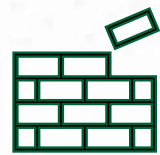# GLOBAL TECHNOLOGY SCAN

## A&P CONFERENCE 2022  25 AUG 2022

Peter McHannigan, Innovation Lead – Orchard Technology, Zespri
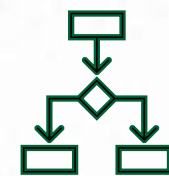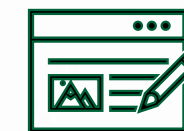
# TOPICS

## CONTEXT

- Why orchard technology?
- Why a technology scan?

## APPROACH

- Scope
- Significant & persistent challenges
- Delivery
- Guiding questions

## FINDINGS

- Sizing
- Big 4 investment
- Technology categories
- Challenge hot spots
- Summary
- Activation considerations
- End notes
- Common questions

# THANKS

Ernst & Young
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Linda Mills
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Mark Edgecombe
Melanie Walker
Roger Linney
Robin Barker-Gilbert
Frank Bollen
Brett Hartman
Christina Robinson
Jayson Benge
Jemma Hughes

Roger Hellens
Beth Kyd
John Mawson
Matthew Ryan
Cam Clayton
Phillipa Wright
Tim Woodward
Allister Holmes

# 1.
# CONTEXT

# WHY ORCHARD TECHNOLOGY?
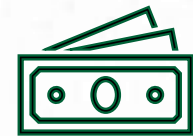
## COMMERCIAL DRIVERS

It's a business operation so there is a desire to optimize for profitability while dealing with:

- Complex decisions
- Lack of visibility
- Increasing operational costs
- Variability (crop, people, & environment).

## CUSTOMER & SC DEMANDS

Increasing customer and supply chain demands for:

- Product features (looks, taste, nutritional value, storage and shelf life)
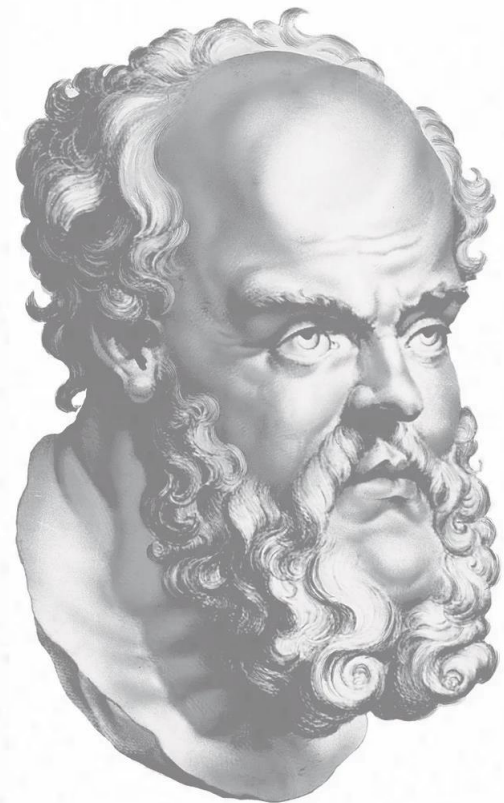- Year-round supply
- Sustainability
- Data.

## GROWER PROFILE

Changing profile of growers from:

- Lifestyle to corporate, and
- Smaller to larger producing units.

# WHY A TECHNOLOGY SCAN?

"THE ONLY TRUE WISDOM IS IN KNOWING THAT YOU KNOW NOTHING.

Socrates

# 2.
# APPROACH

# SCOPE

### ON-ORCHARD

Growing and harvesting.

Not post-harvest.

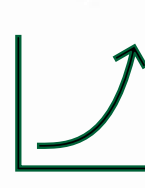Horticulture not just kiwifruit.

### TRADITIONAL
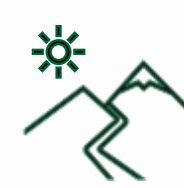
Traditional 3D growing systems.

Not vertical growing systems.

Not controlled environment agriculture.

### SIGNIFICANT

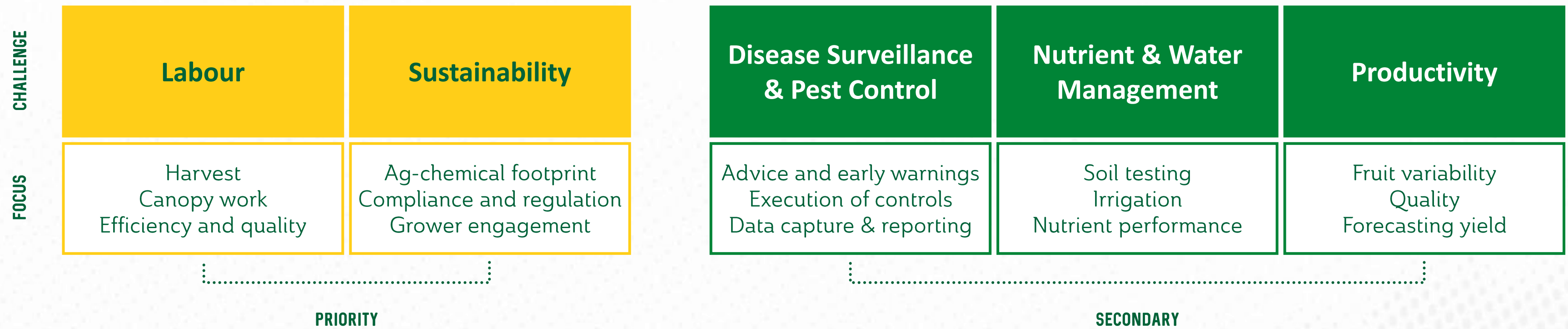Technology that addresses significant and persistent on-orchard challenges.

### HORIZONS

Now (1 – 2 years).

Next (3 – 5 years).

Beyond (> 5 years).

# SIGNIFICANT & PERSISTENT CHALLENGES

| | Labour | Sustainability | Disease Surveillance & Pest Control | Nutrient & Water Management | Productivity |
|---|---|---|---|---|---|
| **CHALLENGE** | **Labour** | **Sustainability** | **Disease Surveillance & Pest Control** | **Nutrient & Water Management** | **Productivity** |
| **FOCUS** | Harvest<br>Canopy work<br>Efficiency and quality | Ag-chemical footprint<br>Compliance and regulation<br>Grower engagement | Advice and early warnings<br>Execution of controls<br>Data capture & reporting | Soil testing<br>Irrigation<br>Nutrient performance | Fruit variability<br>Quality<br>Forecasting yield |

**PRIORITY**

**SECONDARY**

# DELIVERY

We worked with Ernst & Young to complete this scan over 8 weeks.

| W1: 21 MAR - | W2: 28 MAR - | W3: 4 APR - | W4: 11 APR - | W5: 18 APR - | W6: 25 APR - | W7: 2 MAY - | W8: 9 MAY - |
|---|---|---|---|---|---|---|---|

Project Setup

Baseline Assessment

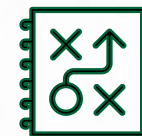Market Scan

Partner Interviews

Evaluation

Pathway to Activation

# GUIDING QUESTIONS

### SIZING

How big, and what is the rate of growth, of hort-tech?

### CHALLENGES

What are the common challenges growers are trying to solve?
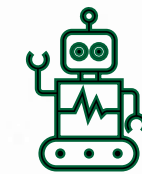
### TECHNOLOGIES

What technologies are they using to solve these challenges?

How mature is this technology?

Who are the key players?

# 3.
# FINDINGS

# SIZING

Global investment in ag-tech is large and growing.

**34.1B USD** Forecast market value of smart agriculture in 2026. Up from 12.4B in 2020 – a 275% increase.

**14.6B USD** Forecast market value of precision agriculture in 2026. Up from 8B in 2021 – a 182% increase.

Sources: Statista, Facts Factors.

# TECHNOLOGY CATEGORIES

Drones    UAVs

**ROBOTICS**

**ML / AI**

**IOT**

**PRECISION AG**

15

# CHALLENGE HOTSPOTS

Heat = number of vendors + size of investment + number of horticultural crops using the technology.

**LEAST ACTIVITY**                                    **MOST ACTIVITY**
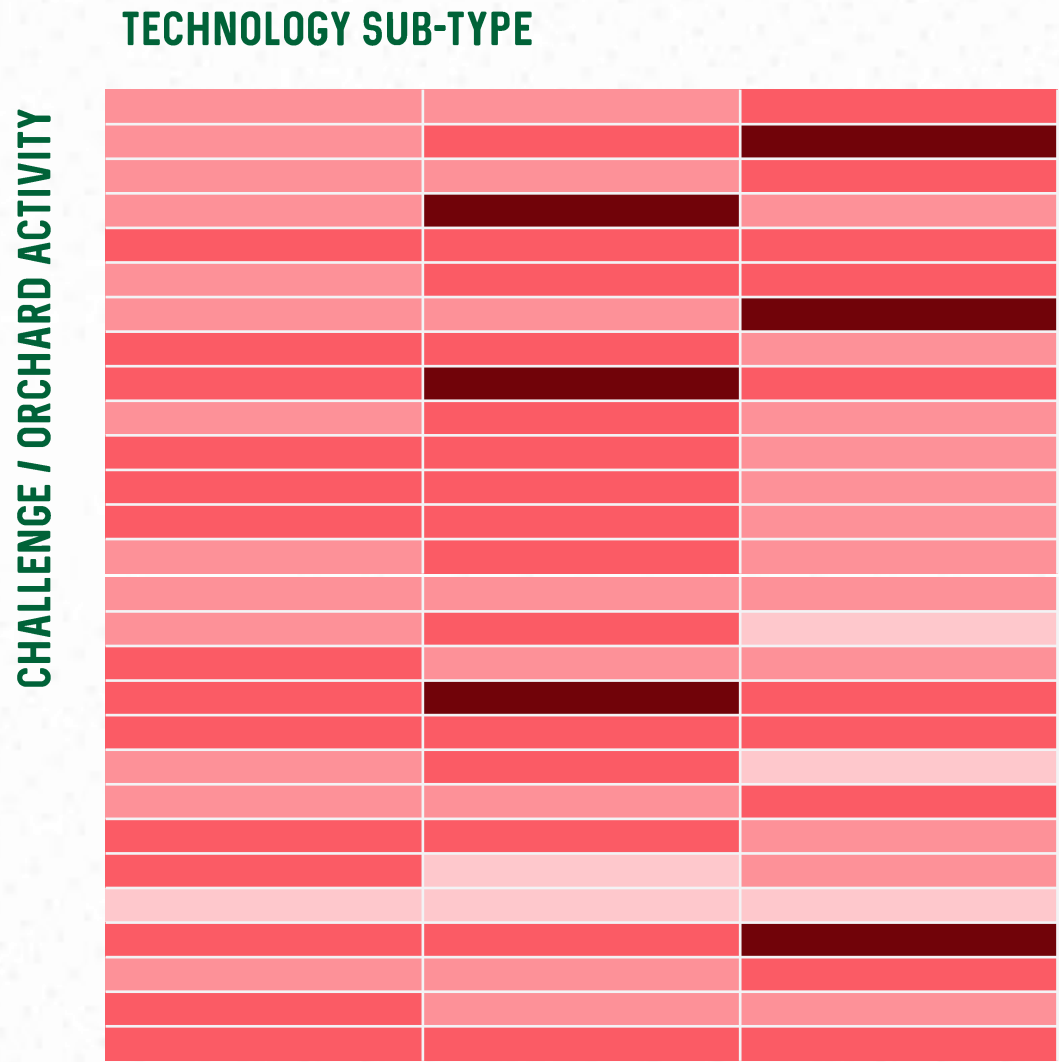
# CHALLENGE HOT SPOTS - ROBOTICS

**TECHNOLOGY SUB-TYPE**

CHALLENGE / ORCHARD ACTIVITY
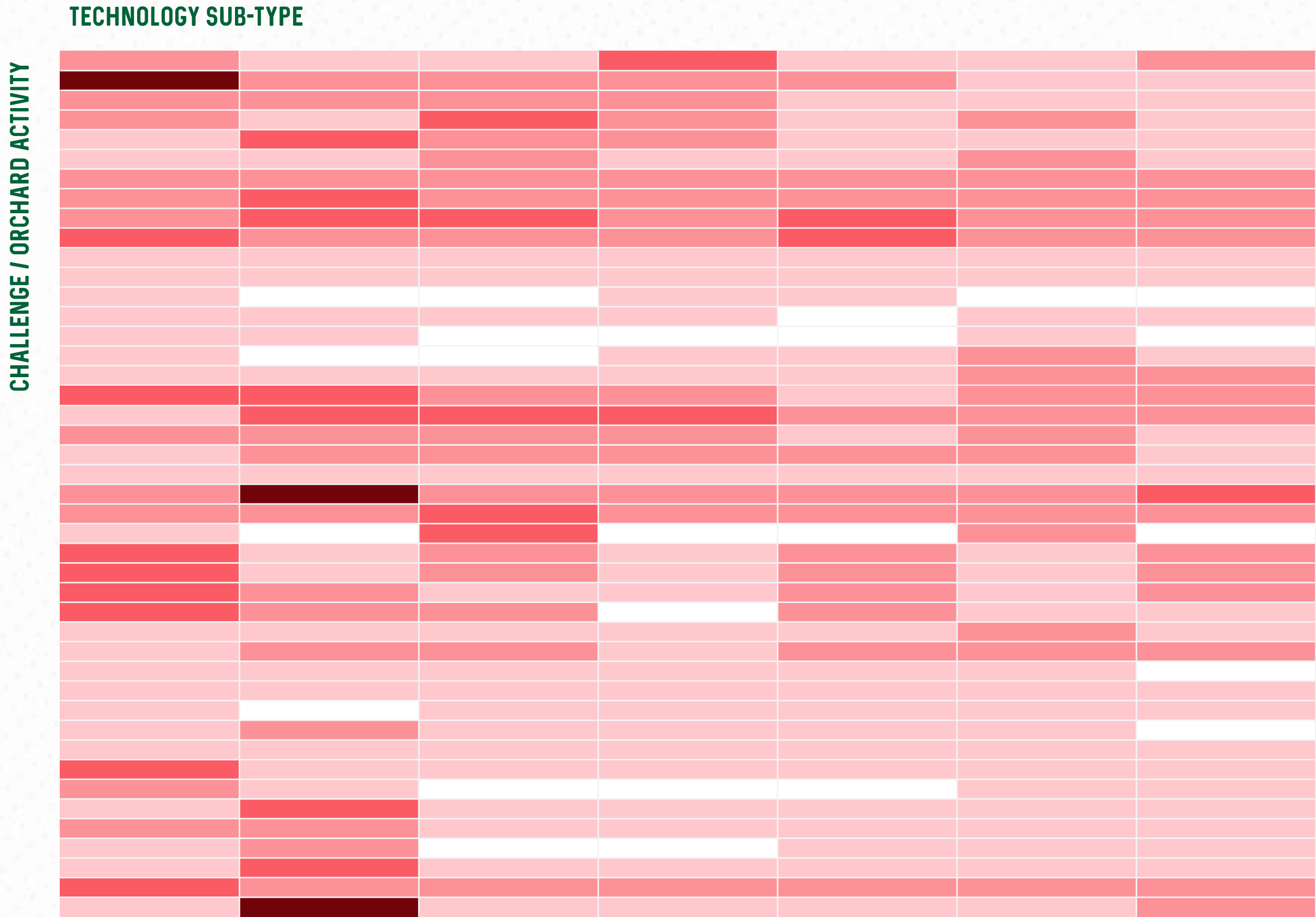


The most common* challenges people trying to solve were:

- Automating harvesting

- Yield mapping and estimation

- Imaging vegetative growth

*Number of vendors + size of investment + number of horticultural crops using the technology.
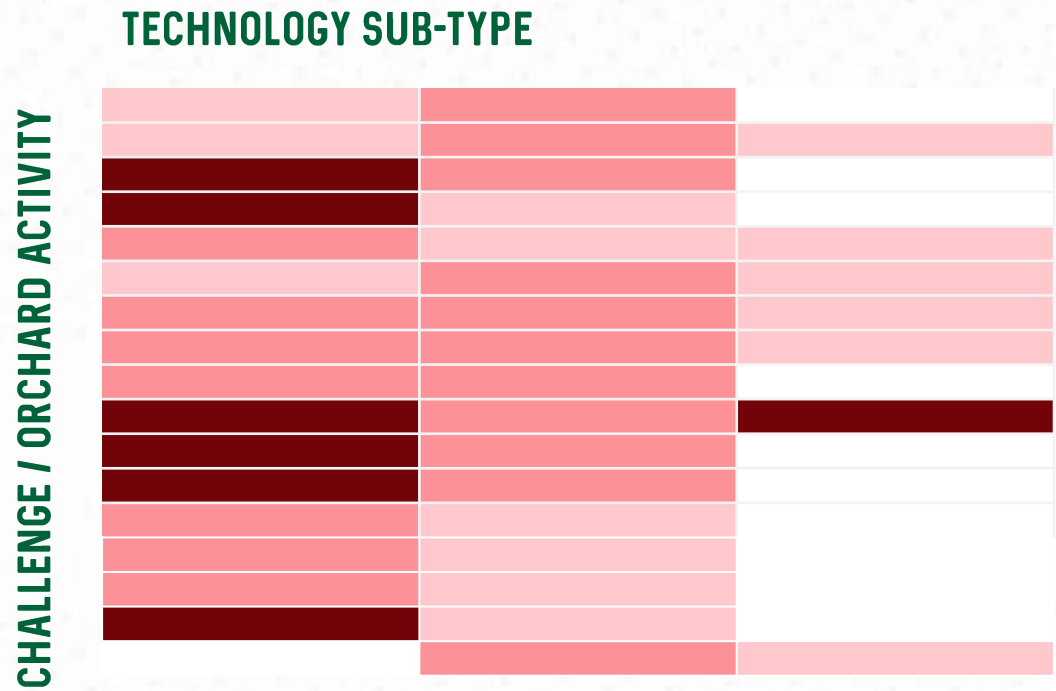
# CHALLENGE HOT SPOTS – ML / AI

**TECHNOLOGY SUB-TYPE**



The most common* challenges people trying to solve were:

- Harvesting

- Irrigation management

- Fruit yield estimation

- Fruit colour

*Number of vendors + size of investment + number of horticultural crops using the technology.
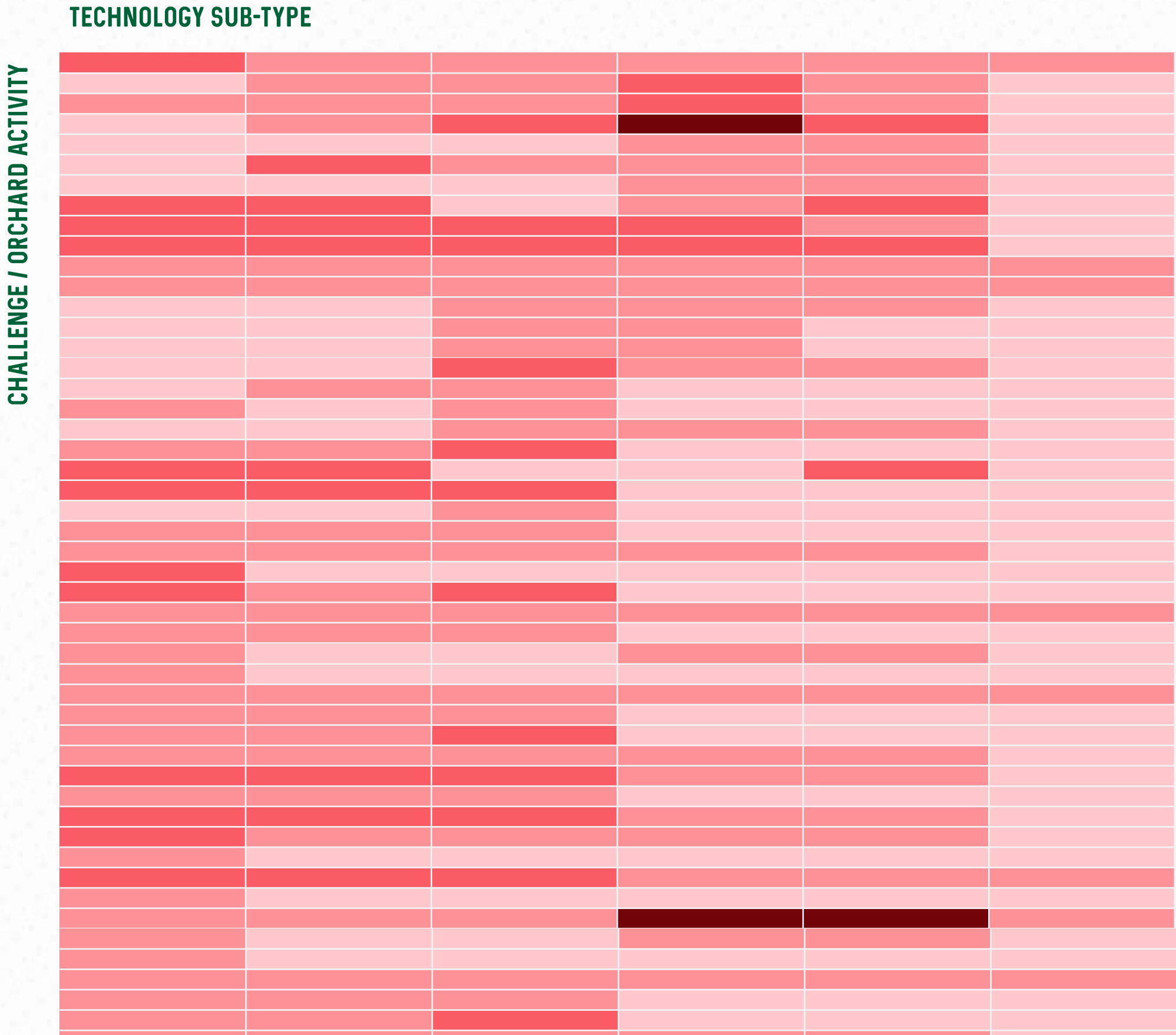
# CHALLENGE HOT SPOTS – IOT

**TECHNOLOGY SUB-TYPE**

CHALLENGE / ORCHARD ACTIVITY

The most common* challenges people trying to solve were:

- Soil moisture status

- Irrigation management

- Disease mgmt x2

- Monitor humidity

- Monitor soil temperature

- Frost protection

*Number of vendors + size of investment + number of horticultural crops using the technology.
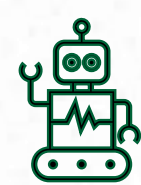
# CHALLENGE HOT SPOTS – PRECISION FARMING

FINDINGS

TECHNOLOGY SUB-TYPE

CHALLENGE / ORCHARD ACTIVITY

The most common* challenges people trying to solve were:

- Irrigation management
- Weed management
- Disease management

*Number of vendors + size of investment + number of horticultural crops using the technology.

# SUMMARY BY TECHNOLOGY TYPE

## ROBOTICS

- Automating harvesting
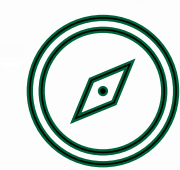- Yield mapping and estimation
- Imaging vegetative growth

## ML / AI

- Harvesting
- Irrigation management
- Fruit yield estimation
- Fruit colour

## IOT

- Soil moisture status
- Irrigation management
- Disease mgmt x2
- Monitor humidity
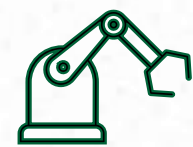- Monitor soil temperature
- Frost protection

## PRECISION FARMING

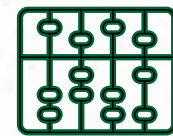- Weed management
- Irrigation management
- Disease management
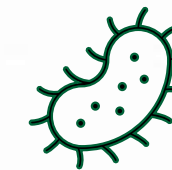
# SUMMARY BY THEME

## HARVESTING

- Robotics
- ML / AI

## YIELD ESTIMATION

- Robotics (+mapping)
- ML / AI

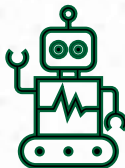## IRRIGATION MGMT
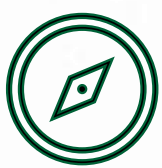
- ML / AI
- IoT
- Precision farming

## DISEASE MGMT

- IoT
- Precision farming

# ACTIVATION CONSIDERATIONS

|  | ROBOTICS | ML / AI | IOT | PRECISION FARMING |
|---|---|---|---|---|
| **MATURITY** | Low | Low | Medium | High |
| **IMPACT** | Very high | High | High | High |
| **INVESTMENT REQ'D** | Very high | High | Medium | Low |
| **CHALLENGES** | Commercial scalability, software lagging, managing the ecosystem including integration. | Data standards, training time, data management esp. with edge computing. | On-orchard connectivity, cyber-security, and data standards to roll into wider systems. | Data standards, considering downstream value potential. |

# END NOTES

We must acknowledge that:

- This was a targeted but still a high-level scan

- Deep-dives into strategic areas of interest will be required

- We've done a deep dive for yield estimation

It is clear that...

- There are significant opportunities to leverage global tech

- Cost and benefit depends on your end game

- Partnerships with local players will be critical

- Kiwifruit isn't a dominant fruit – adaptation will be required

- Understanding the path to commercialisation will be critical in locales like NZ
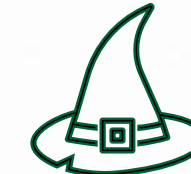
# COMMON QUESTIONS
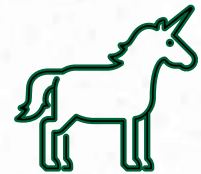
### WHAT TECHNOLOGY SHOULD I INVEST IN?

- What's your problem?

- Maturity and cost.

- The bigger picture.

### CAN I JUST USE YOUR SCAN?

- Maybe.

- No.

- Recurring activity.

### CAN DO A SCAN LIKE THIS MYSELF?

- Maybe.

- No.

- Industry activity.

# THANK YOU

**PETER MCHANNIGAN**

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