>60% of Ag Businesses that invest in Digital Agriculture do not see a positive Return on Investment

“It is not that easy”
Movie: FURY
Common attributes of successful adopters


- High attention from CEO and top team
  - Decision makers see the potential value and are willing to become educated

- Clear strategy and business case linked to value creation
  - Don’t ask what it can be used for, tell me what you want to do

- At-scale investment
  - Digital Ag Tech is scalable. Start small and work up.
80% of grapes in NY and PA are grown for the juice market

Concord makes up 40% of the grapes grown for wine in NY and PA
Concord, Fertilizer, and Fuel Prices

- Concord
- Urea (Nitrogen Fertilizer)
- KCL (Potassium Fertilizer)
- Diesel Fuel
Concord Grape General Cost of Production

- 25% Vine and Trellis Maintenance
- 25% Equipment Operation and Fuel
- 25% Harvest Operations and Trucking
- 25% Crop Protection and Nutrition Materials

Reduce Labor and Production Costs
Improve Efficiency for Yield and Quality
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Improve Efficiency for Yield and Quality

Reduce Labor and Production Costs
The Efficient Vineyard Approach

Measure

Measure vineyard soil, canopy, and crop characteristics using mobile field sensors

Model

Model multi-layer spatial data needed for perennial cropping systems

Manage

Manage vineyards by integrating spatial information with variable-rate technology
Sensor Validation is Important…
...to translate spatial sensor data into horticultural information
Model: Viticulture is a Multi-Layer Decision Making Process
Tools for Working with Spatial Observations

1000

ArcGIS
QGIS

PAT - Precision Agriculture Tools Plugin for QGIS

100

Ag Leader®
Trimble
John Deere Operations Center

Operations Center

4640 Display

InCommand
GFX

Rate/Flow Control Mechanism

10

MyEV Tool

Efficient Vineyard

Learn More at www.EfficientVineyard.com
Farm and Block Level Data Management

Primary MyEV Function

More Basic

More Advanced

Plugins
- Data Joiner: Join several datasets together.
- Multivariate Zoning: Create zones with many variables.

Downloads
- GeoJson
- CSV
- Print
- Zone Polygons Shapefile

www.efficientvineyard.com
Anatomy of Variable-Rate Vineyard Mechanization

H. This method has been used for VR shoot thinning, fruit thinning, and fertilizer applications. It should be possible to extend this technology to any hydraulically controlled implement.

G. A speed sensor on the thinning head allows us to translate flow rate to RPMs and shoot thinning rate.

F. The signal from the liquid flow controller is sent to a variable-rate hydraulic valve, which controls the rotational speed of the shoot thinning head.

E. GPS tracks where the implement is in the vineyard and on the prescription map.

D. As the tractor/implement enters a new management zone, the signal to the liquid flow controller changes.

A. Spatial data are used to generate in-field rate trials and variable-rate prescription maps.

B. AgLeader hardware and software are used to import and visualize prescription maps.

C. Flow rates are assigned to the different treatment zones on the prescription map.

Vineyard machines apply a uniform treatment to a non-uniform system. Integrating spatial data and decision support with precision agriculture technology and vineyard mechanization can lead to mechanized variable-rate applications.
Potential Practical Benefits of Precision Viticulture

• Improve production through soil and vine size mapping

• Optimize fruit quality through crop load (Ravaz Index mapping)

• Efficient use of soil amendments and fertilizers

• Labor Efficiency through VR Mechanization

• Business analysis through revenue (yield, Brix, and market) mapping

• Leveraging Local Viticulture Knowledge
Education
Business Purpose
At-scale Investment