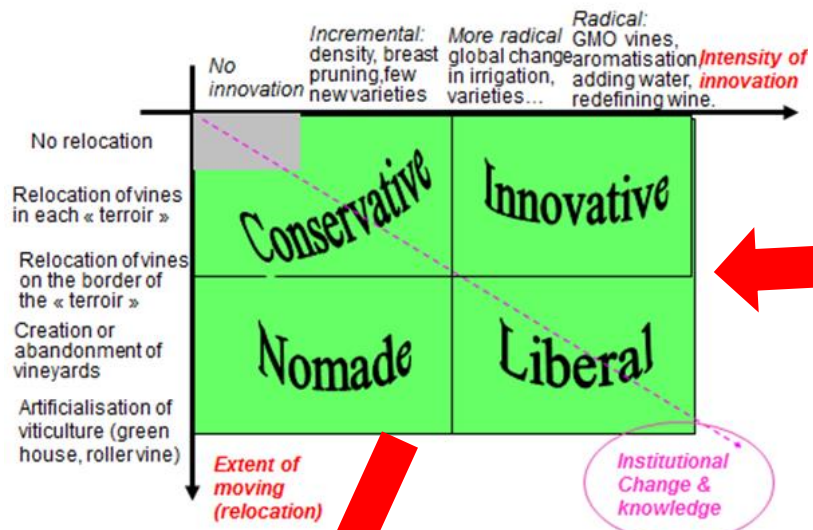
- In **the north**: maturity and productivity often favored by CC
potential changes in wine characteristics (acidity)
main problem : increased disease pressure
- In **the south**: drought and water balance deficit
lack of freshness during maturity stage
potential changes in wine (excess of alcohol degree)

Methodology (4) Strategic Scenarios by crossing two main dimensions of adaptation



Methodology (5): Collection of data, selection of assumptions, construction of pathways

- Identification of external and internal assumptions from three sources of informations (150) :
 - pre-existent prospective studies on wine industry
 - In-depth interviews of 60 stakeholders in 3 wine regions Bordeaux, Languedoc, Champagne (Juan, 2014)
 - Interviews of the Laccave researchers
- Building pathway by an expert group
 - Selection of 70 relevant assumptions (recto vs verso)
 - Identification of influences between assumptions (matrix)
 - Calculation of clusters of assumptions: micro-scenarios, and driving assumptions
 - Combination of the micro-scenarios to build different pathways to the four strategic scenarios



interviews in 3 regions

Interviews in Laccave

Previous studies

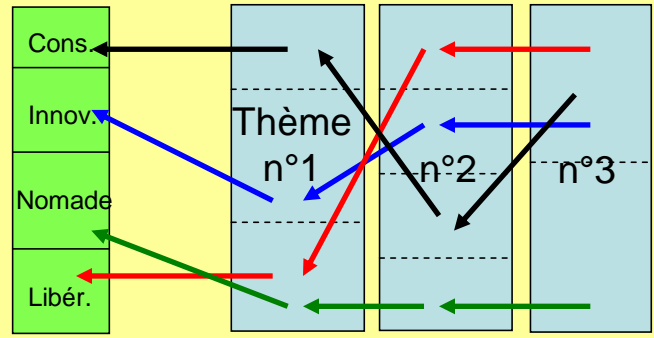
70 hyp. retenues

	H ₁			H _i						H _n
H ₁	■									
		■	+							
				■	+					
						■				
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H _i			±/-	■						±/-
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H _n										±/-

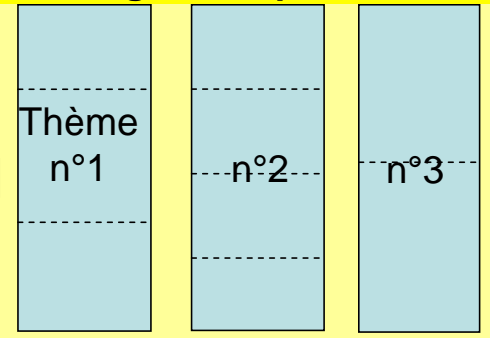
	H ₁										H _i
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H _i											±/-
H _n											±/-

Agrégat n°1 | n°2 | n°3

Driving assumptions



Finding the pathways which can build the strategic scenarios



Framework for building pathways to the 4 strategic scenarios

Global Context	International wine context	Local and national processes in vine and wine systems	Impacts on the wine value chain
<p>Research funding by public agency (goals, topics, amount, partnerships...)</p> <p>Form of agricultural land management (planned, priorities, local vs european governance...)</p> <p>Public health policy / related to alcohol</p> <p>Environmental policy (pesticide, biodiversity, mitigation...)</p>	<p>Evolution of the international definition of wine</p> <p>International norms on wine labelling and wine origin</p> <p>nature and evolution of EU policy for the wine sector, and vine plantations</p>	<p>Relation between wine industry and research</p> <p>Level of Modeling knowledge on CC impact on vine (and wine)</p> <p>Structural capacity of adaptation to CC in the farming systems (water, soil, altitude...)</p> <p>Management of agricultural risk</p> <p>Consumers perception of the evolution of wine taste, impacted by CC</p>	<p>Evolution of the value chain governance (in particular at regional level)</p> <p>Relative evolution of the weight of the French wine regions</p> <p>Evolution of the global performance of the French wines in the export markets</p> <p>Rôle and weight of AOP in the value chain</p>
	<p>Evolution of organic wine demand</p>	<p>Perception of CC by the actors of the wine industry</p>	

Pathway preferentially leading to the **conservative** adaptative scenario

Global Context	International wine context	Local and national processes in vine and wine systems	Impacts on the wine value chain
<p style="text-align: center;">State disengagement with regard to the research on wine</p> <p>Planned and binding agricultural land management</p> <p style="text-align: center;">WHO considers wine as others alcohols (restrictive policy...)</p> <p>Strongest environmental policy, in particular when water resource is concerned</p>	<p style="text-align: center;">No radical technological change in oenology the same international definition of wine</p> <p style="text-align: center;">"The wholly obtained" dictates the origin of the wine</p> <p style="text-align: center;">Plantation rights have been (at least partially) kept</p>	<p>No clear demand of the wine industry to the research</p> <p>No modelling of CC impact at the local (and plot) level and no real development of precision viticulture</p> <p style="text-align: center;">Structural farmers' adaptation capacity is limited to the current wine producing areas</p> <p>Risk management mainly by contractualisation with down stream company or coop</p> <p style="text-align: center;">Consumers are looking for histories of «terroirs», leading to their acceptance of (moderate) impact of CC on wines</p>	<p>The governance of the value chain has no really changed (except for wineturism)</p> <p>Increasing relative weight of the AOP regions</p> <p>The international marketing share of the French wines (in value) is preserved</p> <p style="text-align: center;">The weight of AOP (and GPI?) is increasing</p>
Production of organic wine is risky		CC is seen as a threat by most of the actors of the wine industry	

Pathway preferentially leading to the « innovative » adaptative scenario

Global Context	International wine context	Local and national processes in vine and wine systems	Impacts on the wine value chain
<p data-bbox="92 396 407 525">Performing agro-climatic engineering</p> <p data-bbox="92 622 407 705">Planned agricultural land management</p> <p data-bbox="73 773 426 1031">The WHO promote stronger norms to limit the consumption of alcohol (restriction of distribution of wines) and allergens</p> <p data-bbox="73 1116 426 1330">Strong policy for environment conservation (water, biodiversity) and mitigation</p>	<p data-bbox="484 382 923 682">The international definition of wine is more flexible. Producers are responsible to consumers and supposed to better respond to different constraints</p> <p data-bbox="523 759 884 839">"The wholly obtained" limits the exchanges</p> <p data-bbox="498 888 909 1145">Liberalisation of plantations (but in restricted areas) and more flexibility for blending wines without Gis from the EU</p> <p data-bbox="581 1268 1193 1345">Opportunity for positive evolution of supply and demand of organic wines</p>	<p data-bbox="950 368 1418 531">Cooperation between actors of the wine industry and research on the CC issue</p> <p data-bbox="989 559 1392 702">Datan and understanding of CC impact on vine an wine , allowing the development of precision viticulture</p> <p data-bbox="969 731 1425 831">structural adaptation capacity of farms is limited (viticulture located in difficult area)</p> <p data-bbox="981 873 1402 982">Risk management combining different solutions (including dedicated insurances)</p> <p data-bbox="981 1039 1402 1216">Consumers mainly prefer to keep the wine taste and to limit te impact of CC on quality</p>	<p data-bbox="1472 411 1870 625">The governance of the value chain is open to external actors (consumers, civil society...)</p> <p data-bbox="1499 674 1843 745">Stable relative weight of the French wine regions</p> <p data-bbox="1472 788 1858 1088">The global performance of the value chain is increasing due to the competitiveness of basic and popular premium wines</p> <p data-bbox="1472 1145 1839 1253">AOP wines also integrate innovation in their « codes of practices »</p> <p data-bbox="1329 1273 1843 1353">Positive perception of CC by actors of the wine industry</p>

Pathway preferentially leading to the « **Nomade vineyard** » adaptative scenario

Global Context	International wine context	Local and national processes in vine and wine systems	Impacts on the wine value chain
<p>Public bodies mainly invest for the reduction of inputs (pesticide) and water saving</p> <p>No planed / binding management of agricultural land</p> <p>WHO focus on alcohol, but less on wine (agricultural, cultural...)</p> <p>Reduction of Pesticide use (policy, consumers pressure...)</p>	<p>Wine is still exclusively made by grape, but new technological process are facilitated (reblending, desalcoholisation...)</p> <p>« Made in » more flexible & Emergence of international « wine blenders »</p> <p>Plantation is absolutely free</p>	<p>The demand of innovation by actors is only partially covered by research</p> <p>No development of precision viticulture at large scale</p> <p>In southern regions, the possibility of irrigation is the main factor for adaptation to CC</p> <p>Risk management mainly through contracts between traders and producers</p> <p>consumers prefer a «constant taste related to origin»</p> <p>Organic viticulture is seen as risky</p>	<p>The value chain governance is more open to consumers and citizens</p> <p>Important change in the relative weight of the French wine regions and emergence of new ones</p> <p>The value chain increase its basic and popular premium wines. Some actors invest in foreign countries</p> <p>Different notions of « terroir » (traditional and new: procedural)</p> <p>Negative perception of CC by most of the actors of the wine industry</p>

Pathway preferentially leading to the **Liberal** adaptative scenario

Global Context	International wine context	Local and national processes in vine and wine systems	Impacts on the wine value chain
<p>The state progressively stops investing in R&D for wine</p> <p>Flexible management of agricultural land</p> <p>Restrictive policies on public health and environmental concerns</p>	<p>Open œnological practices</p> <p>Emergence and development of international wine makers/traders</p> <p>Free plantations deregulated markets</p> <p>Evolution less favourable to the developpement of organic wines</p>	<p>Available inovations are adopted (new varieties, GMO, irrigation, corrective oenology...) but R&D is selective and becomes weaker</p> <p>No global extent of precision viticulture</p> <p>Irrigation is the main factor used for adaptation to CC</p> <p>Risk management is the main issue in the wine industry (insurance, contractualisation...)</p> <p>Marketing convinces the consumers to accept and buy wines impacted by CC</p> <p>First seen as an oportunity, CC becomes negative for many wine producers</p>	<p>The value chain governance is driven by downstream actors (traders)</p> <p>Strong competition between « historical » and new wine regions</p> <p>The global performance of the value chain is disapointing</p> <p>Some « terroirs » wines are limited to the top of the range, the market is dominated by technological and marketed wines</p>

Summary of 4 pathways leading to the four strategic scenarios.

...Conservative

Facing pressure from i) health authorities on alcoholic drinks and ii) agricultural policy giving priority to land and water use to food crops, the wine industry, which is weakly linked to the research, perceives CC as a threat. Promoting the cultural and landscape image, the wine producers try to distinguish wine from other alcoholic drinks, but GIs wines and their regions become “island of resistance”, for a viticulture which is start to decrease in volume, area and value. This strategy becomes difficult to follow as CC is more intense.

...Innovative

Environmental, health and CC issues become an opportunity for the wine industry by integrating more and more innovation from the vineyard to the cellar. This development is allowed by a favorable and cooperative context which allow to maintain a relative stability between the French wine regions. This innovative context also relies on i) a voluntary research and innovation policy (private/public partnerships), ii) a binding policy on agricultural land management in the EU (zoning) and iii) more liberal conditions in terms of winemaking.

...Nomade

In the context of i) restrictive policy on alcohol and ii) a research focusing on the reduction of inputs use (pesticides and water), the consumers are aware to find the taste of the origin of the wines. Without sufficient knowledge to develop at large scale a “precision viticulture”, the wine producers find difficulty to reduce the variability of the wine quality. Some of them, joined by new investors, try to find "elsewhere" the reputation of the appellations, while others move to the plains where water is still available for irrigation.

....Liberal

In a more liberal and relatively favorable context for the wine market, new international investors, mainly in blending & trading, lead to the redistribution of viticulture towards three kinds of areas: irrigated areas, residual inherited AOP terroirs, new vineyards benefiting from climate change (but still risky). Some “Terroir wines” or “regional brands” are still marketed, but the supply is mainly composed of technological wines controlled by few wine merchants. Climatic instability, competition between vineyards, deregulation and the power of international traders weaken the wine producers which are disorganized and can not fully benefit from R&D

Conclusion

- First description of four strategic scenarios and four pathways that could preferentially lead to these scenarios : complete descriptions, report and publication will be soon available.
- To capitalize on the methods through reflexive analysis : a contribution to the prospective methods for adaptation to CC
- We will use the 4 scenarios as an animation tool at regional levels : to specify the scenarios and pathways with stakeholders, to promote collective debate helping the co-construction of climate strategy in the regional vineyards