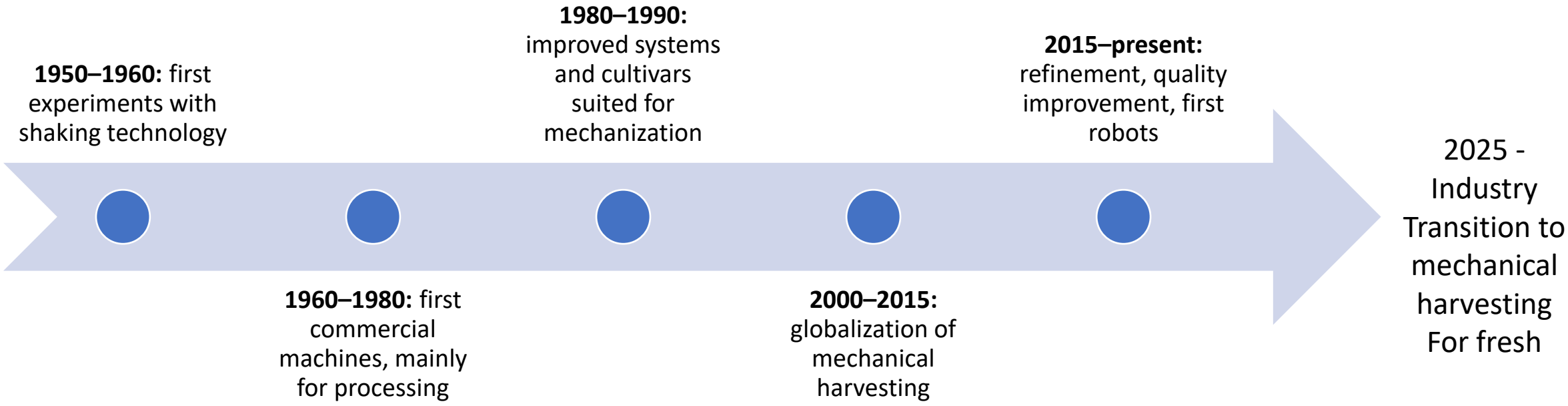
Advancements in Machine Harvest Technology

Marcel Beelen – CEO Fine Field

History machine harvesting



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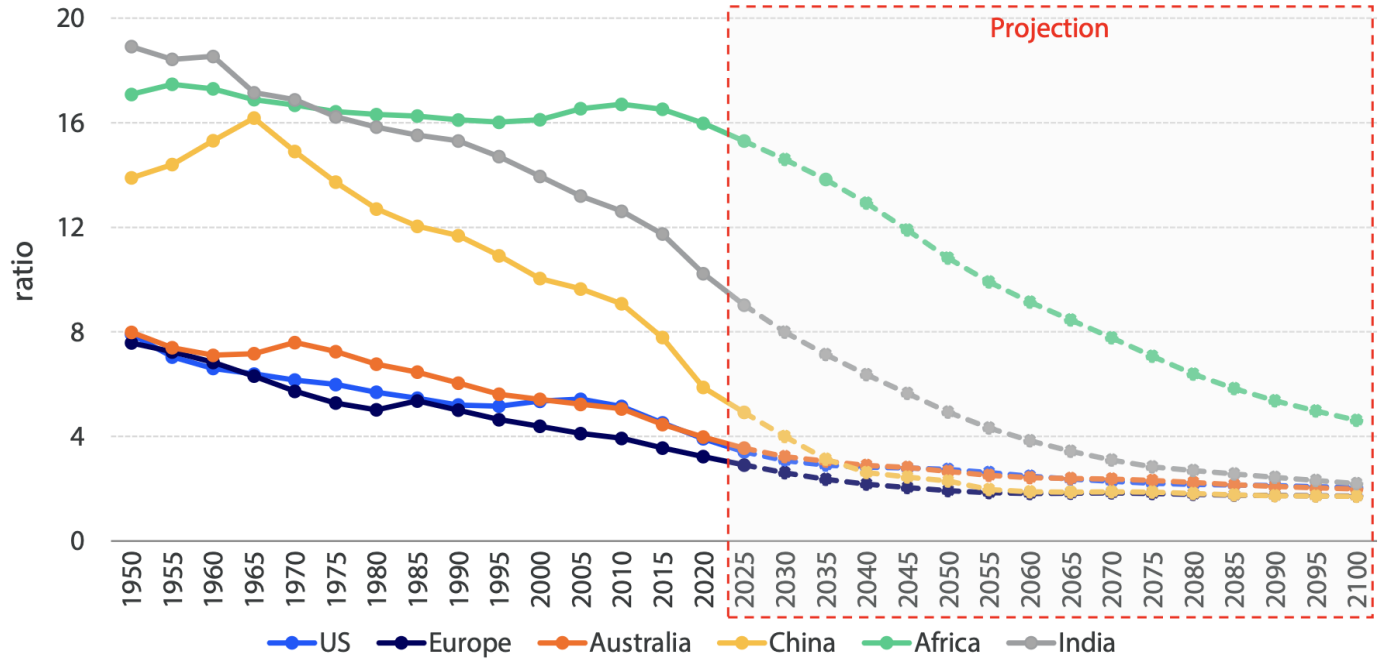
Decreasing availability of labor

Figure 22: Ratio of people of working age (15-64 years) to people aged 65+ in selected countries, 1950-2100*



***Note:** A ratio of 2 means that the number of people in the working age group (15-64 years) is twice the number of people aged 65+ . A ratio of 6 means that for every person aged 65+, there are six people in the 15-64 age group.*
***Source:** United Nations, RaboResearch 2024*

- Labor will remain a major challenge for growers worldwide. In most regions, the labor force is decreasing (see figure 22), which will only increase competition for labor from other sectors.
- For labor-intense crops like blueberries, recruiting sufficient workers and managing their housing and transportation is a significant challenge for growers, in particular during the harvest period.

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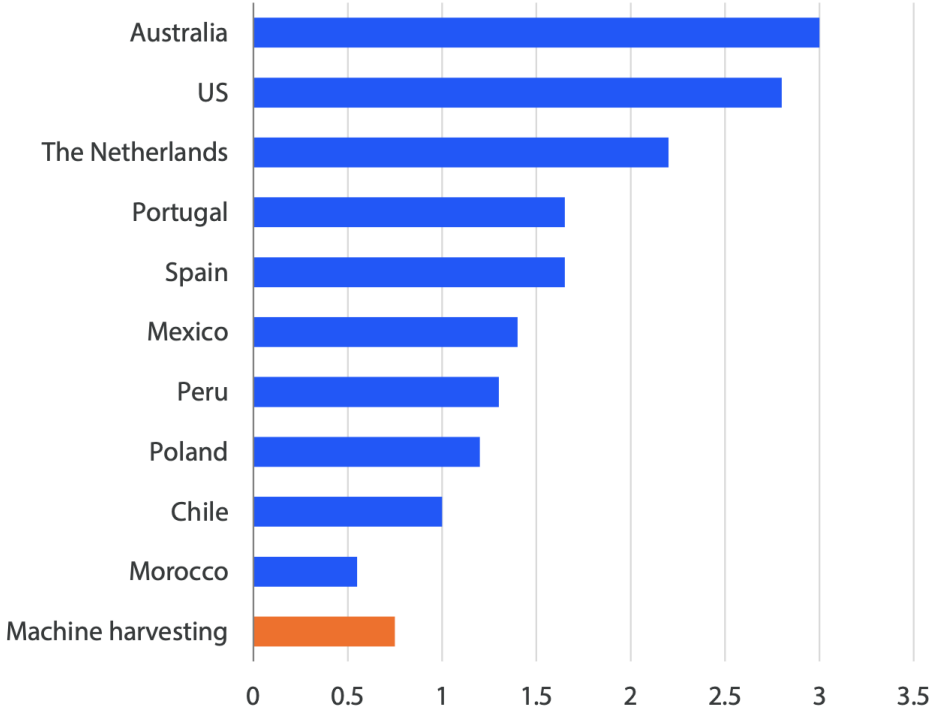
Rising cost

- Labor accounts for 25% to 50% of a grower's blueberry cost price, depending on the country, variety, and production system. While labor costs are relatively high in countries like Australia, the US, and the Netherlands, they are also a growing concern in lower-cost countries like Mexico and Peru. Even in seemingly low-labor-cost countries like Peru, harvesting costs can be relatively high due to additional expenses such as supervisors, long-distance transportation, food, and permit costs or due to lower productivity compared to other countries.
- As labor becomes more of a challenge, we expect producers to increase their focus on this issue and implement changes. These changes include varietal changes (e.g., bigger berries, improved berry detachability), machine harvesting, automation in pre- and post-harvest processes, reduction in the number of harvesting runs, and extension of the season.
- Machine harvesting is undergoing a steep learning curve and must align with the orchard structure and variety grown. If all these factors are addressed, it will become successful. The question is when.

Figure 23: Indicative blueberry harvesting costs (USD/kg)



***Note**: Harvest costs can differ widely among growers and according to calculation methods.*
***Source**: RaboResearch 2024*

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Current state of mechanical harvest for fresh

- First machines developed for fresh are available
- Industry is accelerating changing to machine for fresh
- US has biggest adoption of machine for fresh
- Other markets make first steps
- High chill areas are leading the change
- US is volume oriented
- EU/ South America is quality oriented

“Okay, machine harvest is done today, but it's episodic and occasional for most people, meaning you have to have an old variety that's at just the right harvest period, with just the right temperature, with just the right fast market, weather is at just the right time, you're successful in that”

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Machine harvest

Oxbo

Fine Field

BSK - Kokan

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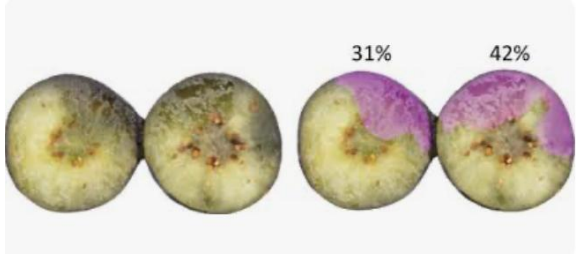
Challenges machine harvest

1. Quality



2. Losses

3. Up time

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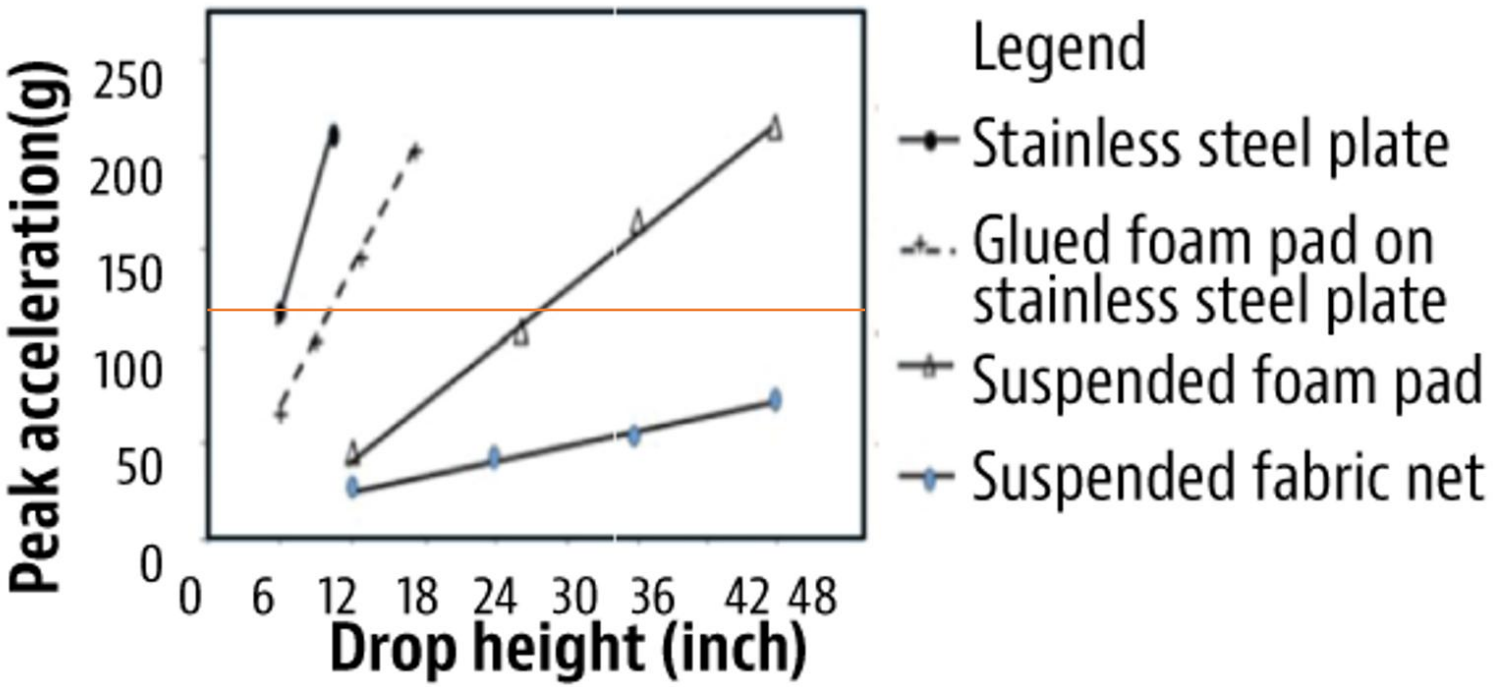
Quality: minimize bruising



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*University research - Fumiomi Takeda

Quality: minimize bruising

Metal

Suspended fabric

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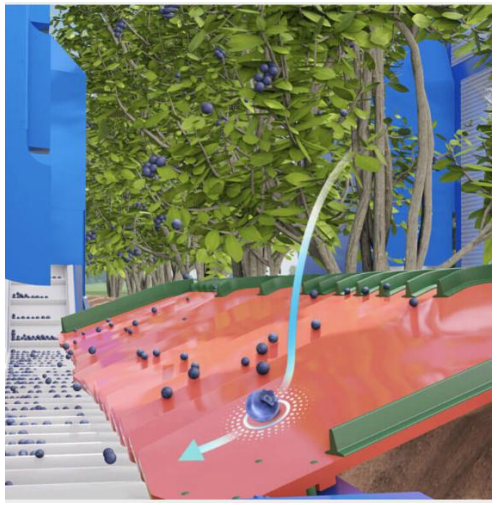
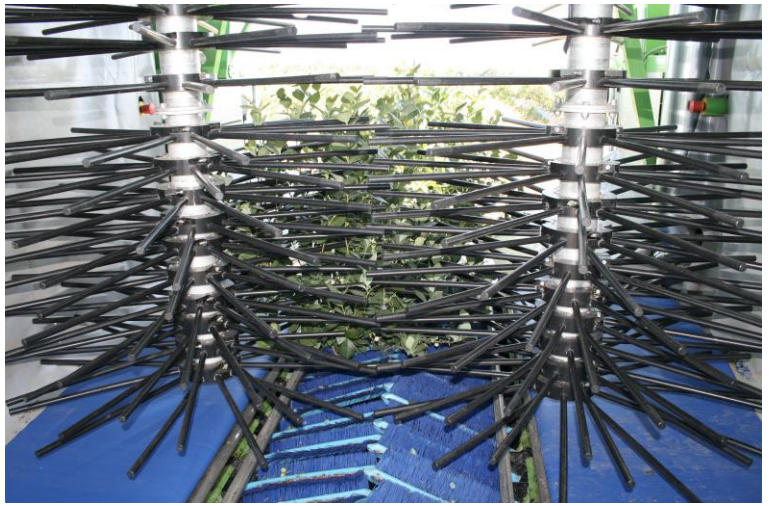
Advancements on soft drop

Catcher plates with fabric nets



Catcher plates with ‘pneumatic pillows’



Soft brushes for sealing plant and catching berries
Suspended fabric net all around for dampening fall on other drop areas

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Breeding: cultivars with higher mechanical harvest tolerance?

Losses: catch systems

Catcher plate

Brushes

Disc comb system

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Uptime

- Organize for succes
- Speed of service
- Availability of spare parts
- Plan for over capacity

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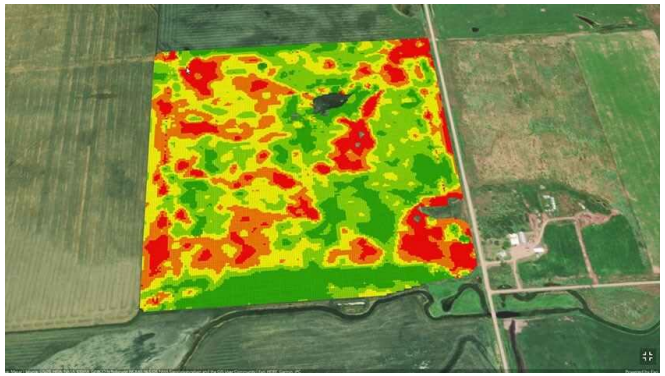
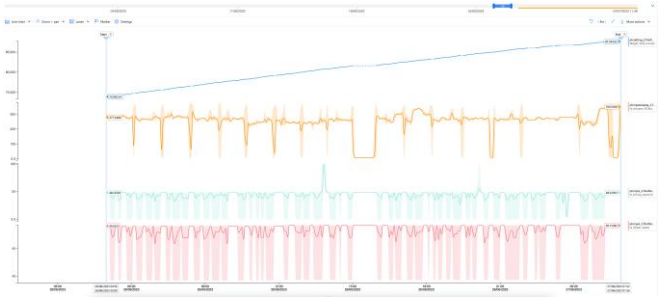
Future

- Further refinement preserving quality and losses
- Data and AI
- Adapt for field conditions and coversystems





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Takeaway

Machines are going to replaces handpick and are helping on:

1. Consistency
2. Quality
3. Sustainability
4. Food safety
5. Value

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Questions?

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