



Climate Change and Economic Challenge Strategies for Vinegrowers, Winemakers and Wine Estates

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European Association of Wine Economists

The look of an Economist

Climate and nature

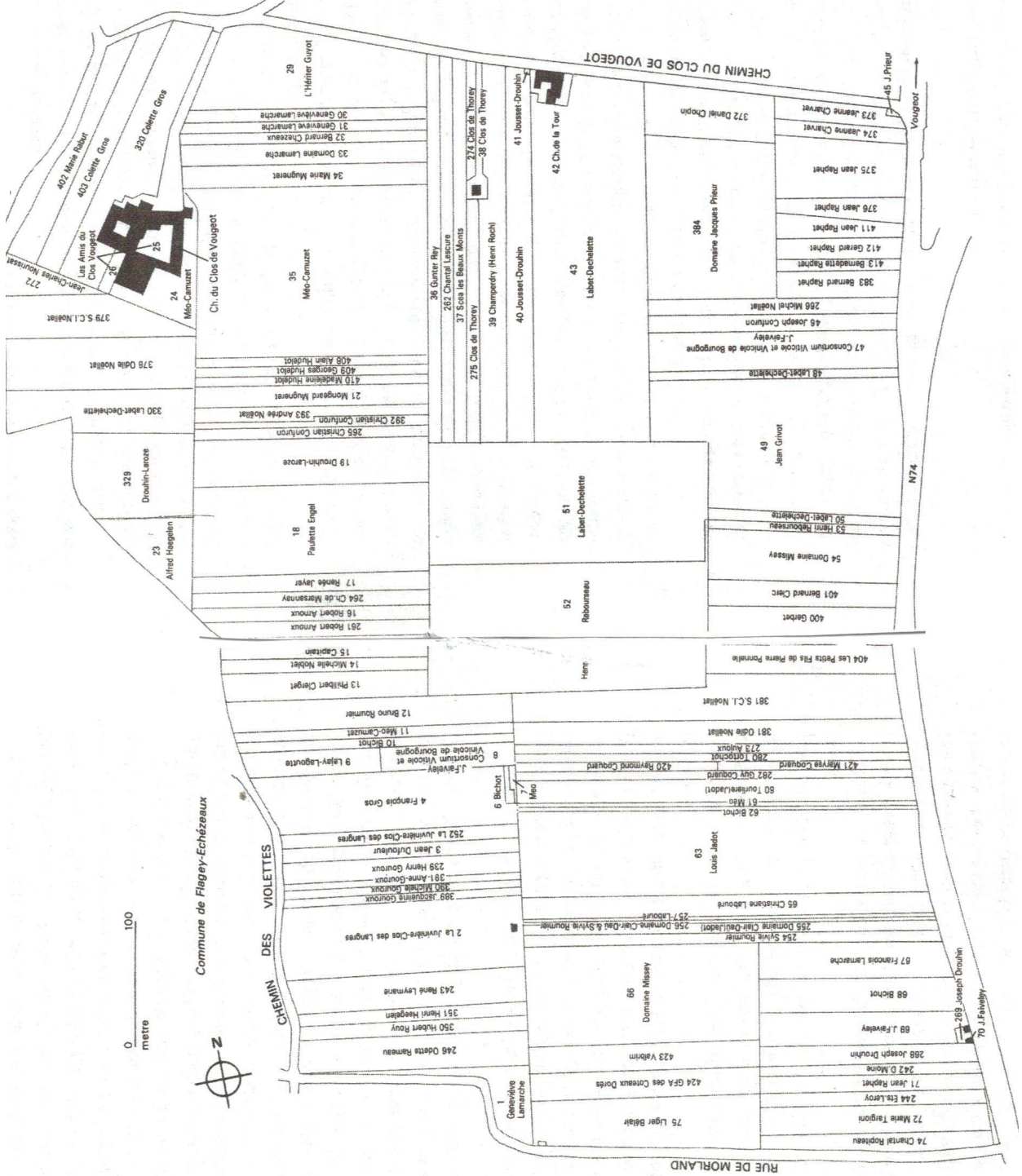
- * production factors
as land, capital, labor
- * now relevant and pervasive factors in
viticulture

The estates in Burgundy (1)

- * familial and specific estate
medium size: roughly 56% between 5 and 15 ha
- * double function: grapegrower and winemaker - *vigneron*
- * with permanent and occasional workers (pruning, harvest)
- * multiplots vineyard land
15 to 20 plots in different villages; reduce naturally exposure risk to frost and hail
- * high specificity of each plot (altitude, slope, exposure), protection by proximity of bush, wood, wall...

Plot of Clos de Vougeot
50 ha 96 ares 54 centiares - **126 acres** - 85 owners and "vignerons"
crucial influence of topography
difference between top and bottom of the plot

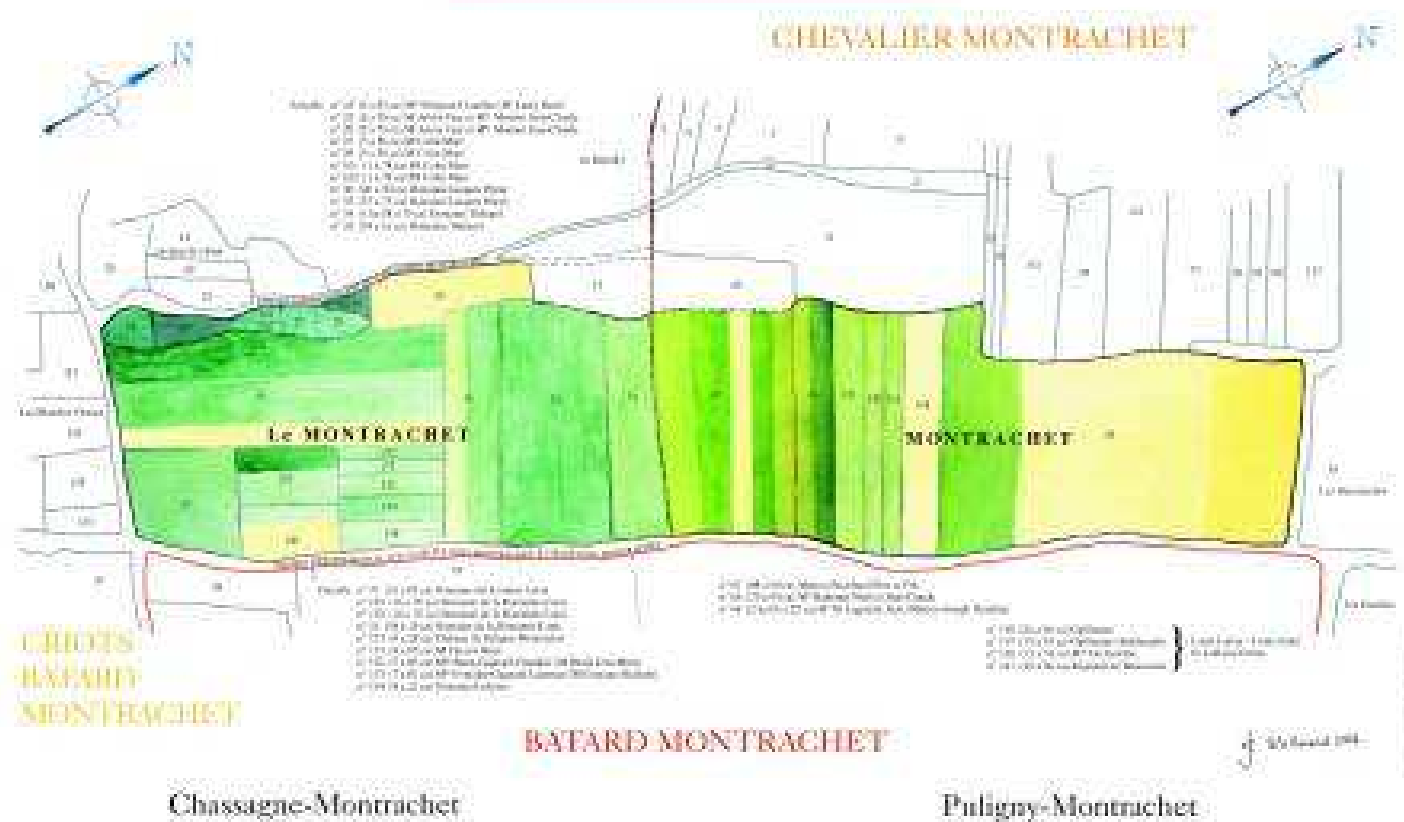




Plot « Le Montrachet »

7ha 99a 80ca - **19,768 acres** - 18 owners – 26 producers

LE MONTRACHET



The estates in Burgundy (2)

- * valorisation of *terroir* nuances at plot scale
- * high ranking of wines (4 levels)
- * good experience of permanent adaptation because of high spatial climate variability due to the terrain of small space (spread of 2 or 3 Celsius degrees between top and bottom of a plot)

A selection of some challenges

Water requirement

- * watering generally prohibited for AOC/AOP
- * but new regulation proposed if the drought is dangerous for vine stock (collective action)
- * micro-irrigation implemented in southern appellations
- * requires heavy equipment and important water reserve
- * some inaccessible plots - no water available
- * conflicts of water use: viticulture, farming, industry , population

Subsequently

- * needs of water reprocessing
- * rising water price is foreseeable
- * choice of priority treated plots is required

Frost

- * advance of flowering during late frosts period
- * what plots to protect?
- * how to protect?

Collective installations of vineyard frost protection and collective watch



*heaters (gas, petrol)
pollution*



*sprinkling water
great quantity of water and
necessity of reserve water*



*wind machine
with petrol reserve*



frost canvas

<http://www.duboisag.com/fr/hibertex-pro-toile-de-protection-contre-le-gel-5673.html>



power cables

show after spraying



Hail and severe storms

- * high frequency, high intensity
- * local impacts and local protection

- * destruction of crops (one year)
- * serious injury for vine stock followed by scrupulous pruning to keep / protect future harvest

Hail - *Roche de Solutré*, 13th of Avril 2016

Burgundy



destruction of crop

financial loss



Soil loss and nutriment erosion impact on future quality of grapes ... and wine

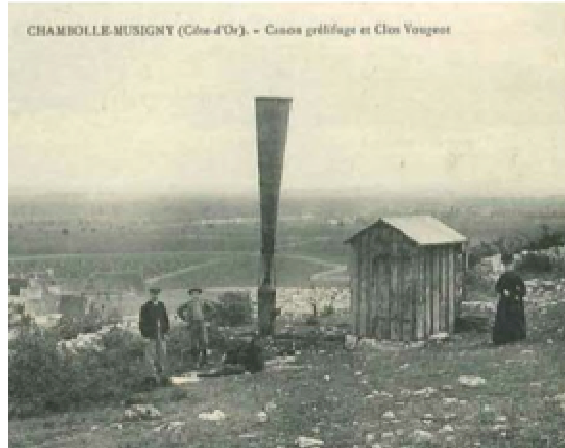


Figure 2. Rigoles creusées dans les inter-rangs lors de l'orage du 11 juin 2004 (Vosne-Romanée)



Source : JP Garcia et alii – Université de Bourgogne - 2007

anti-hail guns and new networks



network of 53 generators for anti hail protection system
in Burgundy - Côte de Beaune

For *vignerons*, importance of

- * subscription of weather report and warning message **at a very local level**
 - * collective watch
- * and grapegrower solidarity

Migration of parasites from the south

vine pests and diseases

- * fight against vectors responsible for disease distribution
- * loss (partial or total) of harvest
 - * risk of loss of plant



Scaphoideus titanus

vector of disease
"golden flavescence"

- * development if not enough cold winter temperature
Winter 2015 – 2016 ?
- * irreparable consequences for continuity of vines eventually vineyard (cf phylloxera)



Drosophila suzukii

loss of grapes
reduction of yields
and vintage

Collective and compulsory action in search of parasites vector of golden flavescence

- * official and regional decision of compulsory treatment
- * absence of treatment endangers the vines of area (plots, vineyard village)
- * prosecution against grapegrower if no treatment



Evolution of treatments concern of health and environment



limit of ineffective chemical
treatment

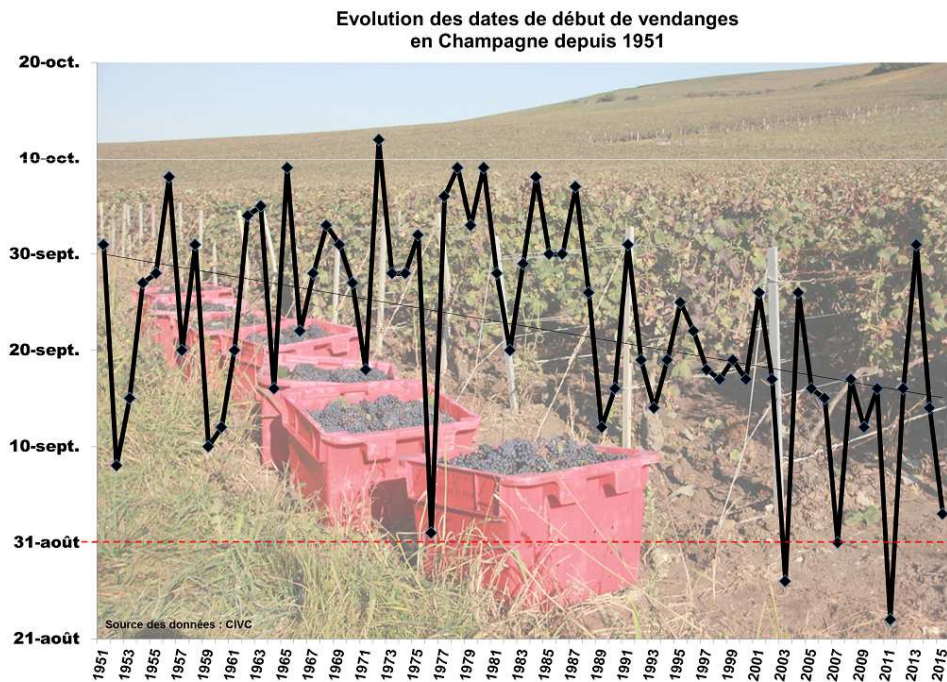
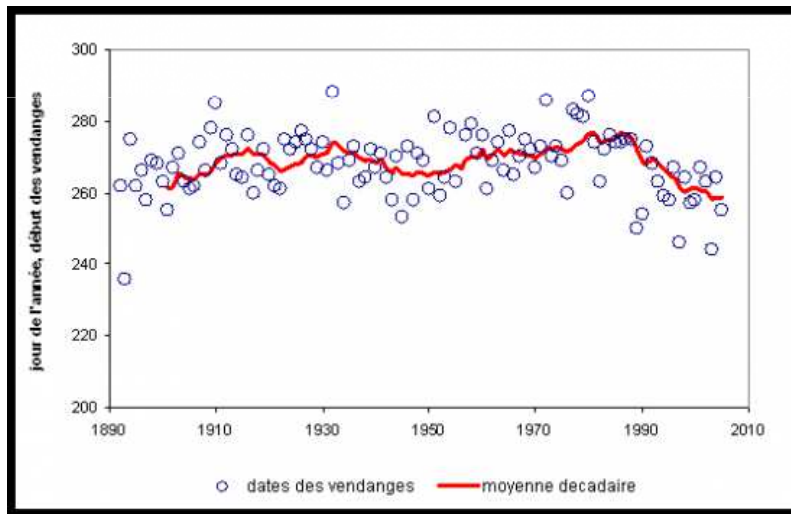
2015 - « millerandage » and drought



- * imperfect fertilization of the flower that gives small berries
 - * drought and low rainfall in August
 - * beautiful harvest although reduced
 - * very good sanitary condition; high quality for wines
- * rising of prices in "en primeur" charity auction sales
 - Hospices de Beaune (November 2015, 27 to 32 %)
 - Nuits-Saint-Georges (March 2016, 54 to 73 %)

Harvest

at the beginning of September
with high temperature during the day



<http://www.ca-espace-champagne.com/changement-climatique/>

<http://rechauffement-climatique-aquitaine.e-monsite.com/pages/consequences-aquitaine/nologie.html>

Harvest during night
between 2 and 7 AM in Italy

or very early in the morning
grapes at winery before 10 or 11 AM
in Bordeaux – Graves area



Transport yesterday in vintage vat



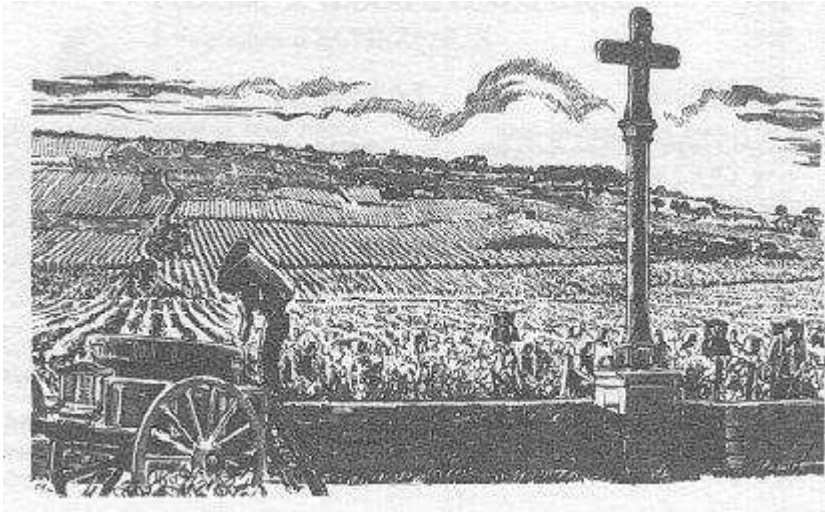
Today: equipment to keep grapes fresh,
not squeezed to avoid risk of fermentation or spoilage by indigenous
microorganisms on berries or on grape handling equipment



*crates of small
size with holes*



use of refrigerated trucks



meticulous sorting out

* during cutting in the row

* at the end of the row

* at the entry of the winery
(sorting table)



* sorting table under the attentive eye of the responsible of the estate (owner, winemaker, ...)

* time using

* labor using

* time and money costing



* importance of regional climate model
with precise local characteristics

With help of « *vignerons* »
their sense of observation, their presence in plots
their adaptability and sense of experimentation
their extreme vigilance

I wish us to have pleasure to continue to share and
to taste fine and great wines!



and a new responsibility with the
inscription of

"Climats de Bourgogne"

at UNESCO World Heritage

(4th July 2015)



Organisation
des Nations Unies
pour l'éducation,
la science et la culture



Les Climats du vignoble
de Bourgogne
inscrits sur la Liste du
patrimoine mondial en 2015



The Climats of
Burgundy become
**UNESCO World
Heritage.**



Thank you for your attention!

Cheers!

