

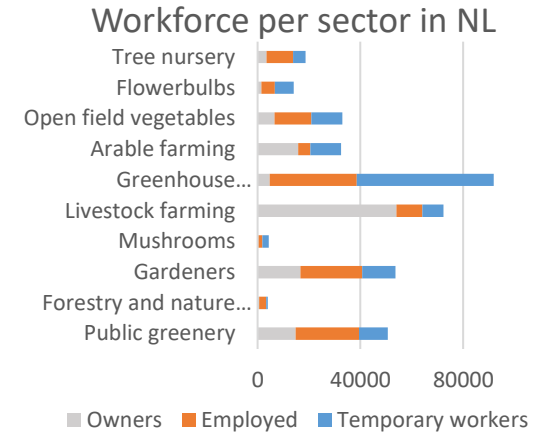


Robotics and Automation in Agrifood Systems

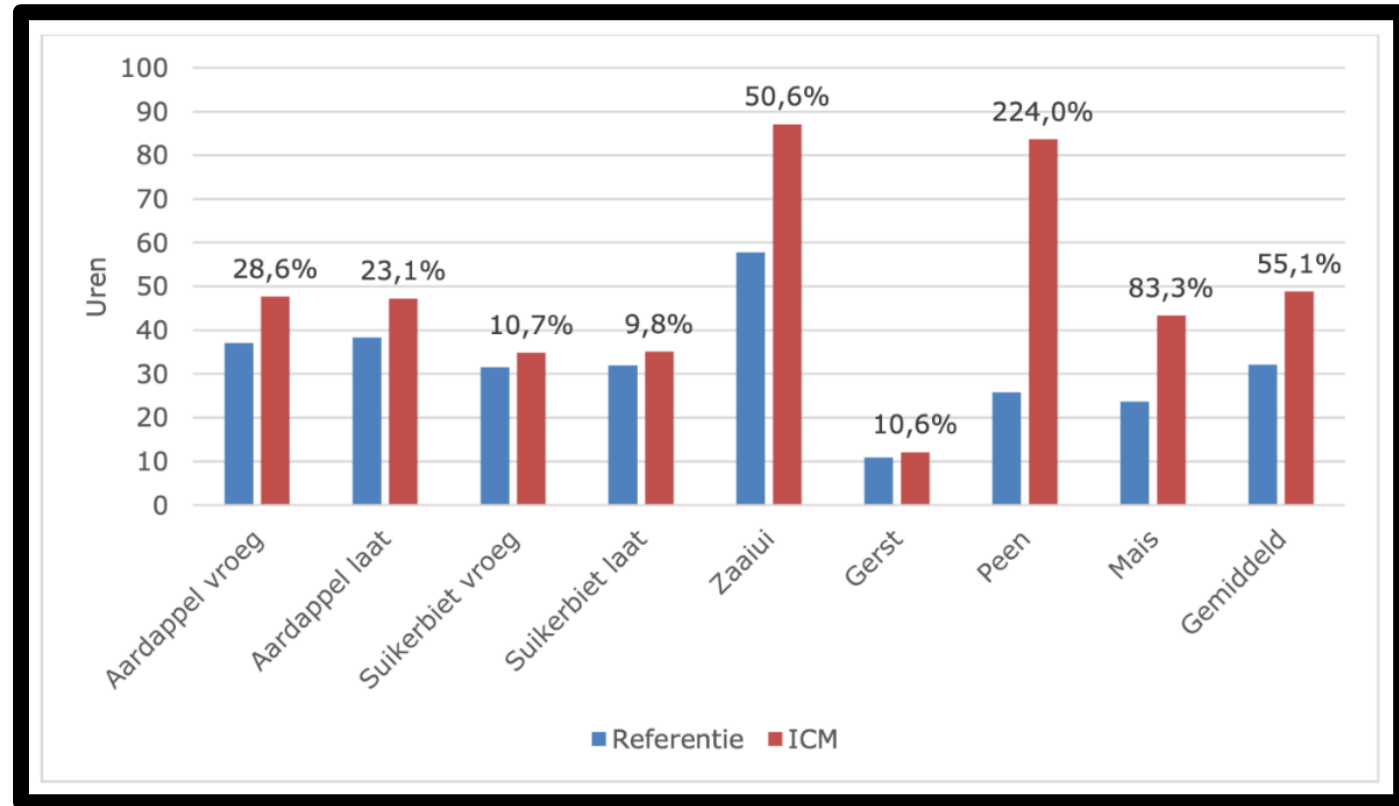
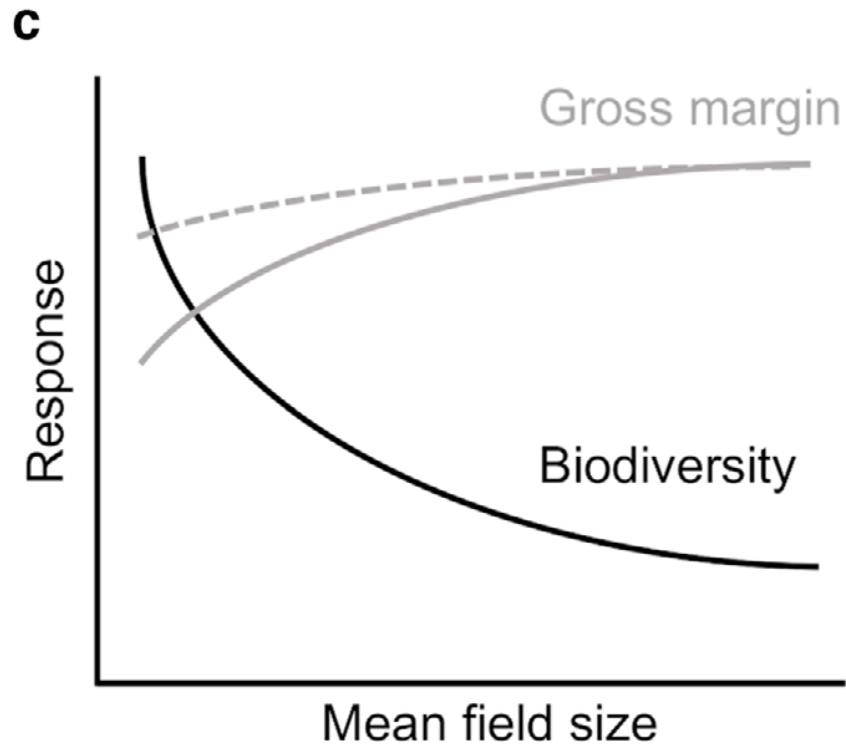
11 february | Erik Pekkeriet | erik.pekkeriet@wur.nl

Domestic shortages of labour

- In NL >100k p/year extra workforce from abroad is added
- >50% is agrifood related
- Drivers are: horticulture, fresh food processing and logistics
 - Mainly high value fruits and vegetables in short and fast running value chains
- Workforce is aging and sourced over longer distances from urban societies
- Worldwide agrifood workforce is declining rapidly
 - Due to more monoculture and automation



Labour input increases when improving sustainability



Monocultures are easily scalable, improve specialisation and are sensitive to international trade

The dilemma

To produce food more sustainable, fresh, diverse and nutritious and reducing inputs at the same time, more labour/effort is needed.

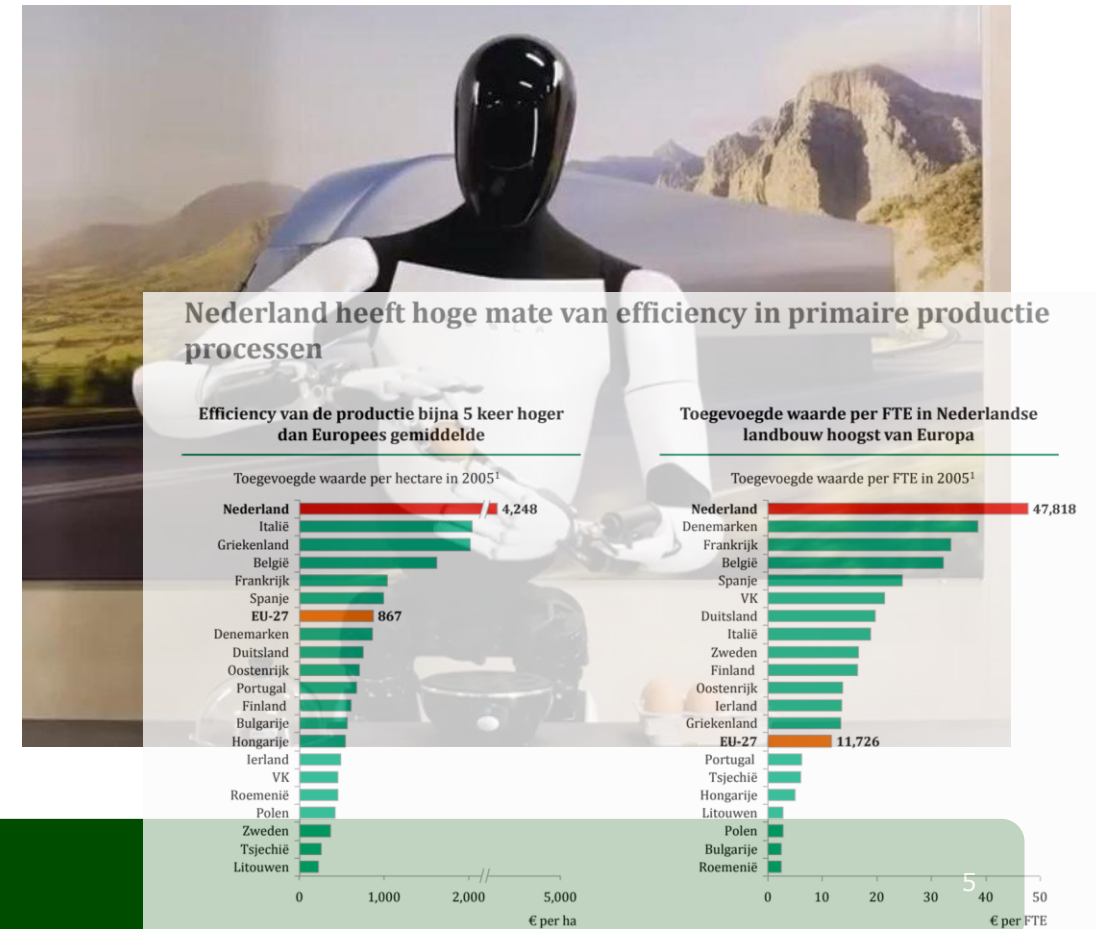
Labour inputs must increase, precisely at the moment when at the macroeconomic level labour availability is under most pressure, both demographically and politically.



The vision

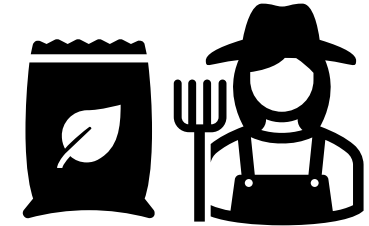
The answer is not automation per se but the development of automation that enables economically and environmentally viable creation of productive, diverse, heterogeneous farmed landscapes.

Extremely low cost/ accessible, adaptive, multifunctional robots that provide high levels of labour input to deliver productive, biodiverse, heterogeneous landscapes of diverse cropping systems



Robots are the future, Robots can:

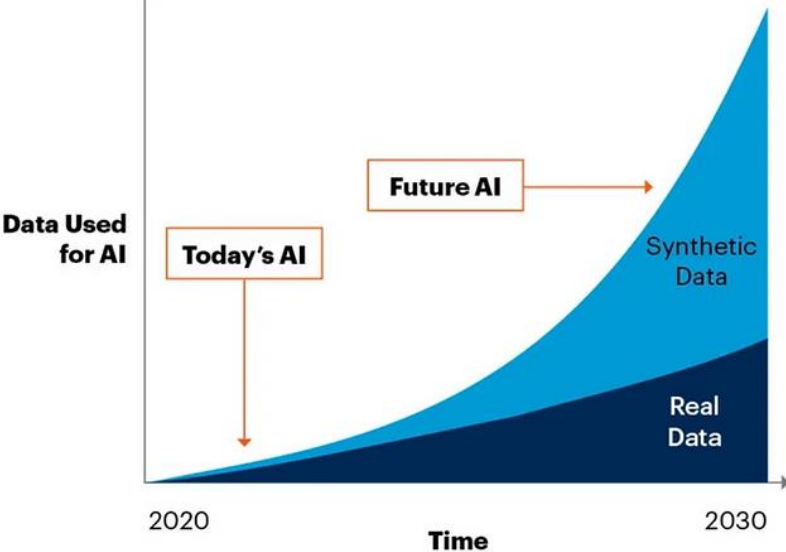
- reach every plant and every animal everywhere
- act more frequent and collect reproducible trusted data
- perform good in repetitive short cycle tasks
- introduce new methods like plasma, laser wiping, UVC treatment, strip cropping, drying
- act more precise at the right timing. It reduces: Soil compaction, chemicals, water, fertilizers/manure, energy, labour, administration, risks, logistics, can replace harsh working conditions
- scale easier nearby urban societies



Where are the robots...?

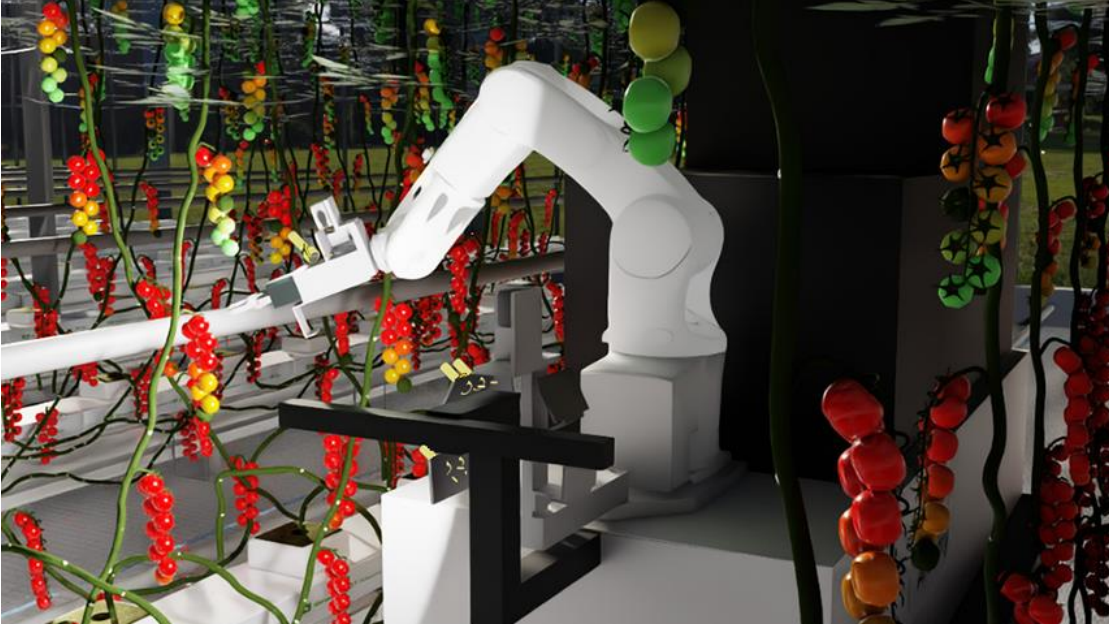
1. Still high input of labour due to immaturity of technology | e.g. automated implements
2. High R&D cost - expensive
 - Many functions not mature, poor simulation environments
 - No standardized building blocks, no sharing, no scalability
 - Still new, we lack seasons of training
3. Ownership issue machine manufacturer - farmer
 - AI Robot = Dataset + AI + Robot = Performance
 - Poor service and remote control levels. Technology should unburden the farmer
4. As applied trusted technology and business models
5. Systems approach | fallback scenarios | logistics
6. Limited long shot financial resources and access to VC, Angels, risk-credit
7. Limited integrated robot experimentation farms with interoperable data infrastructure

Highlight Key Technology 1: Simulation

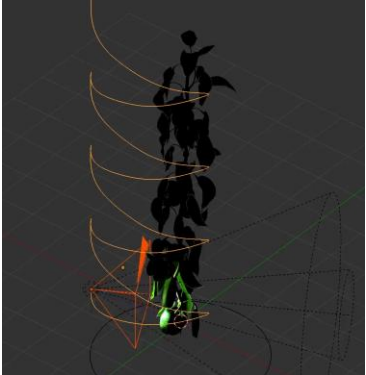
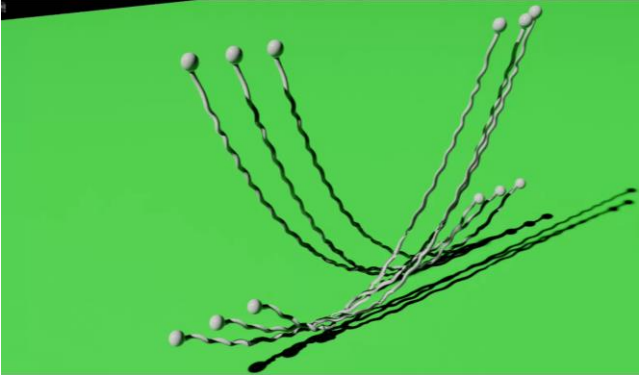


- Artificially Generated Data
- Generated From Simple Rules, Statistical Modelling, Simulation and Other Techniques

- Obtained From Direct Measurements
- Constrained by Cost, Logistics, Privacy Reasons



Source: Gartner
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Hightlight Key Technology 2: Teleoperation



End slide

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