
Chapter 6

Vineyard management



Site Selection

1) Environmental conditions

Grape grower assesses average rainfall/temp/sunlight. Soil - fertility/drainage. Influence grape variety, planting density, training, trellising.

2) Business considerations

Proximity to utilities (water/power), availability of workforce, accessibility to site machinery, cost of land.

3) Grape variety

Climactic conditions considered. Demand. EU may restrict variety.

Planting/replanting

For new plantings:

- Vegetation cleared
- Fertility of soil assessed/corrected
- Young vines (brought pre-grafted from nurseries) planted - hand or machine
- Individual plastic sleeves to protect against animals
- Sometimes irrigation necessary
- First yield after 3 years

Replanting

- Most vines replaced after 30-50 years
 - Old vines produce high concentration fruit but not high yield/can be disease prone
 - Vineyard left "fallow" (unplanted) after vines dug up to recover nutrients
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Managing the vine

(Goal: to maximise production of fruit)

Vine training

- Shape permanent wood on vine - either **low trained** (to benefit from heat) or **high trained** (benefit from above frost).
 - **Head training** = little permanent wood, either just trunk or few short arms growing on top of trunk (spur pruned or replacement cane pruned).
 - **Cordon training** = trunk with one or more permanent horizontal arms (cordons) - usually spur pruned. Longer to establish as more wood → but easier to machine harvest. Usually 1 or 2 cordons but 4+ on larger structures.

Vine pruning

- Removal of unwanted leaves, canes, permanent wood
- Winter/summer pruning
 - Winter - determine number of buds/location in coming growing season.
 - Buds can't be too close together (canopy management)
 - Winter pruning styles:
 - **Spur pruning** = short sections of one year old wood cut to 2 or 3 buds. Spurs distributed along cordon of wood (cordon trained) or top of trunk (head-trained).
 - **Replacement cane pruning** = canes are longer (8-20 buds). 1-2 canes retained and tied horizontally to trellis for support. (Usually for head-trained vines, more complex, skilled workforce required). *Guyot - single or double*.
 - Summer pruning
 - Restrict vegetative growth so sugar can go to grape
 - Leaf stripping - grapes have sunshine exposure

Trellising and Canopy Management

Managing green parts (leaves, etc) of the vine

Trellis = permanent stakes + wires that support replacement cane and vine growth.

- **Untrellised vineyards**
 - Vines hand down to the ground (bush vines)
 - Head-trained + spur-pruned
 - For hot, dry, sunny, warm climates as extra shade helps protect grapes (ie, S Rhone + Barossa Valley). Not suitable for cool/damp climates - as no airflow promotes fungal disease.
 - Beaujolais - head-trained/spur-pruned tied at tips to expose bunches to sunlight/air (*Gobelet*)
 - Can't mechanically harvest
- **Trellised vineyards**
 - Lines + horizontal wires/canes + shoots tied to trellis
 - 3 reasons for canopy management (trellis):
 - Control amount of sunlight exposure
 - Open canopy improves air circulation
 - Aid mechanisation in the vineyard
 - VSP ('Vertical Shoot Positioning') = trained vertically + tied into place onto trellis forming single canopy (canopy is open/aerated/shade free).
 - If not, VSP → top of shoot slop over for shape

Density (no of vines per hectare)

- Hectare (area enclosed by square with 100m sides)

- One acre = 0.4 hectares
- Density varies (1000 vines per hectare → 10,000 vines per hectare)
- Availability of nutrients/water considered

	Insufficient rainfall	Sufficient rainfall
Low level of nutrients	In low rain areas, large densities mean roots compete less for water	<ul style="list-style-type: none"> ● High water/low nutrients = vine still thrives ● Vines planted in high density (to stop vegetative growth) <ul style="list-style-type: none"> ○ Promotes root competition ● Bud numbers after winter pruning important <ul style="list-style-type: none"> ○ Carbohydrates in vine (energy) - too few buds and vegetative growth high/too many and not enough energy to ripen crop ● High plant density + strict bud control common in European vineyards
High levels of nutrients		<ul style="list-style-type: none"> ● Very fertile soil = bad for viticulture ● New world (more fertile) - low density plantings using vines with multiple canes + cordons <ul style="list-style-type: none"> ○ High quality and high yield

Yield (measure of grapes produced)

- Measured (a) in weight (tonnes) and (b) by volume (hectolitres of wine per hectare)
- Producers predict yields - legal reasons (EU)/contractual obligations/how much space in tank for wine needed
- Estimates made by bud after winter pruning - but frost, poor fruit set, disease all reduce figures
- If yield too high - green harvesting (removing immature grapes after véraison)
 - If wrong time, vine will compensate and add energy to grapes = returning yield to original size.

Yields and quantity

No solid link between low yields and quality

Managing vineyards and pests

Disease/hungry animals

Damage to leaves - impacts photosynthesis

Pests

- Phylloxera
- Nematodes

- Def. Microscopic worms that attach vine's roots (affecting water/nutrients)
- Prevent = sanitise soil before replanting and use resistant rootstock
- Birds and mammals
 - Prevent: Netting against birds/protective fencing against rabbit/deer/boar
- Insects
 - Prevent: Insecticides or integrated pest management (more environmentally friendly).

Fungal diseases

- Downy and powdery mildew
 - Fungi = warm/humid - thrive in all green parts of vine. Grapes lose fruit flavours/bitter taint.
- Grey rot
 - Caused by Botrytis Cinerea = damp conditions
 - Taint flavour, loss of colour in black grapes
 - Good for certain white grapes (sweet wines)

Fungicides

- Powdery mildew = sulphur-based spray
- Downy mildew = Bordeaux-mixture, copper-based spray
- Spray by tractor
- Maritime climate = more spraying (high rainfall)
- Canopy management → open vine canopy means far more airflow
- Spraying stops close to harvest (no residual harmful chemicals)

Other diseases

- Viruses - contagious, spread via cuttings/nematodes. No cure, must dig up vines, sanitise land.
- Bacterial diseases - sharpshooters (insects that spread bacteria). No cure - strict quarantine - interrupt sharpshooter lifecycle - dig up vines, sanitise land.

Viticultural practices

Chemicals negative effect on land, sustainable alternative include:

Sustainable agriculture

- Chemical spray restricted
- Growers consider yearly weather/pest/disease potential + prevent (sometimes with chemicals, but less so)
- Integrated pest management = predator of pest encouraged to live on land (biodiversity)
- Range of plants in vineyard = habitat for predator of pest + nutrients when ploughed into soil.

Organic agriculture

- Limited treatment against pests/diseases (small quantities)

- Accreditation needed from organic certification body
 - Must work towards conversion to organic standards before certification

Biodynamic agriculture

- Rudolf Steiner/Maria Thun - organic practices + philosophy + cosmology
- Soil = integrated with earth/other planets - homoeopathic 'preparations' used to fertilise the soil, treat diseases, ward off pests
- Certification bodies available

Harvest

- Begins when grape grower believes the fruit will create desired style of wine
- If bad weather - harvest bright forward to save crop
- Coordinate harvest to not overwhelm winery with fruit

Machine harvesting

- Shakes trunk of wine - collect ripe berries that fall (as well as unripe/damaged grapes, leaf, insects, MOG (matter other than grapes)).
- Sorted at winery

<p>Advantages:</p> <ul style="list-style-type: none"> ● Speed ● Work through the night (keep grapes cool) 	<p>Disadvantages</p> <ul style="list-style-type: none"> ● Only flat/gently sloping land ● Cannot be used for wines with whole bunch style (champagne/beaujolais)
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Hand harvesting

- Individual workers using secateurs (to cut)

<p>Advantages:</p> <ul style="list-style-type: none"> ● Good for sweet wine ● Less grape damage ● Stems intact - the whole bunch harvested 	<p>Disadvantages</p> <ul style="list-style-type: none"> ● Must be used on steep slopes ● Expensive/labour intensive
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Multiple Choice Practice Questions

1) Which training system involves training on vines vertically and tied into place on a trellis forming a single narrow canopy?

- a) Guyot
- b) Pergola
- c) Vertical Shoot Positioning (VSP)
- d) Gobelet

2) What is the primary goal of winter pruning in a vineyard?

- a) To reduce the risk of frost damage
- b) To remove diseased wood and improve vine health
- c) To enhance grape colour and flavour
- d) To determine the number of buds that will produce shoots in the growing season

3) Which method of irrigation is considered the most efficient in terms of water usage?

- a) Flood irrigation
- b) Drip irrigation
- c) Furrow irrigation
- d) Sprinkler irrigation

4) What is the purpose of green harvesting in vineyard management?

- a) To reduce the number of grape bunches to improve the quality of the remaining fruit
- b) To protect vines from fungal diseases
- c) To increase the overall yield of the vineyard
- d) To control the vine's growth rate

5) What is the main benefit of organic viticulture?

- a) Increased grape yield
- b) Improved vine height
- c) Enhanced sustainability and reduced environmental impact
- d) Faster ripening process

Answers

1. c) Vertical Shoot Positioning (VSP)

2. d) To determine the number of buds that will produce shoots in the growing season

3. b) Drip irrigation

4. a) To reduce the number of grape bunches to improve the quality of the remaining fruit

5. c) Enhanced sustainability and reduced environmental impact