

Spraying challenges in the Douro Wine Region of Portugal



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Douro Wine Region

- 250.000 ha total Area
- 44.000 ha under vineyard
- 33.000 grape growers
 - 1,3 ha / grower (avg.)
 - 3 plots / grower (avg.)

ADVID Associates

- 13% of Total Vineyard Area
 - 37 ha / grower (avg.)



Associates
Main rivers

■ Altitude and slopes

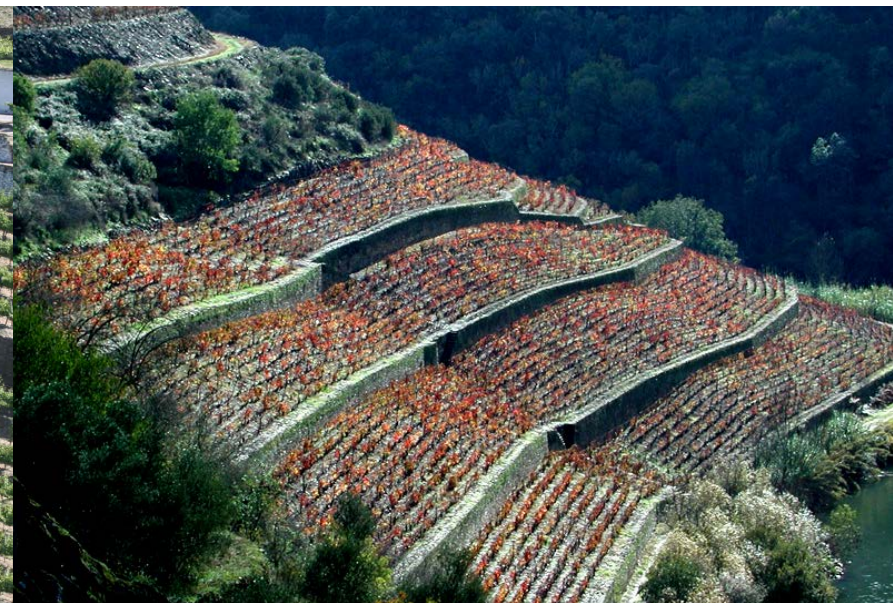
Altitude (m)



% surface in each class of slope in the 3 sub-regions

SLOPE (%)	BAIXO-CORGO (%)	CIMA-CORGO (%)	DOURO SUPERIOR (%)
0-15	9,7	7,2	15,1
25-30	15,2	12,3	13,8
30-40	21,0	20,1	19,8
40-50	23,8	25,3	24,3
>50	30,3	35,1	27,0

Traditional vineyards (30 % of the total surface)



- High density of plants
- Hard mechanization
- High costs of labour







This system is better adapted to small plots of land with up to 40% steepness and can be worked by mechanical means using pulleys or specialized tractors

Horizontal terraces supported by earth (embankments), each bearing 1-2 rows of vines planted far enough apart for a small tractor to move between them and with a low planting density (3 000 to 3 500 vines/ha.

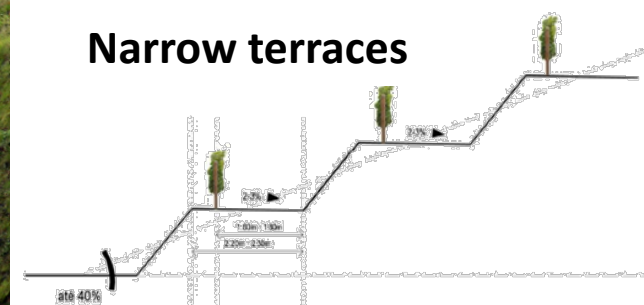


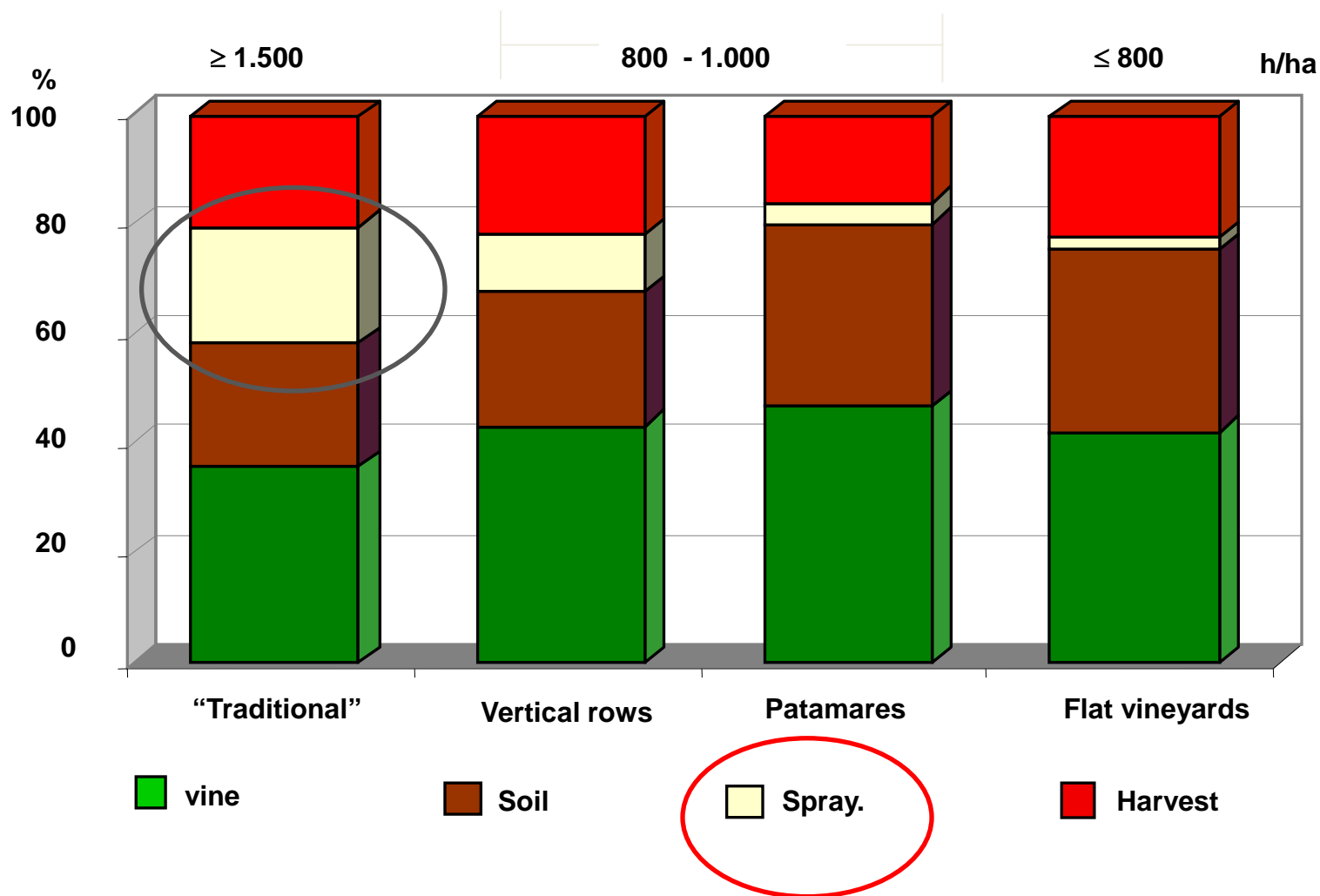
Problems identified:

- Transitability, - Stability of machines;



Narrow terraces





- **High diversity of vineyards systems** – it is difficult to properly adjust the amount of applied input to each vineyard's leaf area
- Commercially available **equipments are not adapted** to our situations
- **Spraying efficiency** is reduced by several factors:
 - transitability, stability of machines;
 - difficult access to water sources,
 - climate conditions (wind-drift, high temperatures)



❖ Fungicide crop sprayers common problems

- **Difficulties in the machine movement paths** (low working width between rows in terraces), and movement inversion.

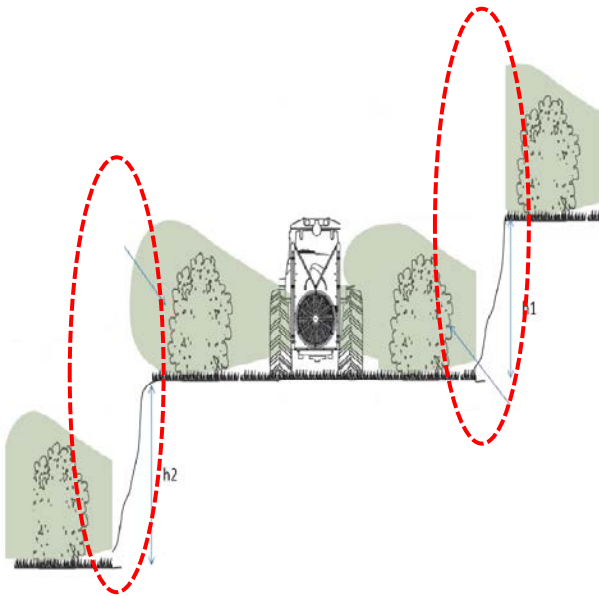


- **High operative inclination** (longitudinal or horizontal as to the machine) and access-related problems with terrace arrangements in the slopes



- Jet cannons, can be effective in terms of operation speed, but increase **waste**, generating economic loss and environmental impact

- **Canopy access** - “Patamares” have specific spraying difficulties associated to the upper and lower embankment sides of canopies.



ADVID has been promoting **working sessions** with winegrowers with the purpose of:

- Enhancing calibration of spraying equipment
- Improving spraying efficiency and reducing pesticide waste
- Adapting pesticide dose to leaf surface
(in 2014 in collaboration with Changins-Wädenswil Station of Switzerland with Olivier Viret)





Research & development – Projects concerning Spraying / Mechanization

ADVID has been promoting working sessions between winegrowers, scientific institutes and equipment manufacturers with the purpose of **developping new and more adapted equipment**, mainly adapted to steep slope viticulture.



Aim: Find solutions for specificities of steep slope viticulture, reducing costs and maximizing grapes quality

- Spraying
- Mechanization



Partners

- Researchers of INEGI (Porto Univ.)
- Suppliers of machinery
- Associates and technical staff of ADVID



Ideas and strategies opportunities

- ✓ Apply sensors and vision technics to access the quantity of leafs during the spraying season
- ✓ Apply precision mechatronic spraying systems that can dynamically adjust the liquid quantity to be sprayed
- ✓ Promote the engagement of agriculture equipment manufactures between viticulture producers, universities and R&D Institutes
- ✓ Promote the engagement and motivation of creating new technological approaches that are capable of being applied in other agriculture productions

Thank you for your
attention!

