Consultant report

Shelterbelt porosity assessment

Generated 02 May 2026 · Measured 02 May 2026

RESULT

GOOD

POROSITY
44.3% (Optimal)
WIND PROTECTION
Strong
CONFIDENCE
High
RECOMMENDED ACTION
No immediate action required

Executive summary

- **Shelterbelt is within optimal range (44.3%).** The 20–50% band is the agroforestry-accepted target for field shelter.
- Wind protection: **strong**. Estimated 45–60% lee-side wind reduction over ~15–22× tree height downwind.
- Measurement confidence: **high** (from 1 photos; 0 flagged for quality).
- **Recommended action:** No immediate action required.

Recommendations

OK

No immediate action required

Porosity sits inside the agronomic 20–50% band. Re-measure annually or after any storm damage, thinning, or new planting.

Wind-impact estimate

Protection effectiveness: Strong. Best balance of wind reduction and protection distance. This is the literature target.

Estimated lee-side wind-speed reduction: **45–60%** relative to the upwind free-stream.
Usable shelter distance (≥20% wind reduction): **~15–22 × tree height** downwind.

Key metrics

Average porosity	**44.3 %**
Confidence	**93 / 100 (High)**
Photos analysed	**1**

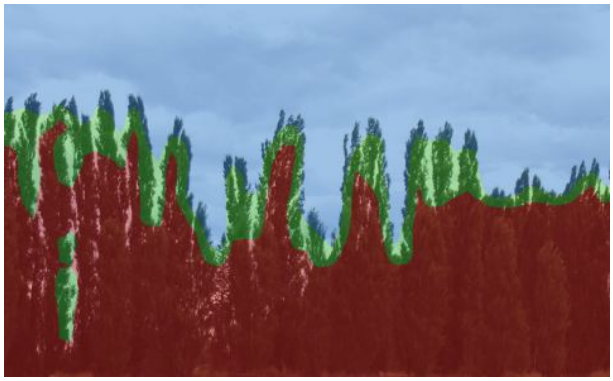
Photos flagged	**0**
Cutoff mask	**18% of frame**

Per-photo measurements

#	Filename	Porosity	Confidence	Status	Notes
1	Cultivos_de_alfalfa_y_cortina_rompevientos_02.jpg	44.3 %	93	Valid	

Visual gallery

Red regions are denser than optimal, blue regions more open than optimal, green is within the 20–50% sweet spot. Representative photos selected from the highest-confidence readings and the porosity extremes.



Cultivos_de_alfalfa_y_cortina_rompev
Porosity 44.3% · Confidence 93

Appendix: methodology

This report quantifies *optical porosity*, the fraction of sky visible through each photograph of the windbreak, once foreground ground has been masked out. Optical porosity correlates well with aerodynamic porosity at the 20–50% range that is the agronomic optimum; below that range, trees become a solid wall and wind eddies over the top instead of sifting through.

A cutoff mask ignoring the bottom **18%** of each frame was applied to exclude grass, fences, and foreground ground. The confidence score combines blur, exposure, sky fraction, bimodality of the sky/vegetation luminance distribution, and sky-top concentration. Photos scoring under 50 are flagged as unreliable and excluded from the filtered average.

Wind-reduction figures are literature-derived bands (Cornelis & Gabriels, 2005; Heisler & DeWalle, 1988; Brandle, Hodges & Zhou, 2004). They are rough predictions. Actual reduction depends on wind speed, atmospheric stability, and 3D shelterbelt structure that a single porosity figure cannot fully capture.