# Viticulture

Grape quality is a result of numerous variables (variety, region, inputs, tending of the vines etc.). Drones and remote sensing are pertinent tools to help you achieve growing the best quality grape. It can also help you reduce costs by making better informed decisions and control your inputs.

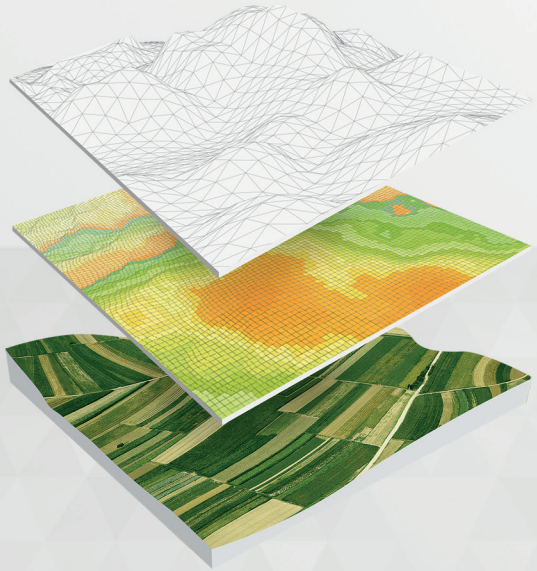
## Seasonal tending of the vines

### Pruning

In viticulture, the first task in the field happens early in the year and sets the tone for the rest of the growing season. Indeed, pruning is a critical stage and it affects future vine growth and grape production. Thanks to 2D/3D orthomosaics, you'll be able to monitor the effect of your pruning techniques later in the season and see where vegetative recovery is happening first.

### Vine suckering and debudding

Drone imagery and 3D orthomosaics can help you monitor the plants with a detailed vision of the rows without having to enter the parcel. You can use this technology to assess the quality of the vine suckering and debudding job, whether it was done manually or mechanically.



## Vine training

Often, you have to prioritize which parcel you need to tend to first. 2D/3D orthomosaics and CANOPY COVER will help you assess where to allocate you manpower first in order to cover all your parcels in time.

## Weed control

In the context of trying to reduce inputs, you need to know how to better allocate your resources. Drones and remote sensing can help you decide on when to trigger weed control depending on what threshold you decide on. 2D orthomosaics can help you visualize the extent of weed cover in between rows.

## Plant vigor and health

Your choice of algorithms to determine plant health will depend on the state of your inter-rows. If the soil is bare (no cover and little weeds), use SAVI (Soil Adjusted Vegetation Index) or GSAVI (Green SAVI) algorithm early in the season. They take into account the soil pixels and focus on vegetation pixels. Once rows start closing, OSAVI (Optimized SAVI) is more appropriate.

If you have cover crops or sodded bands in between rows, you can use NDVI (Normalized Difference Vegetation Index) and ENDVI (Enhanced NDVI) as general plant vigor analysis tools. Note that ENDVI was more specifically developed for BGNIR (Blue/Green NIR) sensors and drone usage.

# Long term maintenance of the parcels

## Missing vine plants

As years pass, vine plants age and sometime die. But replacing an old parcel with new vine plants is a laborious task, which you want to delay as much as possible. 2D/3D orthomosaics and CANOPY COVER (used early in the season, after the first leaves are out) can help you keep an eye on the state of your rows and count how many vine plants are missing.

## Trellis upkeep

Another long term undertaking is trelis maintenance. Again, 2D orthomosaics can help you have a global view of your parcels and choose where to prioritize your efforts.

# Produce

## Transplanting success rate

Successful transplanting is a crucial step towards insuring proper yields. When the transplants are still young and not overlapping, you can use the Row Based Plant Counting algorithm a few days after transplanting to assess the quality of the job. This can be successfully used for brassicas at an early stage for example of for lettuce heads.

## Development rate

In produce production, bare soil or covered soil is often apparent for quite some time and the green canopy rarely fully closes. CANOPY COVER can help monitor the development of the plants and possibly identify variability across the field.

# Turf

## Watering, fertilization and pest management

To monitor the overall health of your turf surfaces, fly your drone regularly and use the ENDVI algorithm to assess the vigor of the cover. The map will help you identify areas that need special attention and that behave differently than the rest. This can help you diagnose irrigation issues, pest pressure and fertilization plans.

## Golf and landscape design

The combination of 2D/3D orthomosaic maps are solid tools to survey, analyze and classify your area of interest. Use those models for not only your prospection work but also as a base for designing new plans.

# Pasture

## Yield estimation

Run the algorithm PLANT HEIGHT. This algorithm is essentially your CANOPY COVER multiplied by a height. This output will be strongly correlated to the biomass for silage.

## Fertilization

### Keeping track of previous yields

Bale density is a good way to assess the distribution of your yield across the field, and it is useful information to keep track of. For that, fly the drone at the end of the season, before picking up the bales, and create a simple 2D orthomosaic with DataMapper for record purposes.

### Assessing current fertilization plan

If you're working with a split fertilizer application plan, drone images can help you spatially custom the last application depending on the vigor of your field. For that, use GDVI prior to the last application.

# Sweet potato

## Transplanting slips

Successful transplanting is a crucial step towards insuring proper yields. When the transplants are still young and not overlapping, you can use the Row Based Plant Counting algorithm a few days after transplanting to assess the quality of the job.

## Assessing irrigation methods

Irrigation is important in sweet potato production and it can be achieved with different systems. Just for like any other practices, it is important to evaluate its impact. CANOPY COVER will help you monitor the development of the vines across the field and will reflect on any disparity of watering linked to the irrigation design system.

# Sugar cane

## Flooding of fallow fields

Flooding fields can help in weed control by creating an anaerobic environment which slows down seed germination. Drone imagery and the Waterpooling algorithm can help you see if your fields are homogeneously flooded.

## General plant vigor

In early stages, the soil will be quite apparent on the aerial images. Therefore, we recommend using the SAVI or GSAVI algorithm which takes into account the soil pixels and focuses on vegetation pixels. Once rows start closing, OSAVI is more appropriate. When the rows fully close, you can use NDVI (Normalized Difference Vegetation Index) and ENDVI (Enhanced NDVI) as general plant vigor analysis tools. Note that ENDVI was more specifically developped for BGNIR (Blue/Green NIR) sensors and drone usage.

# Pests, disease and weed pressure

## Ratoon crops stage

After ratooning, sugarcane stools are especially subject damages due to rodent, insect, or harvest practices. Missing ratoons create open spaces in the canopy which are beneficial to weed proliferation. To estimate the extent of possible damages, use CANOPY COVER to visualize if the field has any significant patchy stand. Depending on the result, you will know how to tackle weed prevention and competition during the early stages with either herbicides or mechanization.

## Damage assessment

Any pest or disease that affects the state of the leaves (less live green surface) will affect the variability of vegetative indices across the field. To assess possible damages, run the general plant vigor algorithms listed above (SAVI, GSAVI, OSAVI, NDVI, ENDVI).


# Yield estimation - biomass

Run the algorithm PLANT HEIGHT. This algorithm is essentially your CANOPY COVER multiplied by a height. This output will be strongly correlated to the biomass and therefore your yield.

# Tobacco

## Transplanting success rate

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## General plant vigor

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## Maturity

Knowing when to trigger harvest is crucial in reducing costs. 3D orthomosaics can help you monitor plant maturity with a detailed vision of the rows without having to enter the parcel.