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Satellite or drone: when each one makes sense for monitoring a farm

They do not compete: they complement each other. Satellite is the first layer for routine follow-up; the drone comes in when the decision requires seeing a tree, a damage or a change the satellite pixel cannot resolve.

By **Daniel Macchi**

One of the first questions we get is whether it makes sense to fly a drone when low-cost satellite platforms with frequent coverage already exist. The short answer: it depends on the decision at hand. The long one is below.

What satellite does well

Regular coverage, near-zero marginal cost, self-service and long historical series. In Uruguay, INIA GRAS and the National Agricultural Information System use NDVI, EVI and radiation series for agroclimatic and production monitoring. To follow the general evolution of a plot, compare seasons or detect that *something* changed in an area, it is the right tool and the cheapest one.

That is why at Trofoni Mapping we use it as the **first layer**. There is no point in flying what a satellite already resolves.

Where satellite falls short

The pixel. At 10 metres of resolution, a satellite image cannot tell one tree from its neighbour, cannot count missing trees, cannot separate a row from the inter-row and does not show the detail of hail or waterlogging damage at block scale. Nor is it available exactly on the day you need it: clouds, revisit frequency and overpass time set the agenda.

What the drone adds

Sub-metre resolution, timing (you fly when needed) and sensors of your choice: RGB for inventory and damage, multispectral for vigour and chlorophyll indices, and photogrammetry for relief and volumes. Local studies by the Universidad de la República show the kind of precision achievable: in fescue pastures, drone imagery reached associations of R^2 0.74 with biomass and R^2 0.76 with measured height; in Tannat vineyards, vigour zones were differentiated with high-resolution imagery.

The drone is justified when the decision requires:

- **Inventories**: how many trees there are, how many are missing, which are anomalous.
- **Events**: documenting storms or floods with georeferenced, dated evidence.
- **Detail**: separating sectors that satellite blends into a single pixel.
- **Relief and volume**: contour lines, volume calculations, drainage.

The practical rule

Question	Tool
How is the plot doing this season versus last?	Satellite
Where should this week's field visit start?	Satellite, then drone if in doubt
How many trees are missing in block 14?	Drone
What area did Tuesday's storm affect?	Drone
How much material is in that pile or that reservoir?	Drone with protocol

What neither of them does

An index identifies a different response. It does not determine whether the cause is water, nutrition, plant health, soil or management. That part still belongs to the agronomist and to field verification. That is why every Trofoni Mapping deliverable ends in a targeted field visit, not in a colour map.

Sources

- INIA GRAS. NDVI, EVI and radiation series for agroclimatic monitoring.
- Universidad de la República. NDVI studies in rice, fescue pastures and Tannat vineyards.
- Trofoni Mapping. Executive summary 2026.

This article states sources, date and limits. It is not advice for a particular case.

https://trofoni.com/en/insights/satellite-or-drone