

COMPETITIVNESS OF COGNAC'S COMPANIES

- WHAT ARE IMPACTS OF GLOBAL WARMING TO COGNAC'S VINEYARD AND WHICH SOLUTIONS COULD BE USED AGAINST THESE IMPACTS? -**

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Abstract:

The impact of projected global warming on the French wine and spirit industry was investigated by several French and International institutes (FEVS, CNRS, CEA, UVSQ, UPMC, IPCC). Expected average temperature between present day and the year 2050 will be 0,6°C to 1,3°C in many viticulture areas in South East. Between 2050 to the year 2100 the projected increase temperature in viticulture areas is 0.9°C to 1,3°C, however it could increase of 2,6°C to 5,3°C. (GIEC, 2007)

The projected changes in phenology in some French wine regions revealed a real effect of climate change to grape maturation. In addition to the projected regional warming and acceleration of vine phenology, harvest may occur in the order of 15 days earlier and 30 days by 2050, depending on the region.

Climate and Nature are the two principal factors to have a good grape quality. However, these models indicated the appearance of natural disasters (hail, dryness, frost, gale) and insects which devastate agriculture and viticulture areas.

The potential adaptation strategies for French wine and spirit industry to interrupt global warming were considered in terms of variety selection, geographic relocation and protection system. There are a lot of terroirs in France and Europe, many presently good for grape growing. These are potentially available for viticulture if water supplies can be possible and secured. However, these strategies stay really expensive and cannot be applied by all wine or spirit company.

Keywords: Global warming – Cognac – Phenology – Frost – Dryness – Hail – Environment

Introduction:

The French wine and spirit industry is an important contributor to the French economy with wine and spirit exports being the 2nd largest valued export behind aeronautic products (FEVS, 2015). The grapevine-based industry “AOC” occupies 490,000ha, the grapevine-based of Cognac occupies 79,866ha either 16.29% of total French vineyards. The spirit industry is considered vulnerable to climate change because of its unique terroirs.

The increasing of carbon dioxide is affecting the atmosphere and making global climate change. According to the Intergovernmental Panel Climate Change there 90% chance of that some of this change is already here. In 2014, the French annual temperature was 1,2°C higher than the long term average. In 2015, the temperature was higher during all the year except month of February, September and October. (IPCC, 2014)

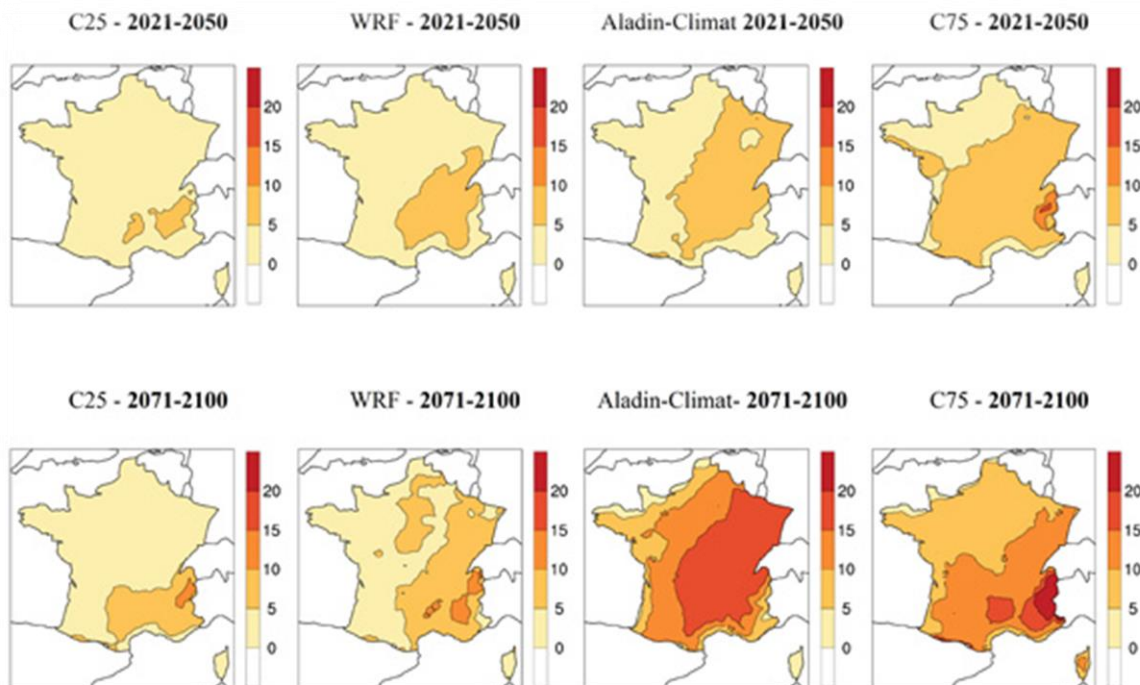


Fig. 1. Temperature differences refers from 1976-2005 of number of days of warm episodes to 2021-2050 and 2071-2100 with most optimists and pessimists representative concentration pathways (www.meteofrance.fr)

In 2021, annual average temperatures are projected to be 0.6 to 1.3 with more days warmer in summer in South-East and an decreasing of cold days in winter in all national territory. By 2071, annual average temperatures are projected to increase by 0.9°C to 1.3°C (RCP 2.6), or 2.6°C to 5.3°C (RCP 8.5). With more than 20 days of high warm in South East, dryness

episode in all south part of France and extreme precipitations in all territory. (METEO FRANCE, 2015)

The research taken was to examine the impact of climate change on a range of viticulture parameters affected by climate. Also to show the actual and projected impacts and the strategies to control and remove these impacts. Author wants make a report on the results of an assessment into climate change impact on grapevine phenology, grape quality and projected solutions focusins on the Cognac industry.

Methodology

For this research, was done phone interview to the Comitee of Pineau des Charentes director about the different information source could be useful for the research. Then, made projected impacts of climate change to the grapevine phenology and grape quality, using information from meteorology website, Intergovernmental Panel on Climate Change (IPCC), and Bureau interprofessionnel du Cognac (BNIC).

Global warming is the increase of Eart's average surface temperature due to effect of greenhouse gases, such as carbon dioxide emissions, which trap heat that would otherwise escape from Earth.

What are the impacts of global warming to Cognac Industry?

I. Impact to grapevine phenology:

The timing of of phenological stages is fundamentally impact by temperature so the impact of projected warming on phenology was investigated. The work of BNIC has shown the existence of a strong correlation of average maximum temperature from April to August. And the strat date of the harvest. So an increase of 1°C maximum daily temperatures from April to August and an harvest earlier than other year of 10 days.

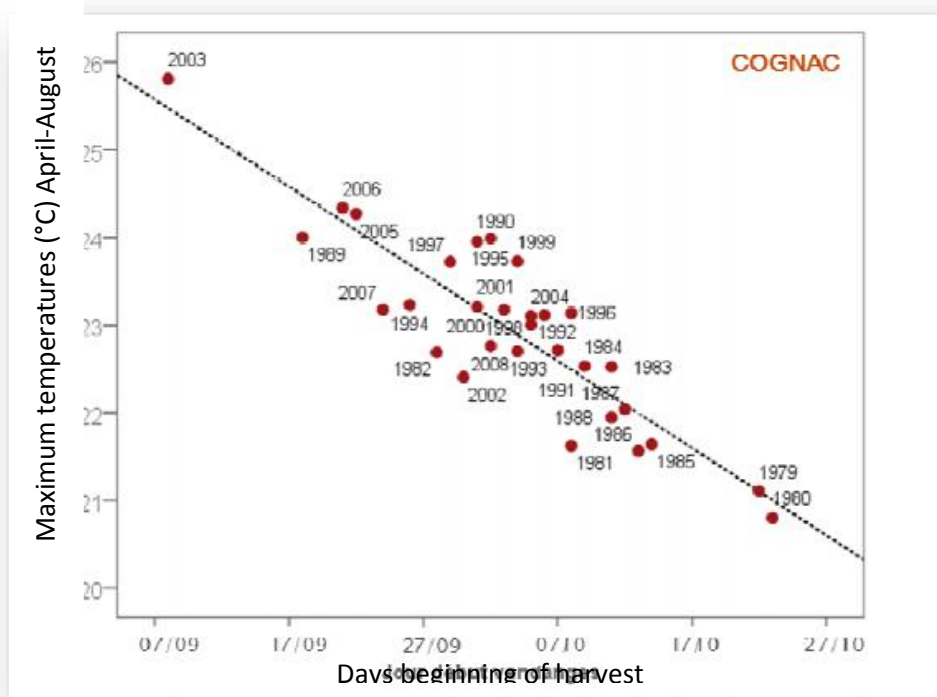


Fig. 2. Days beginning of harvest and maximum temperatures between April to August (BNIC)

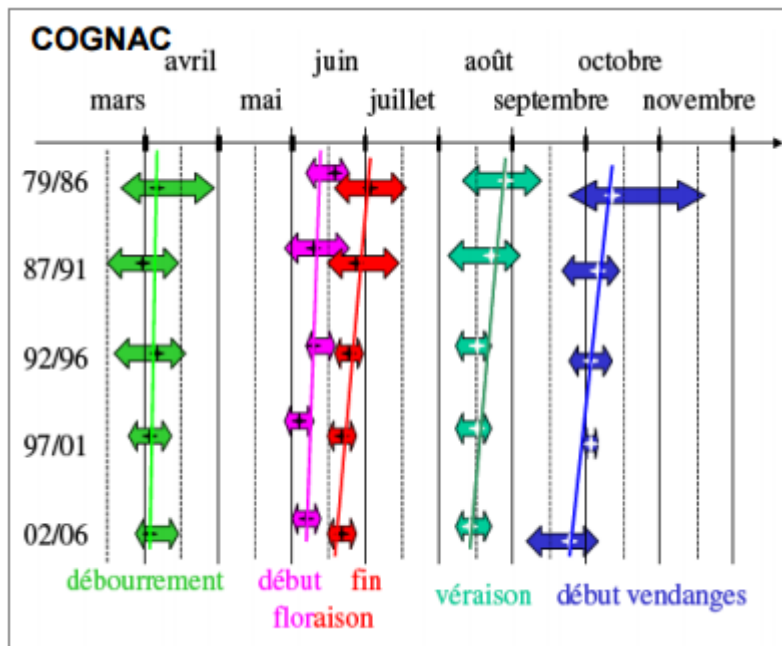


Fig. 3. The grapevine life cycle of Cognac region (SNAKKER, 2007)

An important implication of these findings is the dual impacts of climate change on the temperature of the ripening period. In addition to the higher temperatures, the accelerated

phenology, which causes earlier maturation, results in ripening temperatures increasing even further. For example, each year an increase of average annual temperature of 1.5°C, lead the day of harvest of 15 days. Then this lead increase the temperature during the maturation of 2°C. In total, it is a warming of 3.5°C the vine suffer at the end of the life cycle.

II. Impact on grape quality

Grape quality can be estimated in two principal ways, Glycosyl (glucose concentration) and Acidity. The relationship between climate and these quality indicators had to be determined before climate change impacts on grape quality could be quantified. In addition,

Regional average climate indices (Temperature and rainfall parameters) are compared to this region averaged wine-grape quality estimators. The relationship between quality and temperature varies with the variety of grape. Ugni Blanc is the only variety use to make Cognac and is sensitive to temperature.

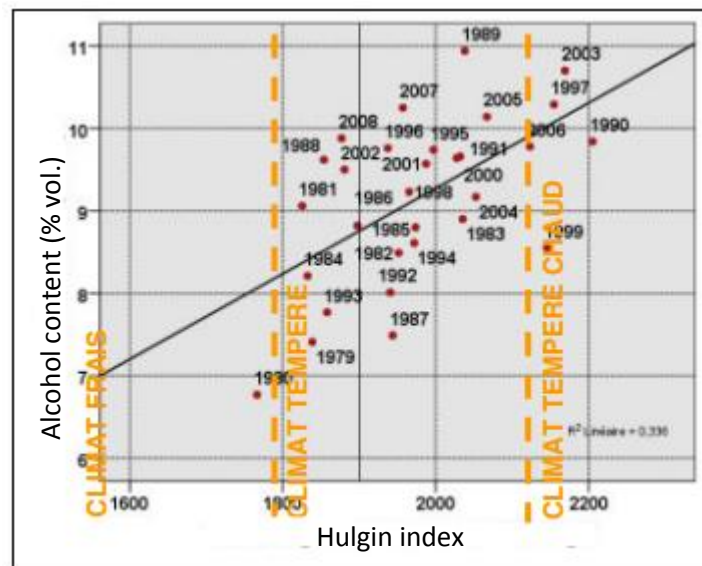


Fig. 4. Correlation between alcohol content after harvest and Hulgin index. (BNIC) (HUGLIN P.,1986)

The impact of the climate change projections on grape of Ugni Blanc revealed a reduction of acidity, azote concentration and an augmentation of glucose during the maturing process. In

addition, it is projected an increase of temperature during vinification and a faster evolution of wines with glucose content higher so an alcohol content higher.

III. Impact to weather and disease emergence

Many plants can be damaged or killed by freezing temperatures or frost. This varies with the type of plant. Plants likely to be damaged even by a light frost include vines, such as grapes. Even those plants tolerate frost may be damaged once temperatures drop even lower (-4°C). The entire visible plant may turn completely brown until the spring warmth, or may drop all of its leaves and flowers.

The number of days with cold temperature is decreasing. The frost risk in spring was 12% of the April period in 1968-1987 and was 6% of the April period in 1968-2007. When there is frost in spring all vineyard are suffering and it is sure the harvest will be really bad. It is a positive impact from global warming to grapevine –based.

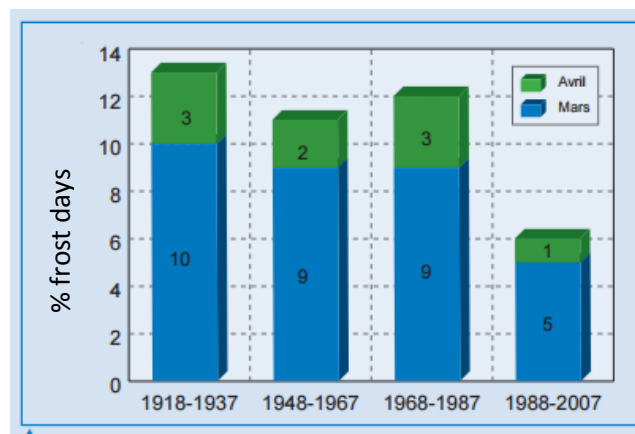


Fig. 5. Percent of total days of frost in March and April in Cognac (BNIC)

Dryness, water is a major factor in the production and quality process. Since 1976, the frequency of summer dryness increase. Occasional hydric stress is benefic for vine but a long term of dryness could kill it. (DANDIN P., 2006)

New diseases and insect that could affect the grapes, but opinions are diverging. We observe an increase an asexually produced fungal spore called odium and mildew. And the Drosophila, a fly, which feed with grape and infect this one.

Results

The Cognac industry will need to evaluate a number of adaptation strategies to reduce the impact of climate change. The industry has few options and obligations. It must preserve the cognac product, current infrastructure. In addition, change to varieties better adapted to warmer climates (Shifting). However, the appellation system exist in France, where by regions produce wine and spirit from a restricted variety list.

The temperature categories have been mapped by Meteo France in projected climate (Fig. 1.). The suitability zones for the variety groups are shown for the South West, Center and North regions of France. But this project could be apply only if the most pessimist scenario happened.

	Alcohol content (%Vol.)	Acidity g/l
Fercal	0	0
R.140	+ 0.0	+ 0.23
333 EM	- 0.3	+ 0.26
41B	- 0.2	+ 0.03
RSB	+ 0.1	+ 0.33
110 R	+ 0.4	- 0.06
P.1103	- 0.1	+ 0.56
Porte-greffe	0.7	0.6

The potential shift of variety suitability projected increase, it could be an alternative against climate change.

Conclusion

As we know competitiveness is the ability of a firm or a nation to offer products and/or services that meet the quality standards of the local or/and world markets at prices that are competitive and provide adequate returns on the resources employed or consumed in producing them.

Cognac is a variety of brandy, a town and also an Appellation d'origine controlee with some legal requirements of the production methods. The first ingredient of this product is grapes (Ugni-blanc), as we know Nature and climate are the most important factors to produce a good and authentic Cognac.

On this day, Climate warming is known as a Global warming. We already observe in all parts of the earth ecologic disaster to human population and nature. In economic and technic view this research show the importance to adapt the Cognac production process to a potential new climate.

Climate change on grape phenology and quality will allow the Cognac industry to determine some of the adaptive strategies that could be useful for the future vineyard development. With the huge infrastructure that goes easily but the small one could have problem to adapt efficiently these strategies.

This first analysis of the projected impact of climate change has shown the challenge to the Cognac and French wine and spirit industry to develop a suitable adaptation strategies to ensure its international competitiveness is maintained.

Impacts	Solutions
❖ Phenology damage	Delocalization of vineyard. Using other varieties. Shifting.
❖ Increase of alcoholic degree (vol%) and acidity	Find a New grape-type, as Monbadon which could be adapted to high temperature and keeping the stability of alcohol degree and acidity rate. Shifting
❖ New diseases	Use new treatments or hybrid. We must be careful about the Appellation rules and also about the sustainable environment respect.
❖ Dryness	Sustainable irrigation.
❖ Frost	Control plant (heater).
❖ Hail and storm	Net anti-hail Insurances Vineyard in different places.

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