



AgroFresh

**EMPOWERING THE BUSINESS OF  
FRESH.**

# AgroFresh is everywhere you need us to be.

With a presence in over 50+ countries our sales, R&D, regulatory and technical service experts share know-how and data across regions to solve customer challenges.



Industry-leading  
global R&D and  
regulatory expertise  
in over 50 countries



Located in key  
fruit-growing regions

# AgroFresh Today:

## Productivity Solutions from the Field to the Packinghouse



Pre-harvest



Post-harvest Storage/Packing/Distribution



Digital Architecture



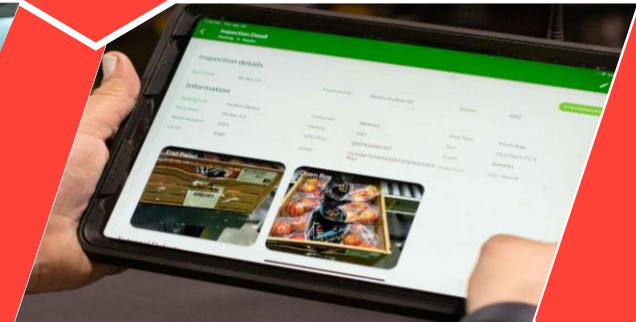
Improving yield, quality and storability



Improving long-term storability and packouts



Improving quality, presentation and shelf-life



Improving data visibility, insights and decision making

**Harvista**<sup>TM</sup>

**RAYNOX**<sup>®</sup>  
SUNBURN PROTECTANT

**SmartFresh**<sup>TM</sup>

**ecoFOG**<sup>®</sup>

**Shield-Brite**<sup>®</sup>

**Accu-Tab**<sup>®</sup> SI  
AUTOMATED CLEANING SYSTEM

**PrimaFresh**<sup>®</sup>

**VitaFresh**<sup>TM</sup>  
Botanicals

**BioSpectra**<sup>®</sup>  
100 SC

**Control-Tec**<sup>TM</sup>

**FRESHCLOUD**<sup>TM</sup>  
**INSPECTION**  
Powered by AgroFresh

**Strella**

Pre-harvest management, tech-enabled inspection

**Hectre**

**RUBENS**  
PRODUCTIVE MARKETING

**NEOLITHICS**

**CROPTACKER**



# Data as Medicine: Addressing Pain Points in Apple Supply Chains

*US Apple Outlook*

August 14, 2025





# Pain Points in Packhouse Operations

## Pain Point Intensity Meter

- High
- Medium
- Low

### Lack of Data Visibility or Timely Intervention

On-site traceability exists but **disconnected** from underlying data infrastructure, making it hard to gather meaningful insights.

**Managers are late to intervene** when things go wrong since their **data is mostly retroactive**, with little **real-time pack line insight** to act on.

Lack of visibility into supply chain, hours spent on **inventory management over phone, paper and pen** or MS Excel.

### Suboptimal Room Monitoring

Data is pulled from simple and rudimentary environmental monitoring sensors that do **not tie to overall packhouse analytics**.

Multitude of considerations causes **struggle to optimize pack-out timing**; decisions made on intuition.

### Manual Inspections

Most QC done manually, prone to **bias, variability and human error** leading to losses due to improper grading and repacking costs.

**Distributors often bear cost of rejections** due to QC issues from inability to track major and progressive defects early.

### Suboptimal Overall Operations

**Significant opportunity to gain operational efficiency** across the distribution center by optimizing equipment, labor and sales.

# 1 Four pain point themes emerged from customer research

## Pain points



### Growers

- A Manual record keeping** – primarily use pen and paper to record, but food safety regulation and retail demand is growing over the years and a lot of labor resource needs to be directed
- B Quality record is required** – to make sure the products achieve Retailer's spec
- B Need for temperature monitoring** – manual and cumbersome to do in field
- B Retailers have strong negotiation power for quality** – consolidated retailer landscape vs. more fragmented growers (e.g., if recall happens, he always needs to accept to maintain the relationship)
- C Inventory management is difficult** – crop has short storage life
- C Harvest timing is key but hard to plan** – limited shelf life of produce vs. mercurial retailer demand
- D Market matching is an art** – key driver of value but difficult to do well
- Z Training large number of (foreign) seasonal workers** – handling techniques is key and trends update; training is a continuous effort

### Distributors

- A Increasing demand for traceability** – food safety regulatory requirements and retailer demands continue to increase
- B Manual inspection causes mishandling risk** – limited options for automation
- B Precise temperature monitoring needed** – “Temperature” is everything”; looking for solution that is real time with alerts
- C Inventory management is difficult** – requires specialists to monitor & make just-in-time decisions
- D Want to know the retailer's demand beforehand** – scared of a shortage of the inventory as it is opportunity loss but sometimes that causes excess
- D Retailers have strong negotiation power** – resemble pain points of Growers
- Y Fragmented tech stack** – using multiple point solutions (ERP, inventory management tools, QC tools) that do not talk to each other
- Z Training across multiple processes** – poor handling leads to waste & recalls; repacking process is done by (untrained) contractors

### Retailers

- A Increasing demand for traceability** – food safety regulatory requirements continue to increase; higher fidelity tracing allows for less loss during recalls
- A Lack of trust in upstream data** – distributors, distributors, growers & others point fingers at each other in case of an incident
- B Manual inspection causes mishandling risk** – limited options for automation
- B Quality and freshness of the product on their shelf** – “consumer's impression” - is their no.1 priority in their business to attract customers
- C Complex distribution center operations** – resemble pain points of pack houses in many ways (incl. need for precise temperature monitoring, complex inventory management, manual processes)
- Y Need for scalable tech** – scalability & reliability is table stakes for IT
- Z High training load** – 1000s of workers across many product categories

## What we heard



*“If I can better know the demand of consumers & retailers, I can plan my harvesting leaner. But it is expensive to do that”*

*“I need to keep track of a lot of information for potential audits”*

*“A lot of software do not talk to each other. For an operation of my size, I can't afford too much IT overhead”*

*“Consumers are unforgiving about produce freshness so that's a top priority [for our entire operations]”*


*“Any software needs to scale across the thousands of stores and distribution centers we have”*

## Common Opportunity Areas

- |  |  |   |   |                           |                         |
|--|--|---|---|---------------------------|-------------------------|
| <b>A Food safety &amp; traceability</b><br>Documentation / inspection / maintaining people's quality | <b>B Quality inspections &amp; monitoring</b><br>Monitoring the quality and environment throughout | <b>C Inventory optimization</b><br>Timing and quantity optimization | <b>D Produce market matching</b><br>Matching supply and demand to maximize sales and reduce waste | <b>Y Tech integration</b> | <b>Z Training Staff</b> |
|--|--|---|---|---------------------------|-------------------------|

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# Takeaways on these pain points emerged from our research

Opportunity areas	What we heard from potential customers			Key takeaways
	<b>Growers</b> 	<b>Distributors</b> 	<b>Retailers &amp; food service providers</b> 	
<b>A Food safety &amp; traceability</b>	<p>Inspections and record keeping are <b>very manual processes</b></p> <p>“ ” “Inspection is done manually, and we use pen and paper to record keep” (Grower, Medium)</p>	<p><b>Food safety compliance and retailers’ demands continue to increase</b> – more specs need to be tracked</p> <p>“ ” “Food safety regulation and retailer’s demand is just increasing” (Distributor, large)</p>	<p><b>We have a lack of trust in upstream data</b> – growers/distributors/logistics providers point fingers at each other</p> <p>“ ” “Traceability at the clamshell level has been a north star for us” (Retailer, large)</p>	<ul style="list-style-type: none"> <li>Growers and distributors have disparate, <b>fragmented data sources &amp; software tools</b> that don’t integrate, resulting in a lack of data visibility</li> <li>Currently spend up to 2-3 hours per day filing compliance paperwork manually or through Excel / other rudimentary tools</li> </ul>
<b>B Quality inspections &amp; monitoring</b>	<p>Retailers have the strongest negotiation power so <b>poor quality becomes a lost revenue and cost concern</b></p> <p>“ ” “If a recall happens, we need to cover all the costs” (Grower, large)</p>	<p><b>Precise environmental monitoring throughout treatment &amp; packing is a challenge</b> but a key enabler of shelf life</p> <p>“ ” “Temperature is everything - we track real-time” (Distributor, large)</p>	<p><b>Quality and freshness of produce on the shelf are retailers’ top priority</b> to attract customers</p> <p>“ ” “Consumers are unforgiving about produce freshness so that’s a top priority” (Retailer, large)</p>	<ul style="list-style-type: none"> <li>Quality and freshness are the <b>Retailers’ top priority that forces the whole value chain to follow</b></li> <li>Growers, and sometimes distributors, bear the <b>cost of rejections</b>, which is often due to <b>poor handling</b></li> <li><b>Temperature monitoring is the key</b> for all users/process to ensure their product quality</li> </ul>
<b>C Inventory optimization</b>	<p><b>Timing is important to maximize produce shelf life</b> but can be more of an art than science</p> <p>“ ” “Crops have short time for storage, so we need to do inventory management properly” (Grower, large)</p>	<p>Inventory management <b>requires monitoring &amp; just-in-time decisions</b> from specialists</p> <p>“ ” “Good inventory management is difficult and requires experience” (Distributor and Food Processor, large)</p>	<p>Inventory management is <b>the key to reducing the food waste</b> but complex</p> <p>“ ” “We use software for inventory management, but it is still not good enough for quick decision making” (Retailer, large)</p>	<ul style="list-style-type: none"> <li>Distributors and retail distribution centers struggle to <b>optimize timing</b> of inventory decisions due to multitude of factors involved</li> <li>Growers experience <b>spoilage/loss</b> in the field or storage if planting/harvesting is not calibrated to demand</li> </ul>
<b>D Produce market matching</b>	<p>Growers need balance <b>maintaining a sufficient harvest quantity while avoiding excess production</b></p> <p>“ ” “Matching yield and demand could reduce food waste” (Grower, large)</p>	<p><b>Matching demand with supply is a cumbersome process</b> as each buyer has idiosyncratic requirements</p> <p>“ ” “We do everything over the phone currently. Salespeople will look for inventory in Excel” (Distributor, large)</p>	<p><b>Finding sufficient quantity of produce is difficult</b> when consumer demand rises unexpectedly</p> <p>“ ” “We sometimes struggle to find enough supply for the quantity we are looking for” (Retailer, large)</p>	<ul style="list-style-type: none"> <li>Growers and distributors <b>struggle to identify buyers</b> that are looking for the specifications of produce that they have currently on-hand</li> <li>Retailers <b>struggle to predict demand</b> for specific produce since many variables impact consumer behavior</li> </ul>

# 1 The intensity of pain points vary by role along the value chain

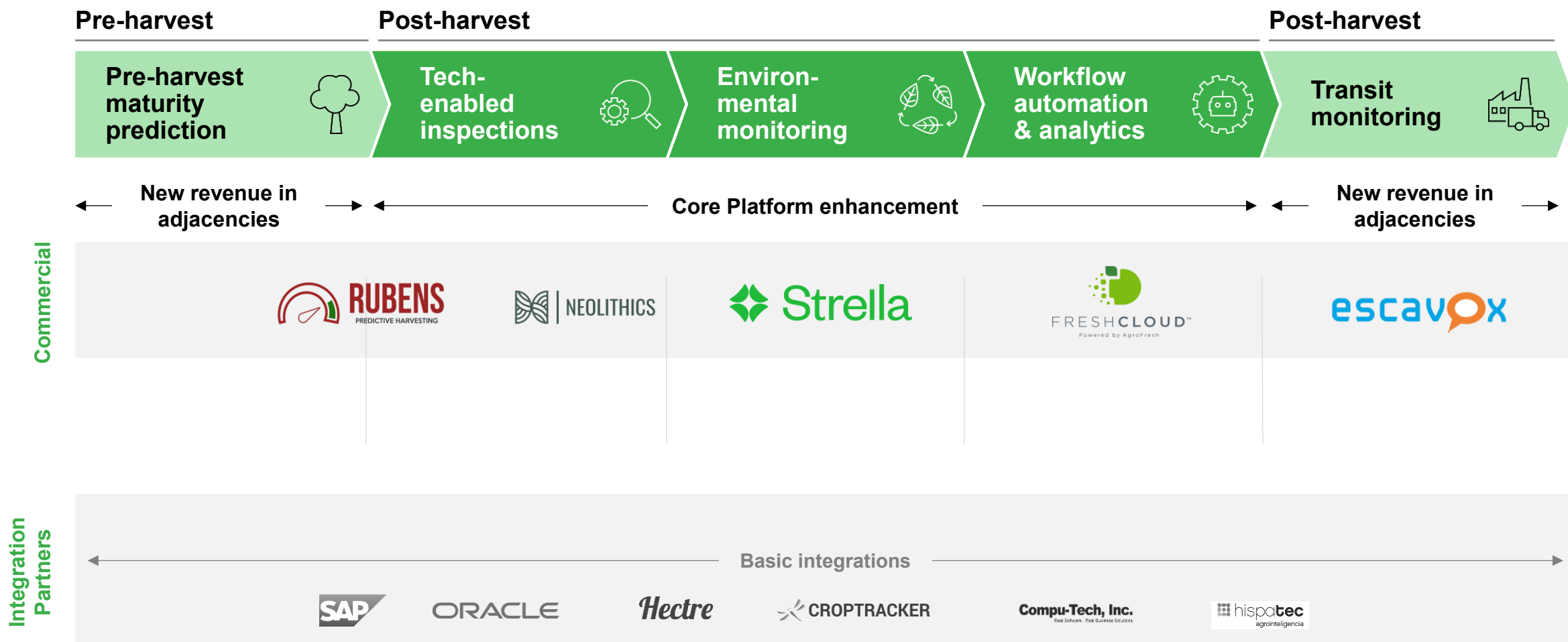


<b>A Food safety &amp; traceability:</b> inefficiencies due to manual workflows / fragmented tools to support compliance & administrative practices (incl. traceability)	High	High	High	High	Minimal	High	Medium	High	To be assessed
<b>B Quality inspections &amp; monitoring:</b> unnecessary loss due to poor inspections, mishandling, lack of visibility into environmental factors	Minimal	High	Medium	High	Medium	High	High	High	To be assessed
<b>C Inventory optimization:</b> unnecessary loss due to excess production / purchase and suboptimal shipment timing (FEFO)	Medium	Medium	High	Medium	Medium	High	Medium	High	To be assessed
<b>D Produce market matching:</b> complicated & inefficient process for matching grower/distributor supply to retailer demand (each with idiosyncratic specifications)	High	High	Minimal	Medium	Minimal	Medium	Minimal	High	To be assessed



# Digital Ecosystem

## Building an end-to-end platform via partnerships



# Pre-Harvest Testing Use Case

## Accurate

Accurate measurements of Sugars (Brix), Firmness, Maturity (starch index).

## Standardized measurement

For measuring fruit quality in the field, and packhouse. Global calibration database.

## Low Maintenance

Simple, easy-to-use device, minimal calibration requirements.

## Real-time

Rapid, non-invasive scanning. Results in seconds. Test more fruit faster (increase sample size).



## Waste reduction

Optimize harvest timing, reduce fruit waste and consumables through non-destructive testing.

## Quality Assurance

Test a larger sample size more accurately and ensure the best products on the shelf.

## Cost Reduction

An affordable platform that will reduce costs associated with testing and grading shipments.

## Digital Platform

Data recorded and backed up digitally for use with machine learning and artificial intelligence algorithms for predictability.

**Integrated with FreshCloud.**

# Room Monitoring Use Case

- Strella's proprietary sensors monitor crucial environmental factors such as temperature, humidity, oxygen (O<sub>2</sub>), carbon dioxide (CO<sub>2</sub>) and ethylene in your facility.
- With wireless, battery-powered functionality, these sensors can be seamlessly mounted on any warehouse surface, providing unparalleled resolution tailored to your specific needs.
- Dynamic data points with state-of-the-art diagnostics and analytical equipment help you understand and protect your produce in real time.
- Dashboard lets warehouse operations teams conveniently view data online at any time, with a custom floor plan.

