

# Orchard spraying based on task maps

Task maps offer a sophisticated, data-driven approach to orchard spraying, presenting substantial benefits in terms of precision, cost savings, and environmental impact. Despite the need for preliminary data collection, the advantages make task maps a valuable tool for modern orchard management.



## Key Benefits of Task Maps:

- **Precision Application:** Adjusts spray rates based on specific, localized data points, ensuring efficient use of chemicals.
- **Cost Reduction:** Reduces the amount of crop protection chemicals needed, lowering overall costs.
- **Environmental Impact:** Minimizes chemical use, thereby reducing the environmental footprint of spraying activities.

## Advantages

- **Pre-determined Chemical Use:** Know the exact amount of chemicals required beforehand, allowing precise loading of the sprayer.
- **Cost and Environmental Benefits:** Reduced chemical use leads to lower costs and less environmental harm.



## Disadvantages

- **Data Collection Requirement:** Gathering information before application adds an extra step compared to sensor-based applications.



## Sources of Information

- Satellite Images
- Drone Images
- Soil Measurements
- Sensor Data
- Harvest Data

**Accurate GNSS** locations for each data point are crucial for precise spray applications!

## Transforming Data into Spray Maps

- **Data Collection**
- **Algorithm Processing into a spray map**
- **Example Application:**
  - Blossom Thinning in Apple Orchards:
  - Data collected via drone during the blossom period.
  - Mapped the amount of blossom and GNSS location of each tree.
  - Task map generated: 0 l/ha for trees below the blossom limit, 500 l/ha for trees above the limit.
  - Result: Only 10% of trees sprayed, leading to significant savings in chemicals and reduced environmental impact.

Task maps enable varying the spray rate throughout the orchard, adjusting application volume based on specific circumstances measured beforehand. This approach can significantly reduce the amount of crop protection chemicals used.

## Spray Rate Limits and Enhancements

- **Sprayer Limitations:** Traditional sprayers may have limited effective spray rate ranges due to spray pressure adjustments affecting droplet sizes.
- **Enhanced Systems:**
  - **Automatic Nozzle Switching:** Allows for a wider range of spray rates.
  - **Pulse Width Modulation Sprayers:** Provides detailed control over spray applications.