

Sustainable wine: what's up?

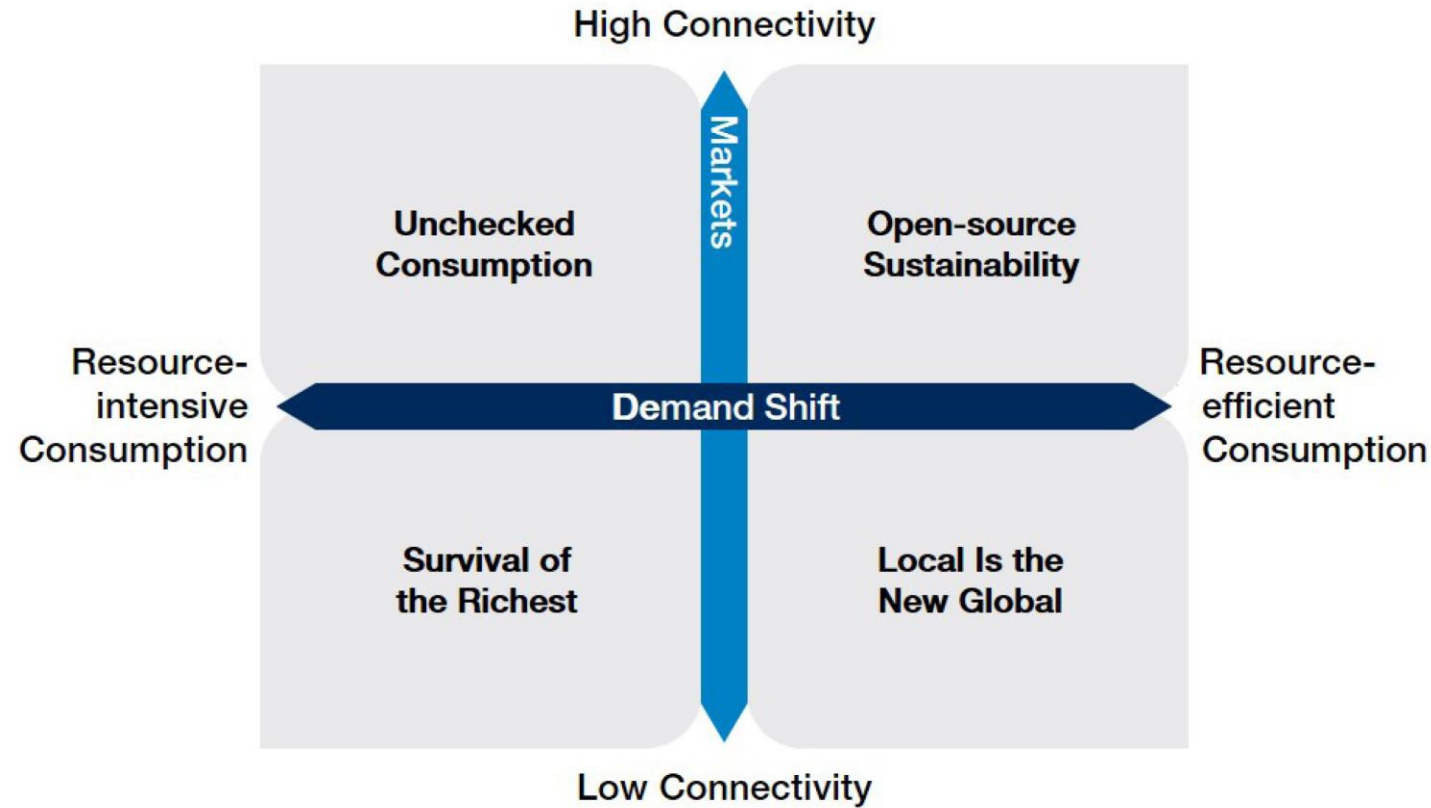


- **Why sustainability
in wine business?**
- **How Technology
is changing vineyards**

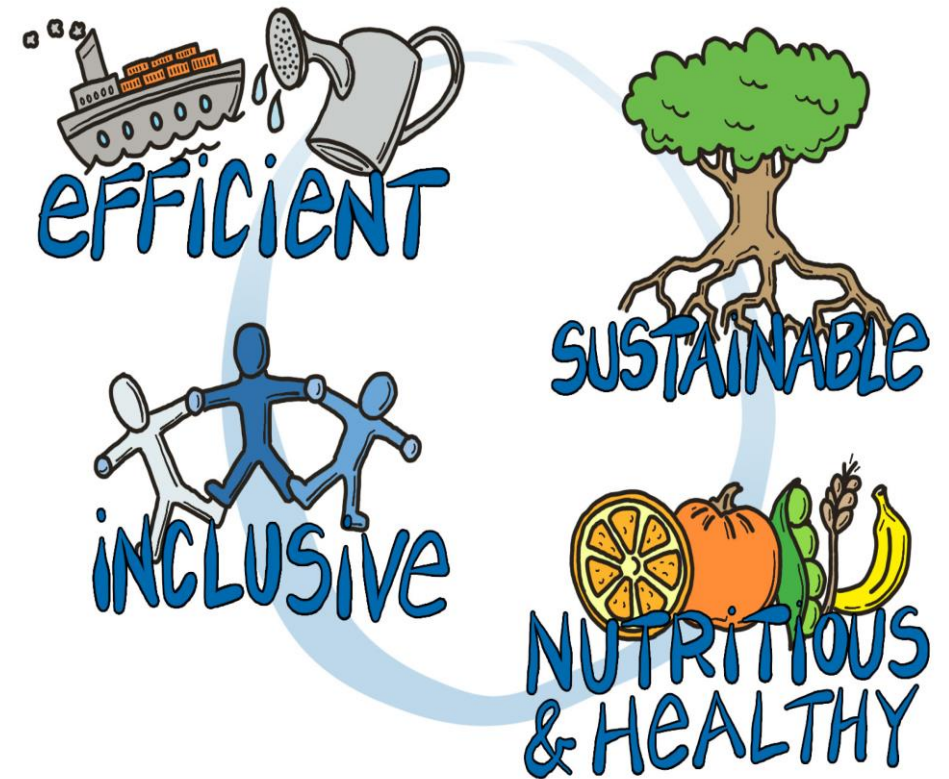


How will food systems nutritiously and sustainably feed
8.5 billion people in 2030?

Food system is changing!



WORLD
ECONOMIC
FORUM





- ❑ increase of demand towards products with **high nutritional** and **health content**
- ❑ growing consumer's attention to **food safety and quality**
- ❑ media networks and consumer needs boosting **food risk** communication and **traceability information**

Why sustainability in wine?

Consumers become more and more interested in healthy food and its social and environmental impacts. However,



- ☐ Do they take care of the **credentials** of the wines they purchase?
- ☐ Do they give importance to **pesticides**, winemaking practices, **water and carbon dioxide footprints**?
- ☐ Do they know how **seasonal workers** are contractually treated and health and safety protected during the harvest?

Why sustainability in wine?

Are you willing to buy a bottle of wine which:

- ☐ whose **glass weighs** almost more than the contents
- ☐ on which **chemicals** are sprayed often without factual and effective planning
- ☐ obtained from **vineyards irrigated** with more than 100 liters of water to produce 1 glass of wine
- ☐ with a consumption of **water in the cellar** of 2.5 liters of water per liter of wine
- ☐ **transported** by air from one continent to another?



[Hoekstra & Chapagain, 2008]





Why sustainability in wine?

Systembolaget, Alko and Vinmonopolet (Scandinavian wine monopolies) have applied in the international bids specific requirements for:

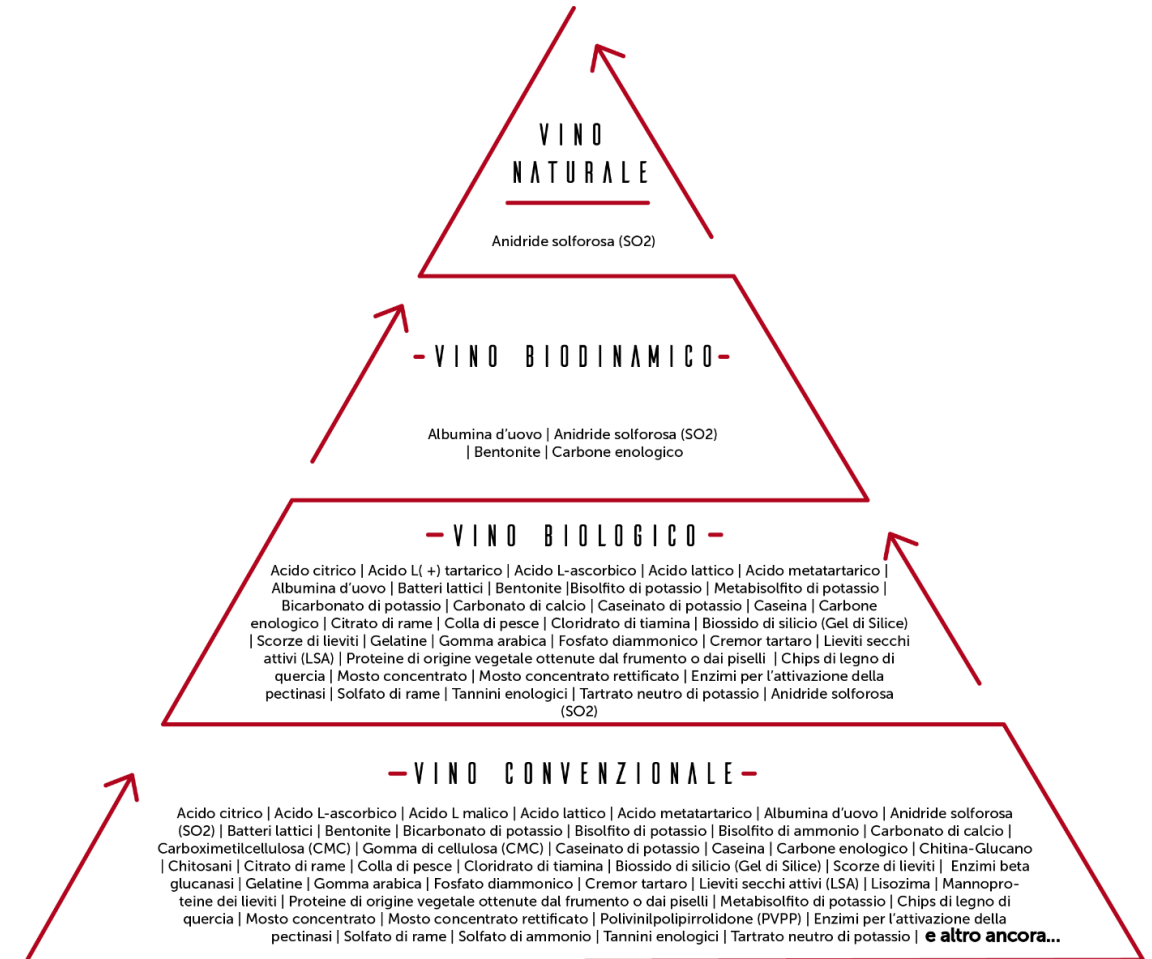
- ☐ low-alcohol wines
- ☐ lighter bottles or recyclable containers (e.g. bag-in-box)
- ☐ organic, biodynamic, sustainable or fair-trade certifications
- ☐ social code of conduct requirements (e.g. BSCI)
- ☐ traceability verification processes and audits

Why sustainability in wine?

What's inside a glass of wine?



source: Winefolly



source: <http://www.vignevin.com/pratiques-oeno>

What's inside a glass of wine?

COMMON ADDITIVES

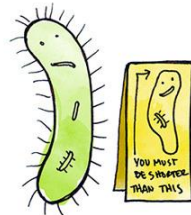
Additives that assist with standard winemaking



ANTISEPTIC & ANTIOXIDANTS

Added before, during or after fermentation. Most common type is sulfites.

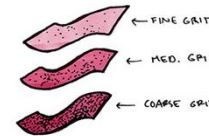
Sulfur dioxide (SO₂), Potassium Bisulfate, Potassium Metabisulfate, Ascorbic Acid (Vitamin C)



FILTRATION

Eliminates microorganisms, removes sediments and clarifies wine.

Charcoal filtration, Crossflow Microfiltration, Flash Pasteurization



POLYPHENOL MANAGEMENT

Stabilizes color and reduces astringency.

Potassium Caseinate, PVPP (Polyvinylpolypyrrolidone), Gum Arabic, Cold Stabilization



HYDROGEN SULFIDE

Corrects bad aromas and taste from hydrogen sulfide and derivatives.

Copper Sulfate, Copper Citrate



FERMENTATION NUTRIENTS

Used to help yeast ferment.

Active dry yeast, diammonium phosphate (aka DAP), Ammonium Sulfate, Thiamine, Yeast Bark (autolyzed yeast nutrient), Enzyme Preparations (pectolytic enzymes)



FINING & CLARIFICATION

Makes wine clear.

Isinglass, Casein, Plant proteins, Egg Albumin, Kaolin, Silicon Dioxide, Tannin, Yeast Protein Extract, Bentonite, Beta-Glucanases Enzymes, Chitin-Glucan, Chitosan



ENRICHMENT

When grapes do not have enough concentration (sweetness) to make wine.

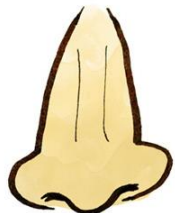
Sugar (Chaptalization), Concentrated Grape Must, Reverse Osmosis, Evaporative Enrichment



DE-ENRICHMENT

When grapes are too sweet to make dry wine.

Watering Back (adding water), Reverse Osmosis



ORGANOLEPTIC MANAGEMENT

Used to control flavor/taste profile.

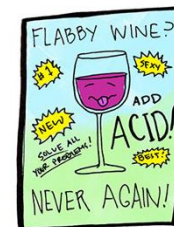
Lactic Acid Bacteria (Oenococcus Oeni), Oak Barrels, Oak Chips, Lysozyme



STABILIZATION

Used to stabilize wine.

Potassium Hydrogen Tartrate, CMC (Carboxymethylcellulose), Yeast Mannoproteins, Metatartaric Acid, Dimethyldicarbonate (DMDC), Electrodialysis, Cold Stabilization



ACIDIFICATION

When grapes do not have enough acid to produce a stable wine.

Tartaric Acid, Lactic Acid, Malic Acid, Electrodialysis



DE-ACIDIFICATION

When grapes are too acidic to produce a stable wine.

Lactic Acid Bacteria, Potassium Bicarbonate, Calcium Carbonate

Why sustainability in wine?

CORRECTIVE ADDITIVES

Additives used to solve problems in winemaking

The hidden side of social aspects

Why sustainability in wine?



Workers in vineyards are exposed to pesticides and injuries caused by mechanical tools and machinery.



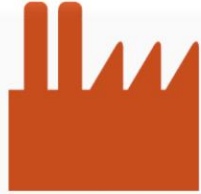
1.25m people employed in the sector



30% of employed workforce are women



+ 200,000 workers in the grape harvesting season



Workers in wineries incur health risks that derive from working in confined spaces with low oxygen and high carbon dioxide levels.

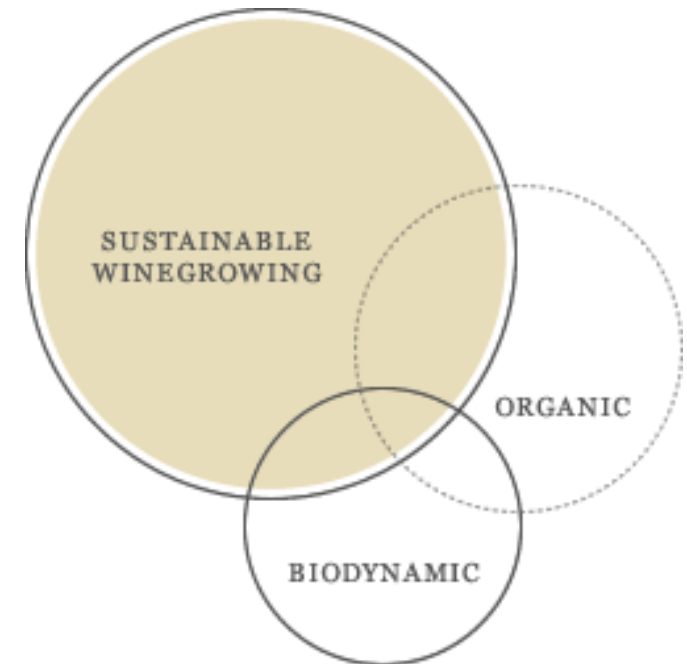
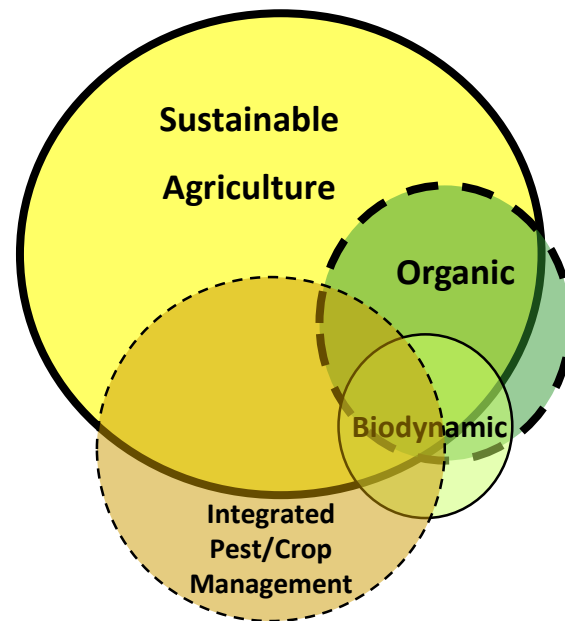
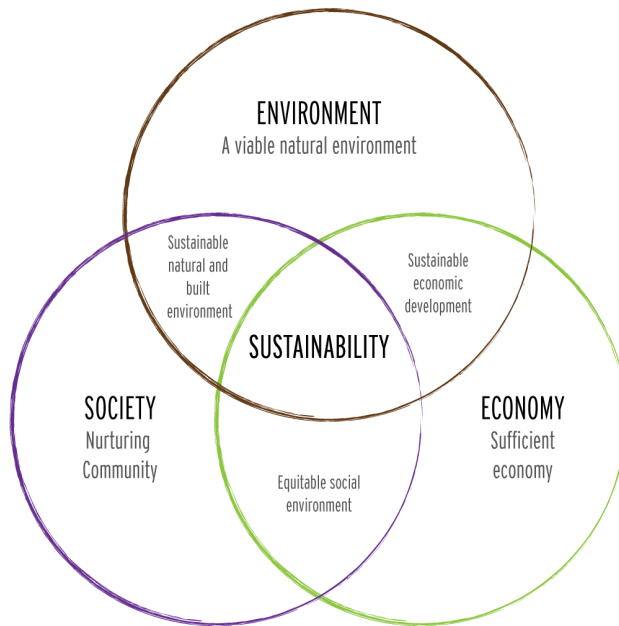


Low-wage levels, substandard housing conditions, a lack of social protection and job insecurity affect seasonal and migrant workers across the industry.

Caporalato has been forbidden under Italian law since 2011 and is recognised as a criminal offence for which recruiters and producers can be convicted. However, in 2016 an **estimated 430,000 workers** were recruited through this process.

Source: the BSCI Sustainable Wine Programme (2017)

Why sustainability in wine?



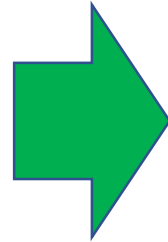
KEY AREAS OF WIDELY ADOPTED SUSTAINABLE PRACTICES:



Sustainable practices in wine

Sustainable practices and programs generate positive outcomes:

- ☐ provide an holistic approach
- ☐ improve company performances
- ☐ better quality assurance process
- ☐ address consumer needs
- ☐ foster the company image



Key performances indicators:

- ☐ reducing water and energy use
- ☐ minimizing pesticide use
- ☐ building healthy soil
- ☐ protecting air and water quality
- ☐ recycling natural resources
- ☐ maintaining surrounding wildlife habitat
- ☐ providing employee education
- ☐ communicating with neighbors, retailers and consumers about vineyard and winery operations

National and International programs



tergeo
UNIONE ITALIANA VINI



How Technology is changing vineyards

Technology & vineyards



Source: Osservatorio Smart AgriFood (2017)

IoT applications

Measure and data analysis of sustainability indicators
(e.g. water, air, nutrients, chemicals, biodiversity, etc.)

Predictive maintenance and process control

Knowledge Based Model (KBM)/Decision Support System (DSS)

Product information and tailor made promotions

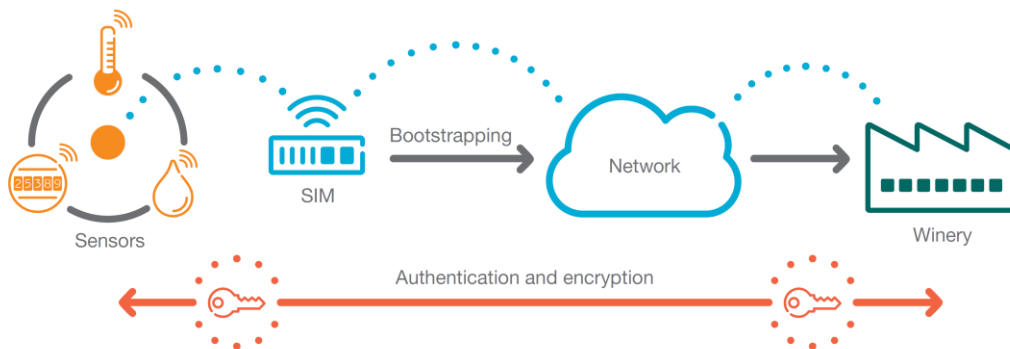
outcomes

- risk reduction of grapes illness
- **improve grapes quality**
- **reduce environmental footprint**
- remote control equipment's
- **decrease health and safety workers incidents**
- increase production continuity end efficiency
- **boost traceability and supply chain management**
- **reduce cost**, improve savings and **stimulate better planning**
- **improve customer experience and client loyalty**

The TracoVino project (Germany)

- Maximized output and optimized management
- Improved wine quality
- Remote monitoring of the vineyard
- Eco-friendly operations

Generic Bootstrapping Architecture



The New Zealand wine business aims to be the first in the world to be 100% sustainable!

New Zealand Sustainable Winegrowing program was established in 1994
and in 2002 they have introduced sustainable wineries standards

<https://www.youtube.com/watch?v=qQGWDNY4tv8>



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