Harvest quality, soil conservation and costs in the potato harvesting - where is the journey heading?

Potato harvest trends

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Presentation at
32nd Annual Meeting of
Club of Bologna

November 13th 2023
in Hannover

FEDER UNACOMA
Italian Agricultural Machinery Manufacturers Federation

Agenda:

1. Introduction
2. State of the art
3. Trends
4. Outlook
5. Summery/Conclusion

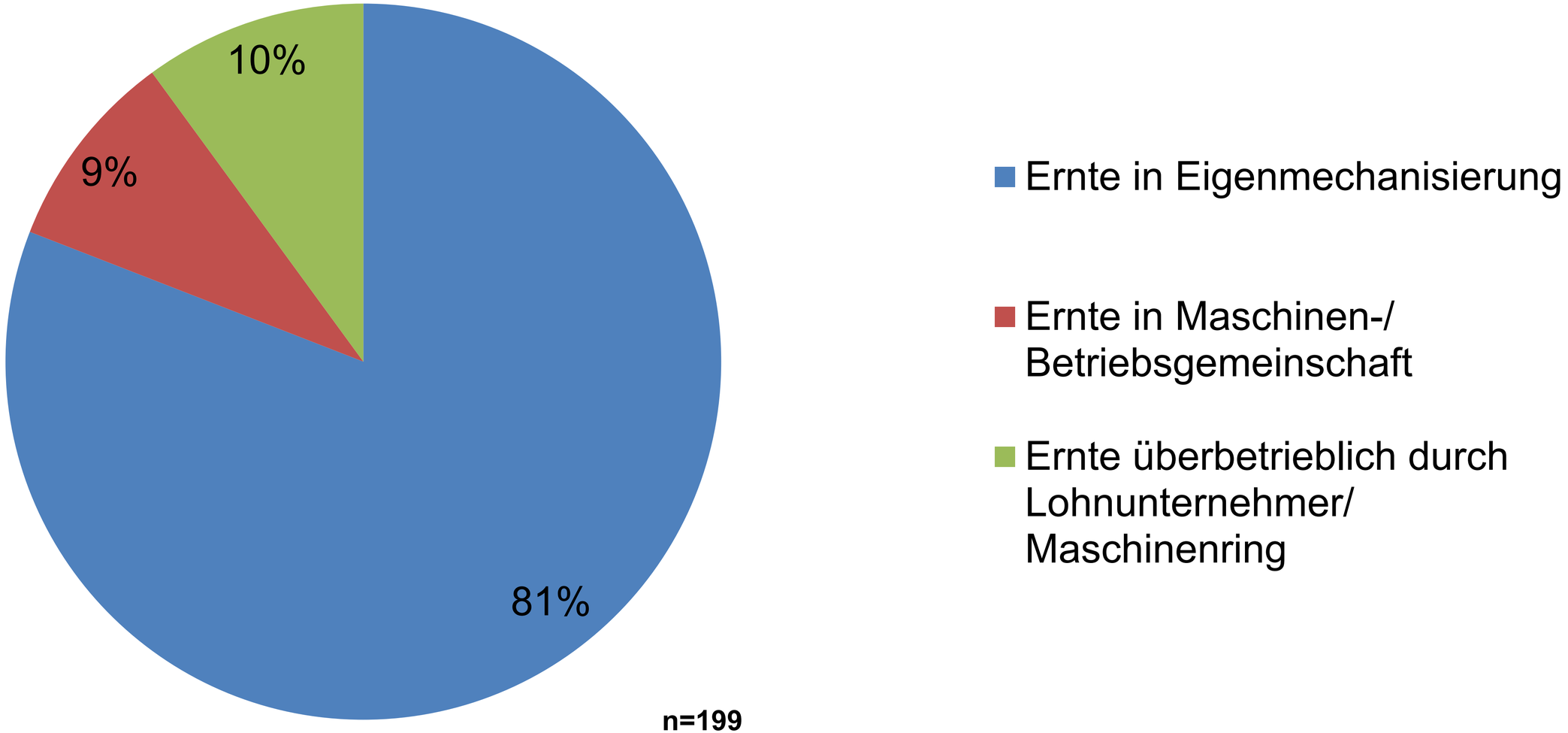
1. Introduction - initial situation

There is hardly any other harvesting process where so many influencing factors and requirements have to be taken into account as in potato harvesting:

- Gentle harvesting - highest quality requirements with regard to damage
- Influence of soil type and condition
- Separation and cleaning of various impurities
- Different market directions e. g. seed, table, starch, process potatoes
- High harvesting capacity depending on the number of rows (best possible utilization)
- Simple an intuitive operation for the user
- Easy cleaning and good accessibility for maintenance

1. Introduction - initial situation

Results of questionary survey Germany, 2018 – Which harvester method will use?



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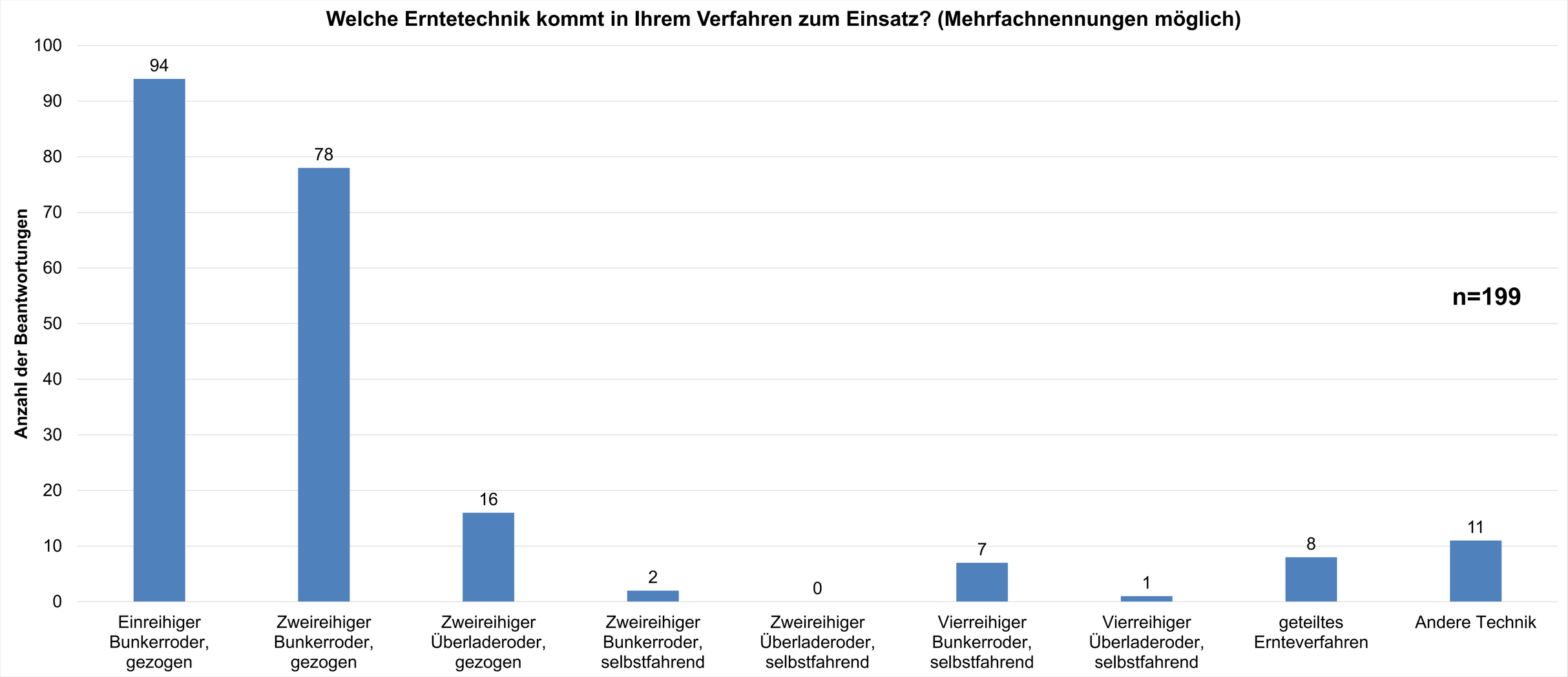
1. Introduction - initial situation

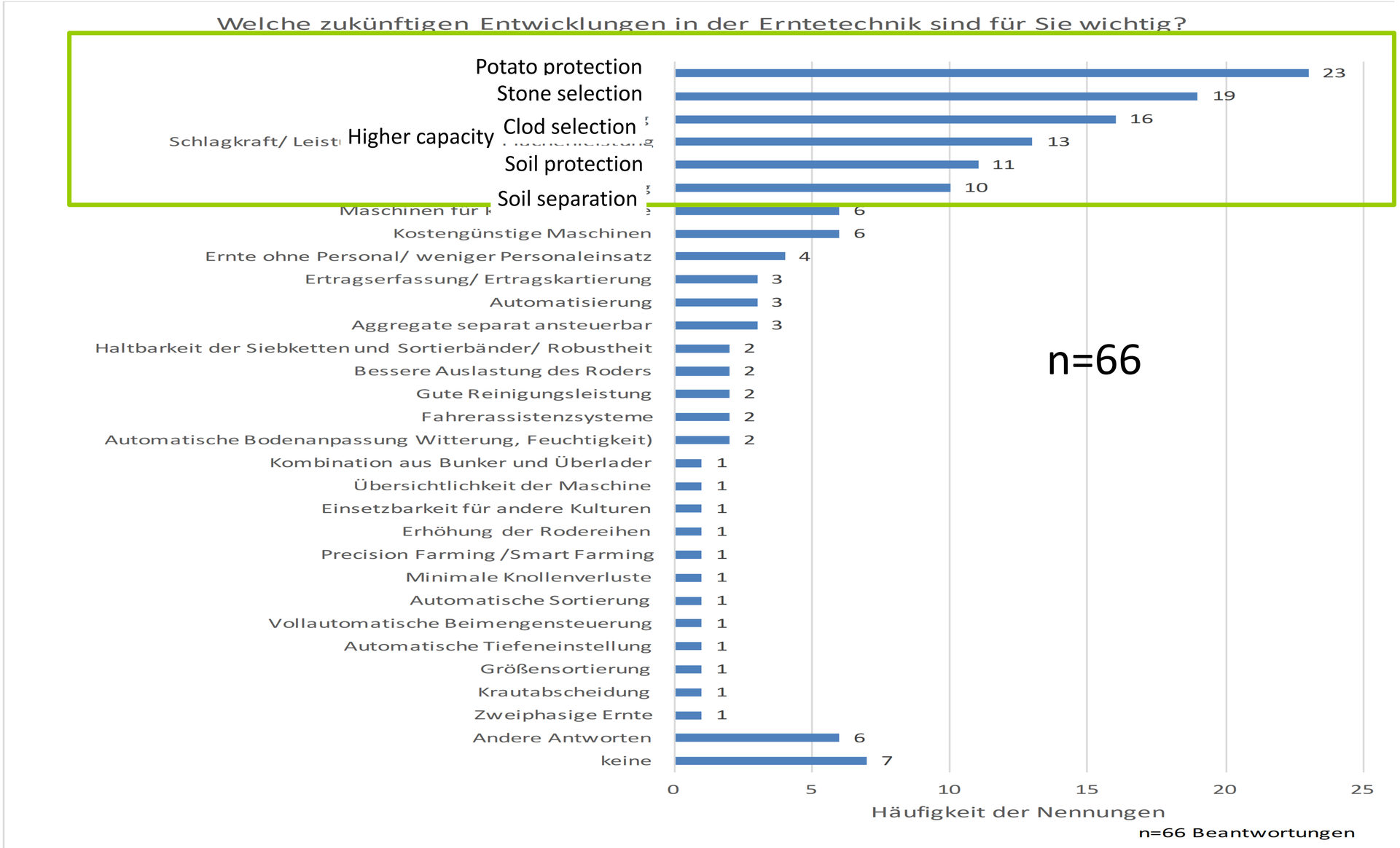
Results of questionary survey Germany, 2018 – Which harvester is used?



Source: Hartl B. 2018

1. Introduction - initial situation

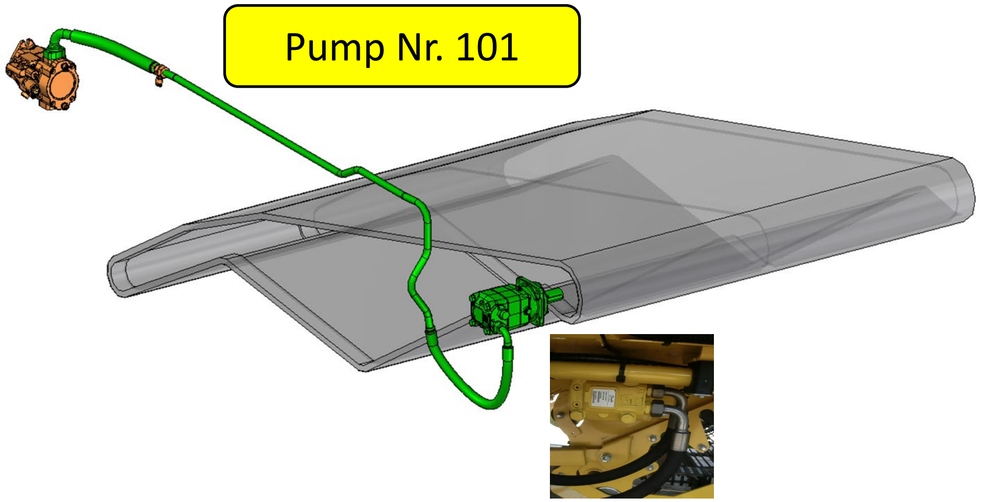
Ranking: Consideration which future development in harvest technology is important?

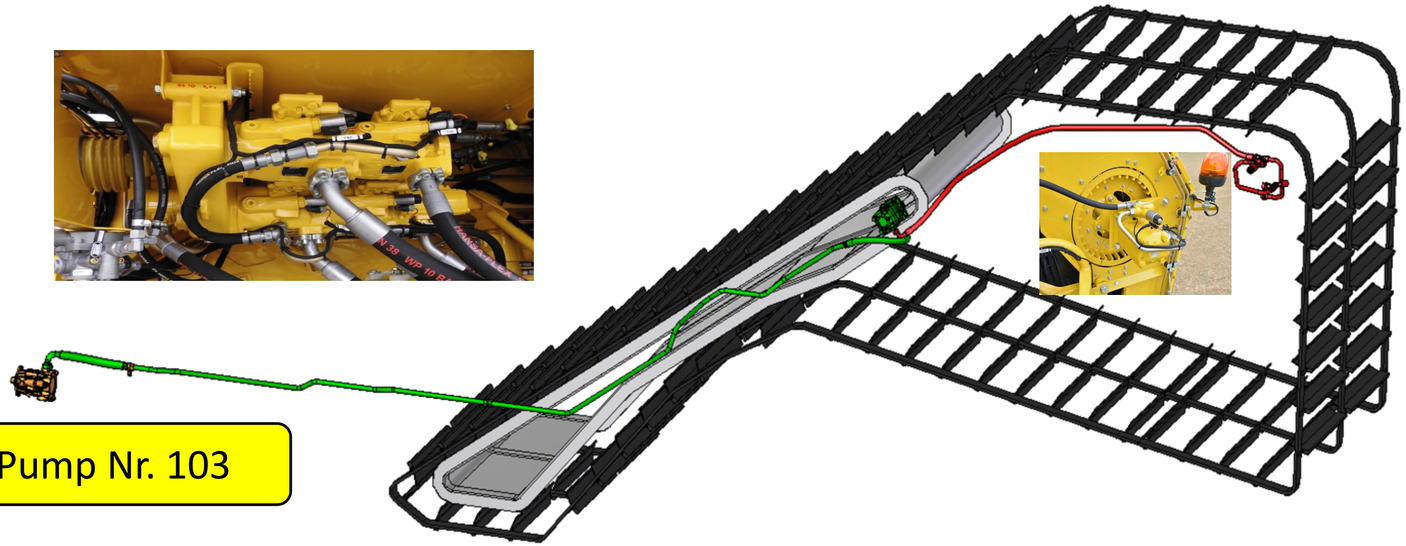


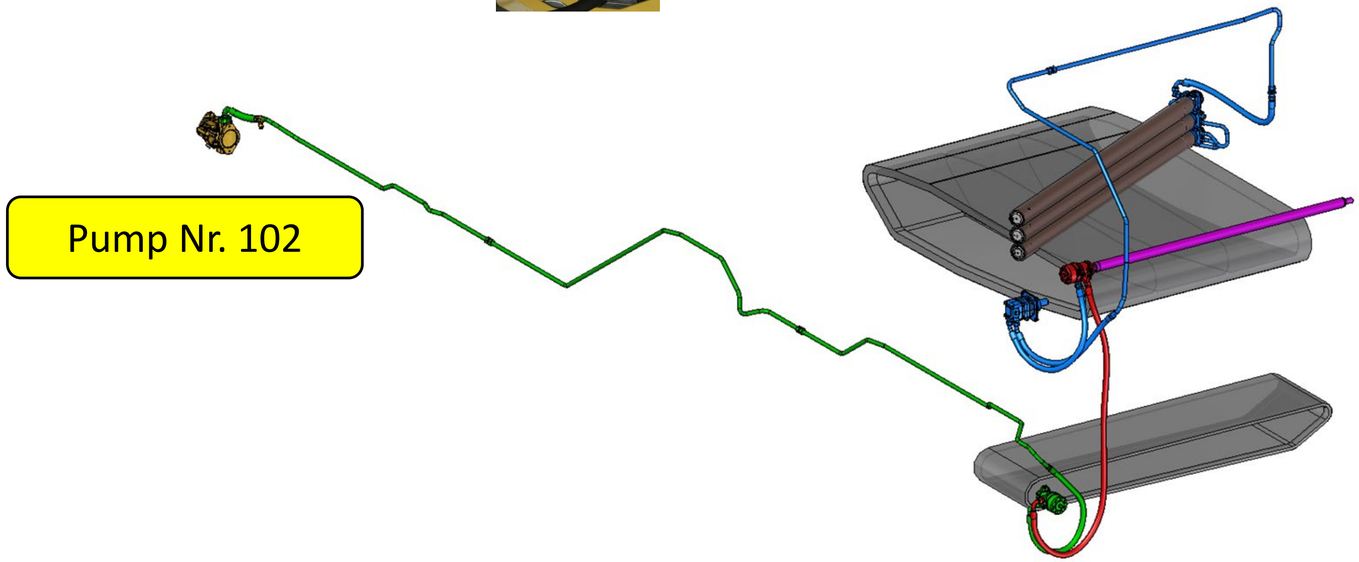
Source: Hartl B. 2018

2. State of the art – drive system

Fully hydraulic drive







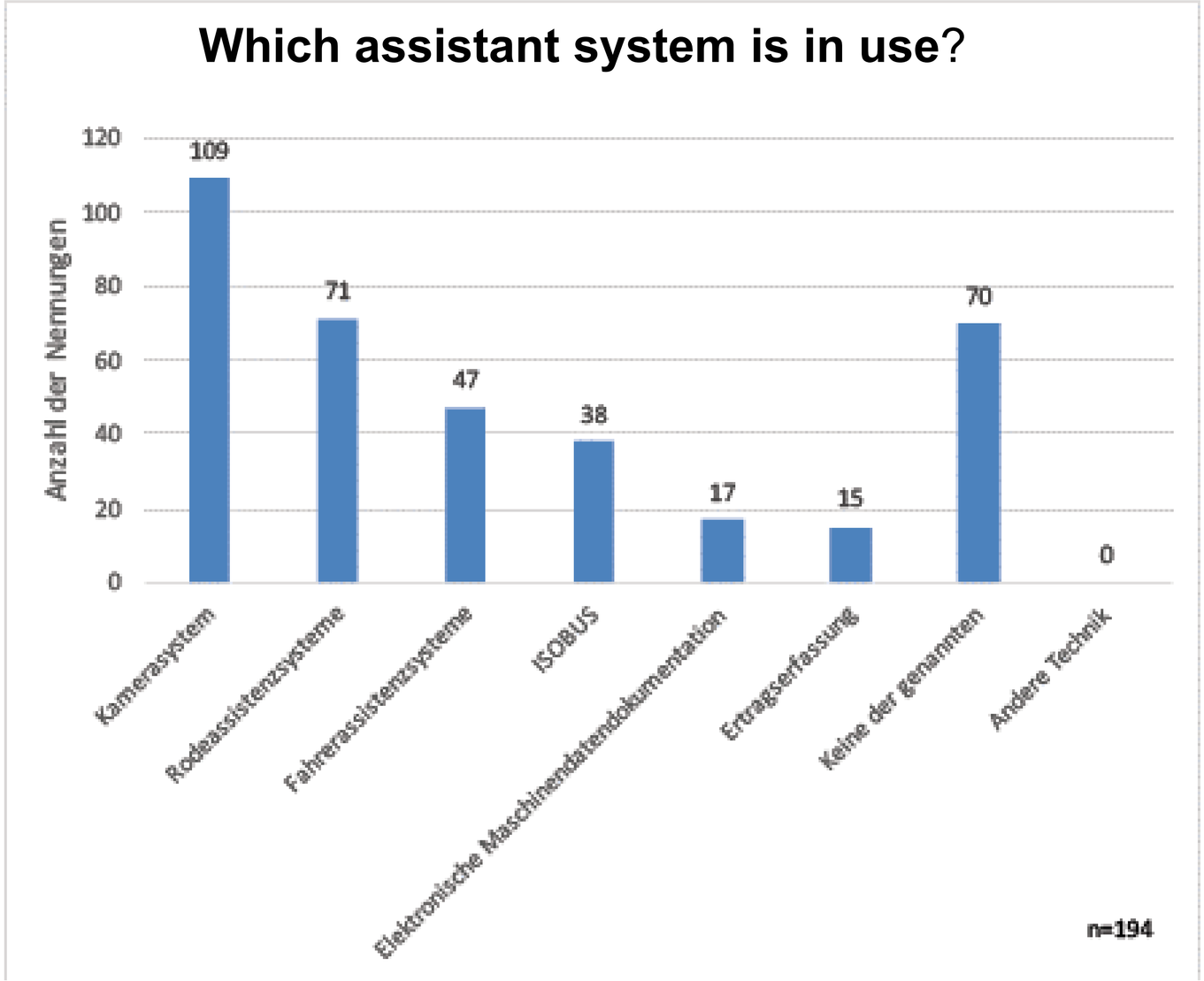
Pump Nr.	Supply of
101	Pump for sieving web 1
102	Pump for hedgehog web 1, deflection roller 1, dirt drag out belt
103	Pump for sieving web 2 & Haulm web

2. State of the art – undercarriage system

Big radial tyre / telescop axle

Tandem axle

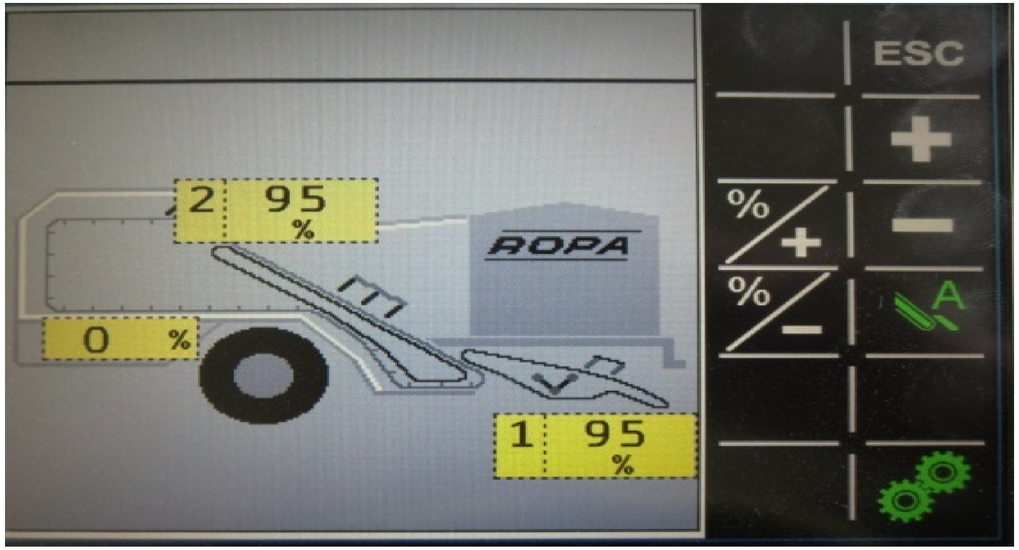
2. State of the art – assistant system



Source: Hartl B. 2018

2. State of the art – assistant system

Assistance systems for easier adjustment and monitoring as well as for automating the machine



- **Program button** for setting different harvest program
- **Pressure and rpm monitoring** incl. display for separating units
- **Automatic clamping** prevents the machine from "closing" by automatically switching off the previous units
- **Turbo Clean** cleaning program - full speed on the headland / during the turning process

2. State of the art – assistant system

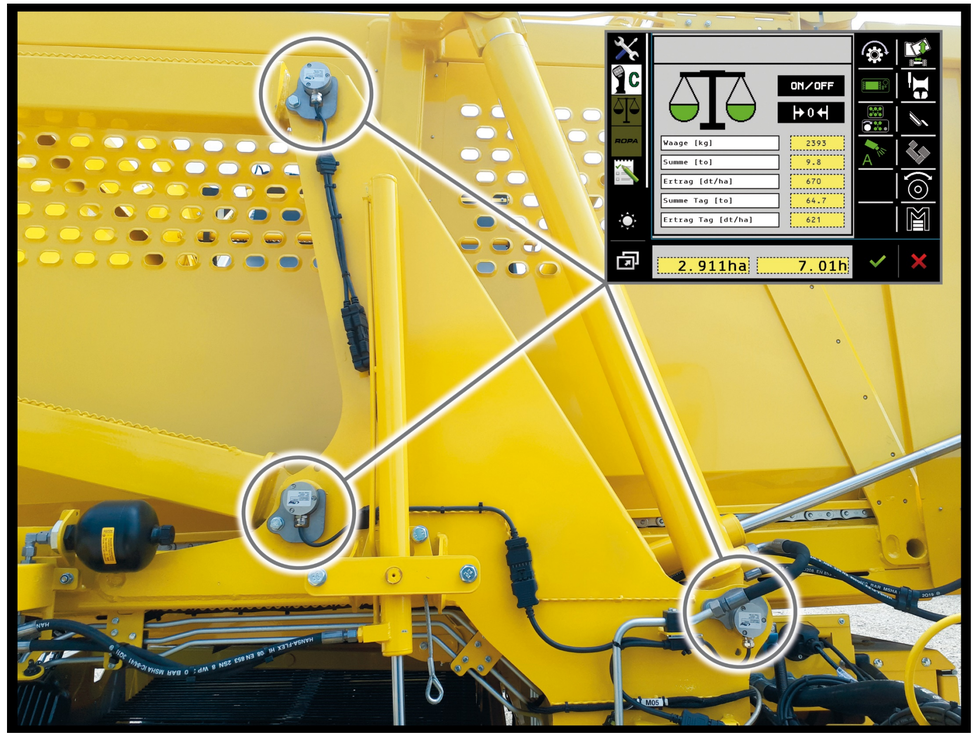
Digital Videosystem

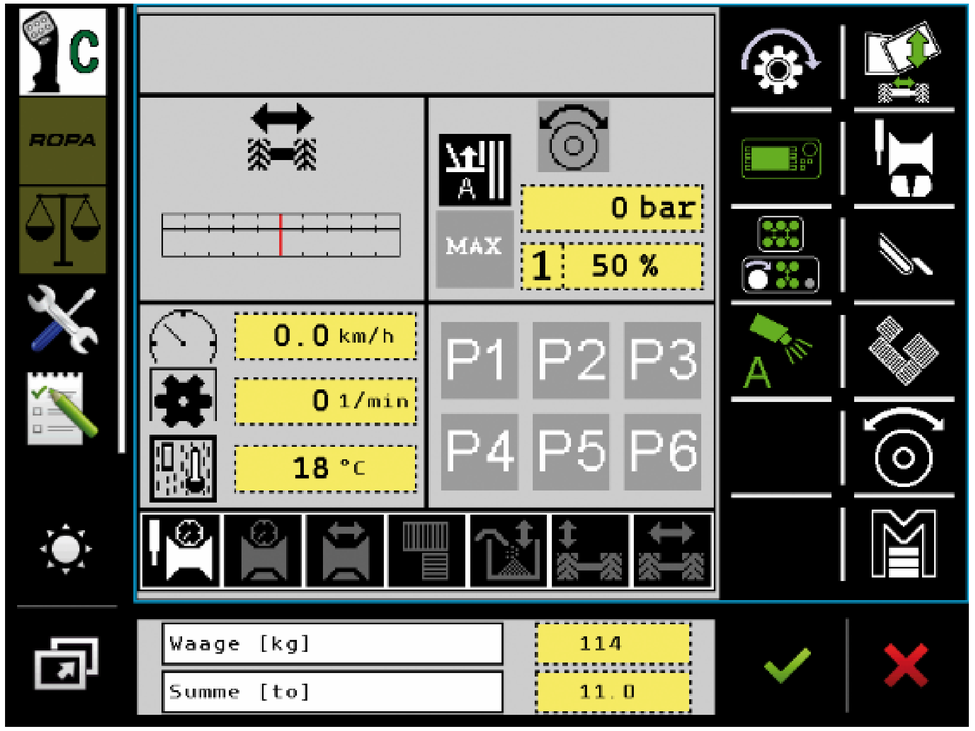
cameras with 120° view

- 10.1 inch monitors possible (HD 1280x800)
- Video switch with 1 Gbit rate (Ethernet)
- Zoom-/wipe function

2. State of the art – assistant system

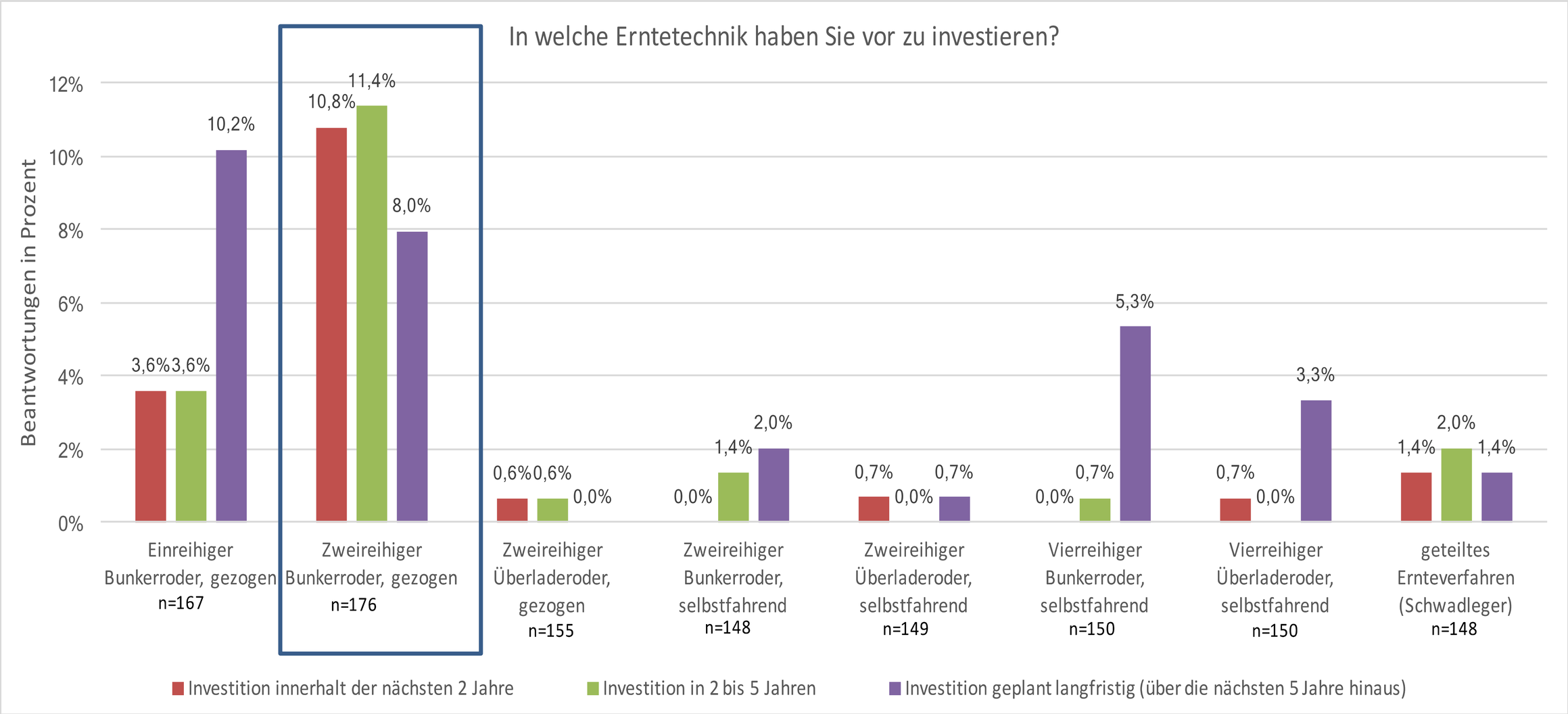
Hopper scale for static weight messurment





- 6 measuring pins (3 each at the front and rear of the bunker) determine the weight shortly before bunkering
- The zero adjustment (tare function) ensures an exact measurement result
- Initial yield estimates can be made in the field
- Transport vehicles are optimally loaded without exceeding the permissible weights
- The farmer can check the quantity of potatoes he has harvested and delivered

3. Trend – harvest system



Quelle: Hartl B. 2018

3. Trend – harvest system

simple and cost-effective 2-row harvesters

Hight capacity 2-row harvesters for corporate and contractor usage

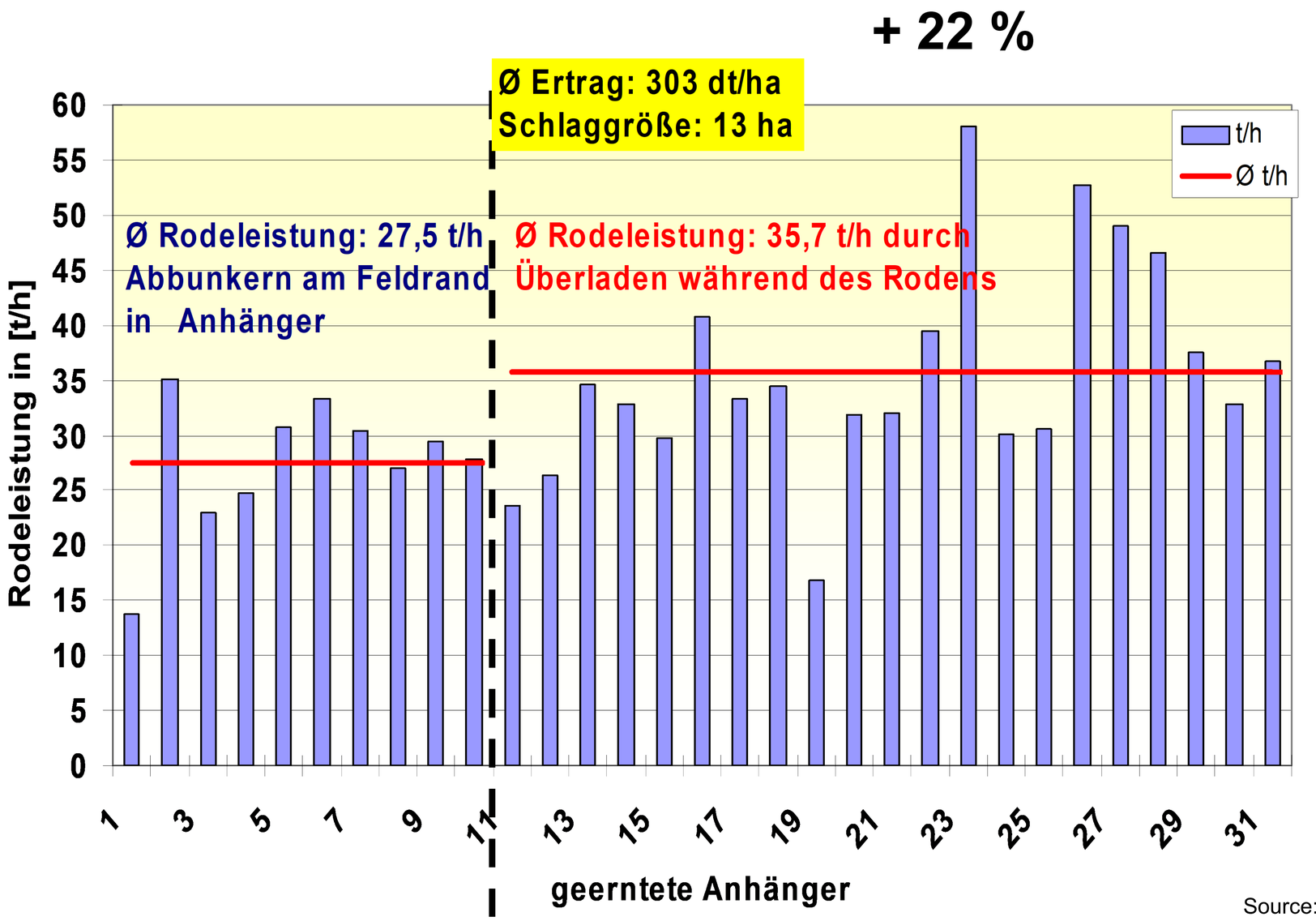
Source: Grimme 2023

3. Trend – harvest system

Bigger hopper > 7,5 t

Overload hopper

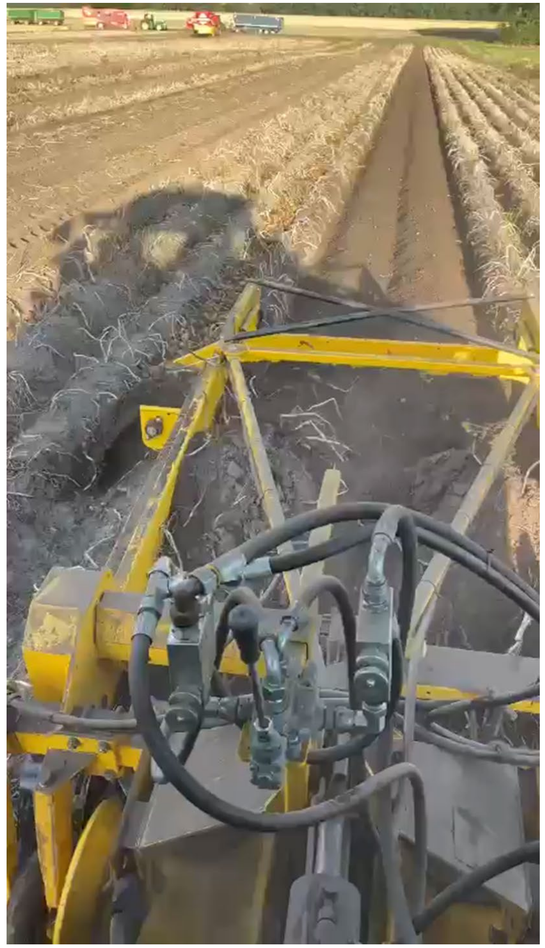
3. Trend – harvest system



Source: Geischeder R., 2004

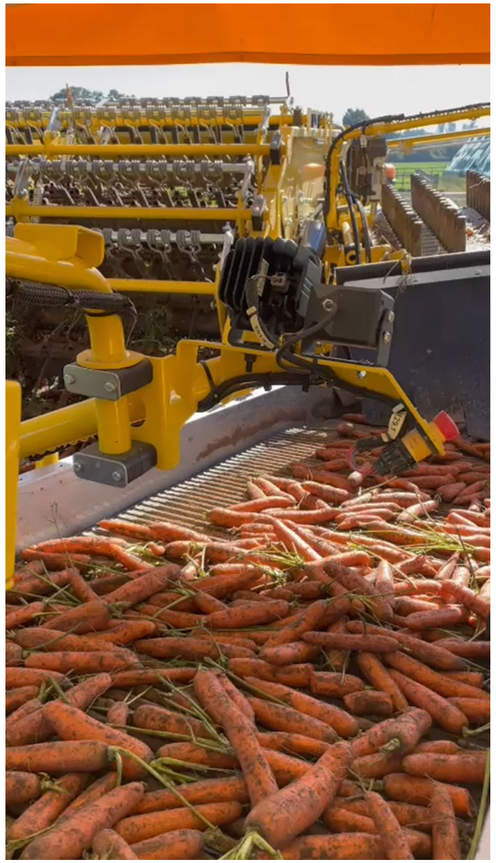
3. Trend – harvest system

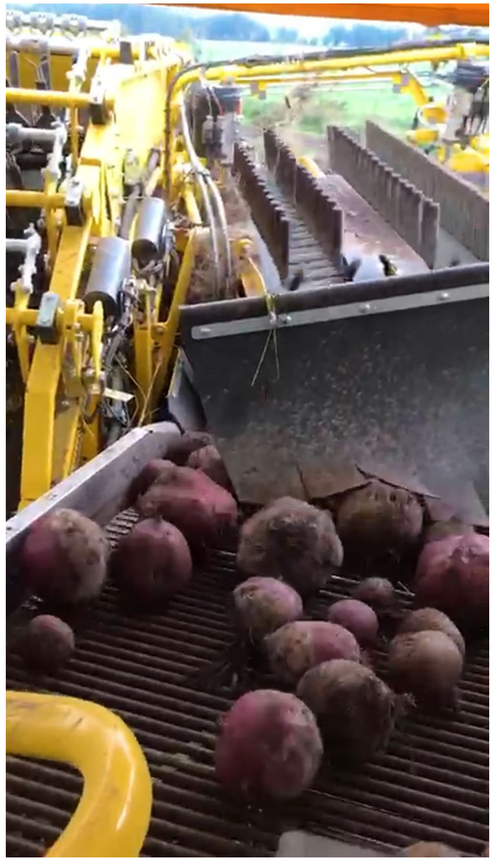
System 2 in 2 for „enriching“ potato ridges for higer harvester capacity



3. Trend – harvest system

Quick & easy exchange intake for multiple root crop harvest





Universal intake

3. Trend – harvest system

Stone & Clod separation/cleaning

Quelle: Grimme 2018

3. Trend – harvest system

Stone & Clod separation/cleaning

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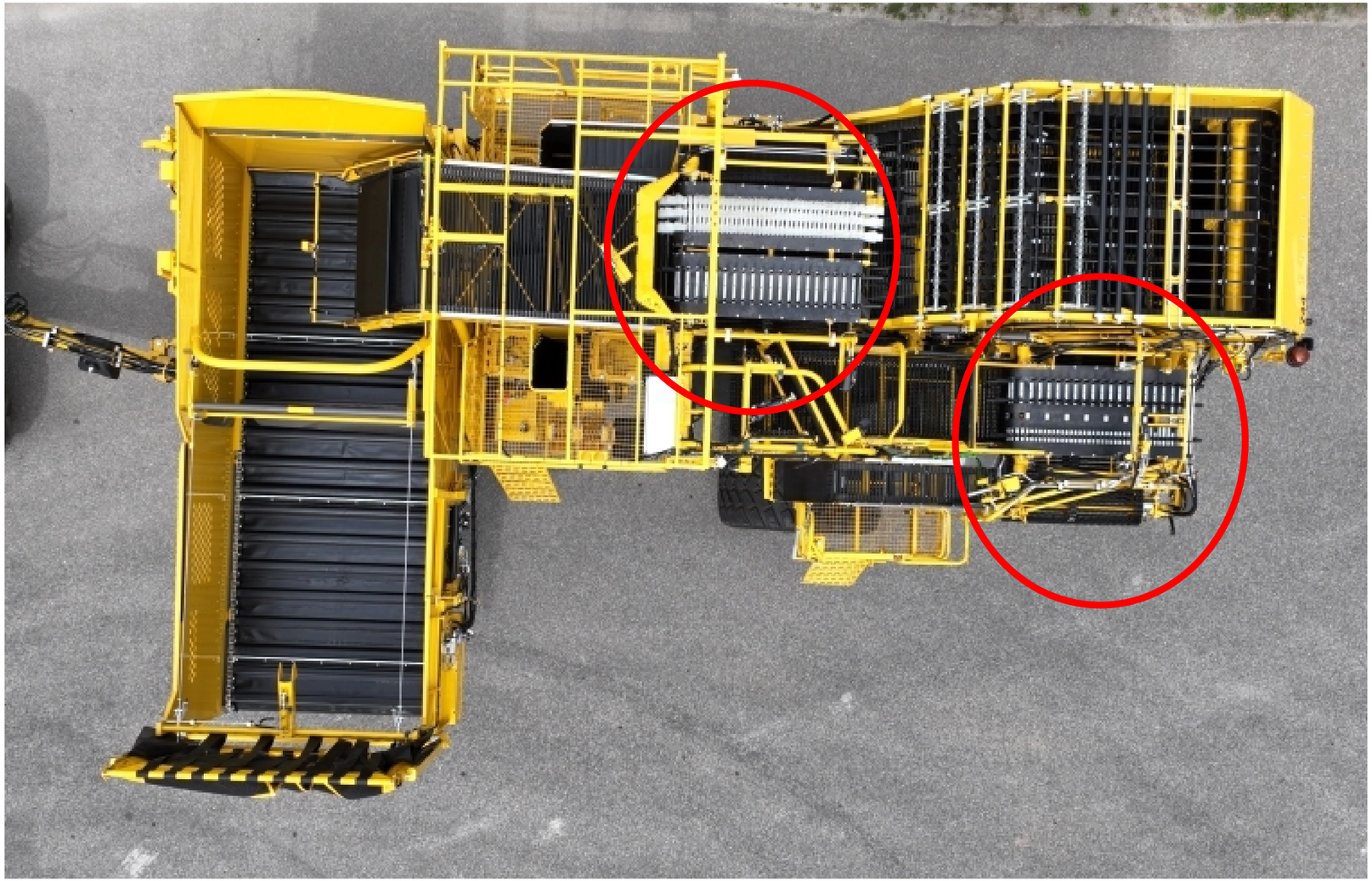
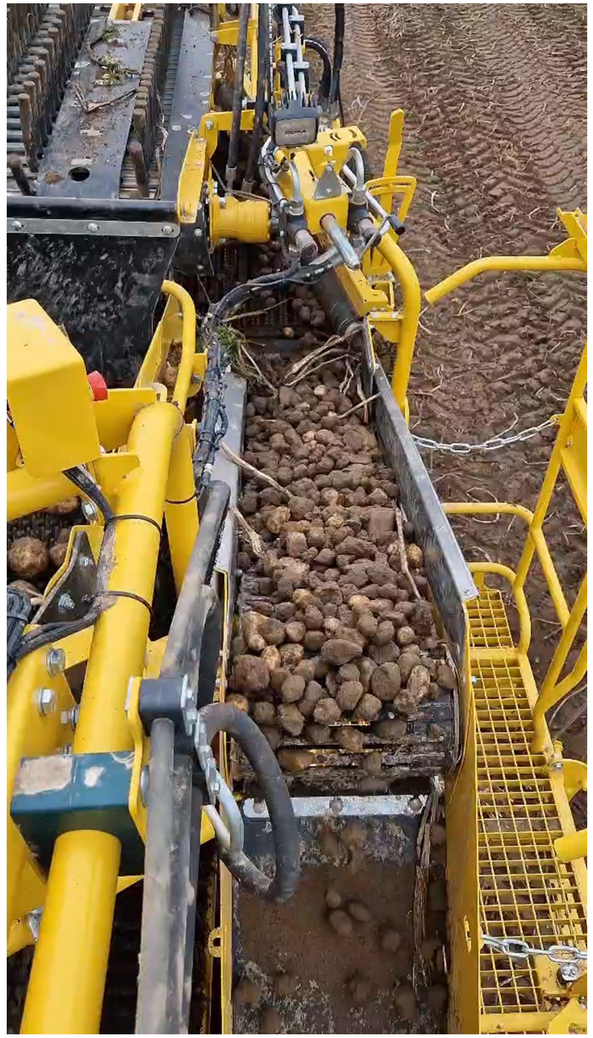
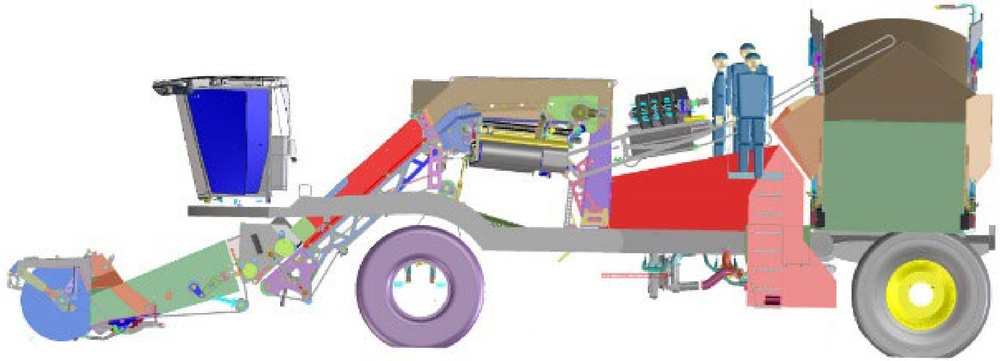
Stone & Clod separation/cleaning

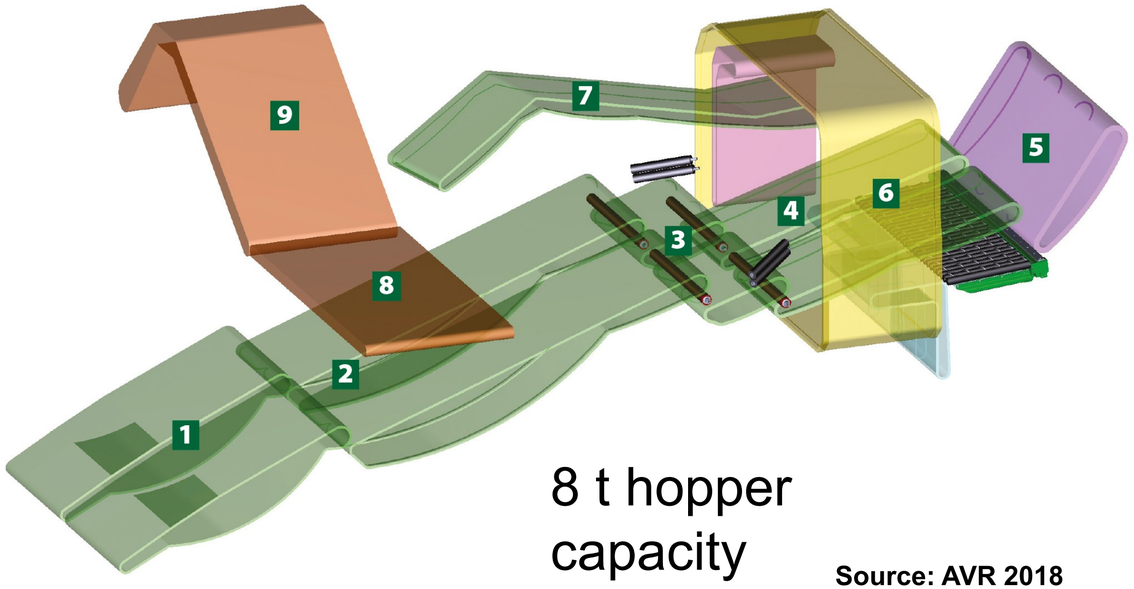




3. Trend – harvest system

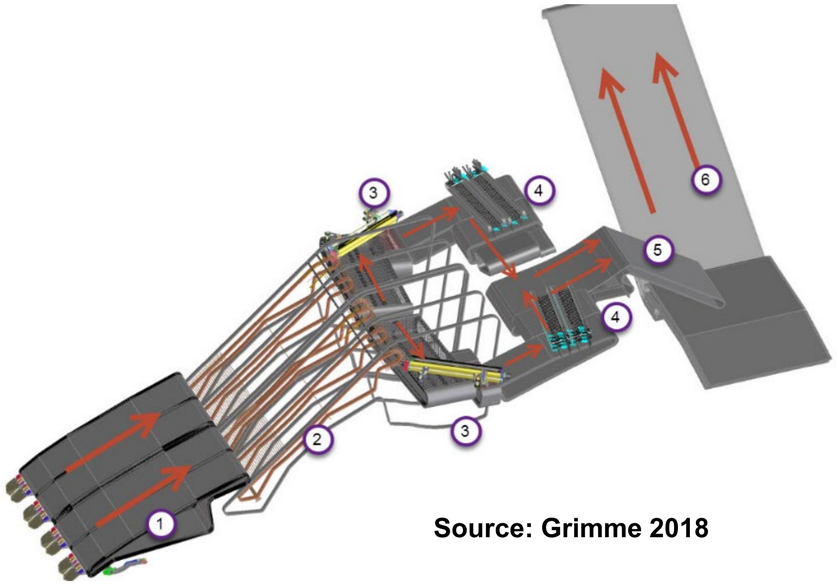


15 t hopper capacity



8 t hopper capacity

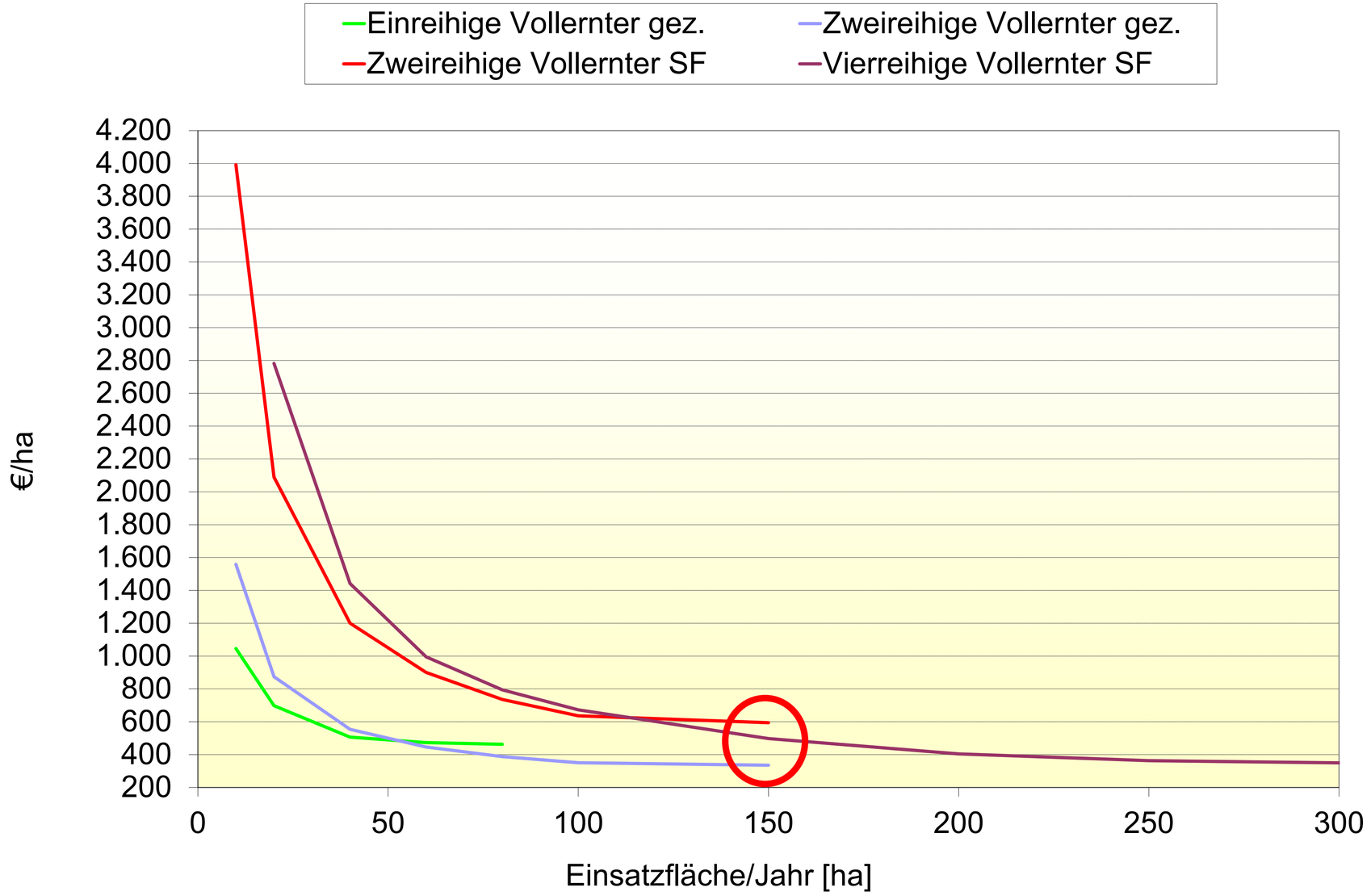
Source: AVR 2018



Source: Grimme 2018

3. Trend – harvest system

Cost comparison – harvest system

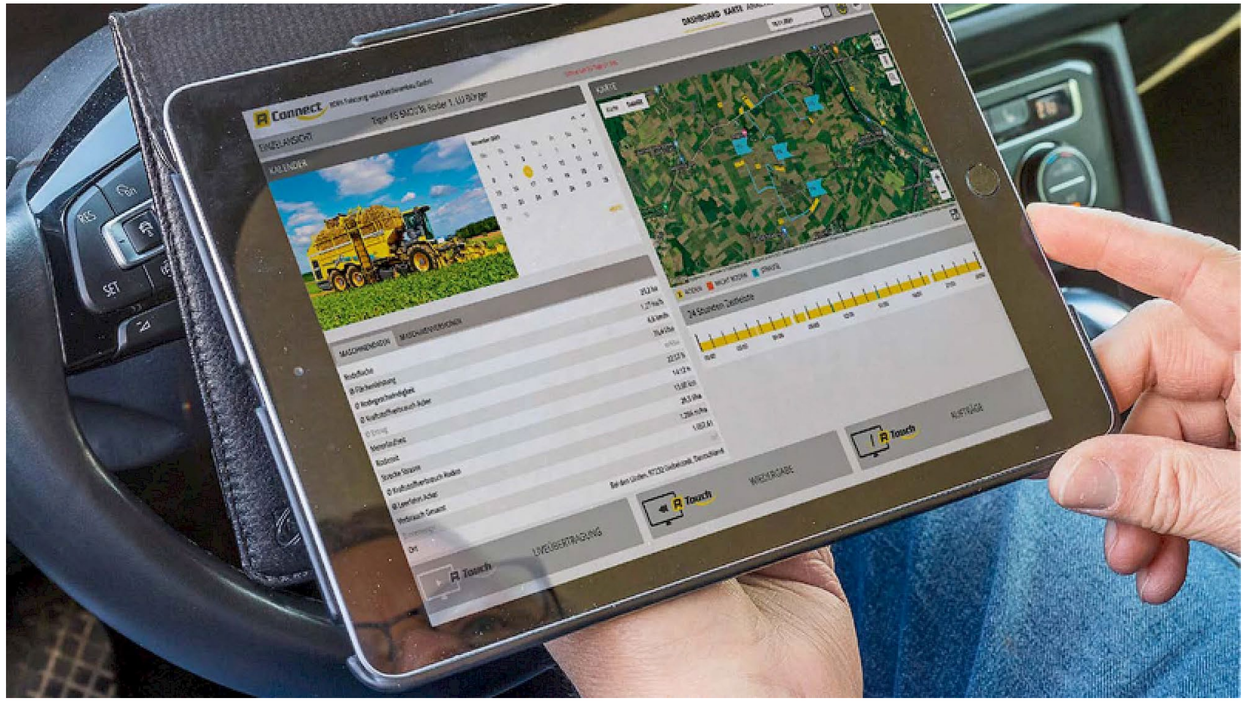


Life cycle: **8 years**

Source: Bauer Th. R. Geischeder, 2004

4. Outlook - Connectivity

- Yield mapping
- Telematic
- Support (Service over the air OTA)
- Analytic

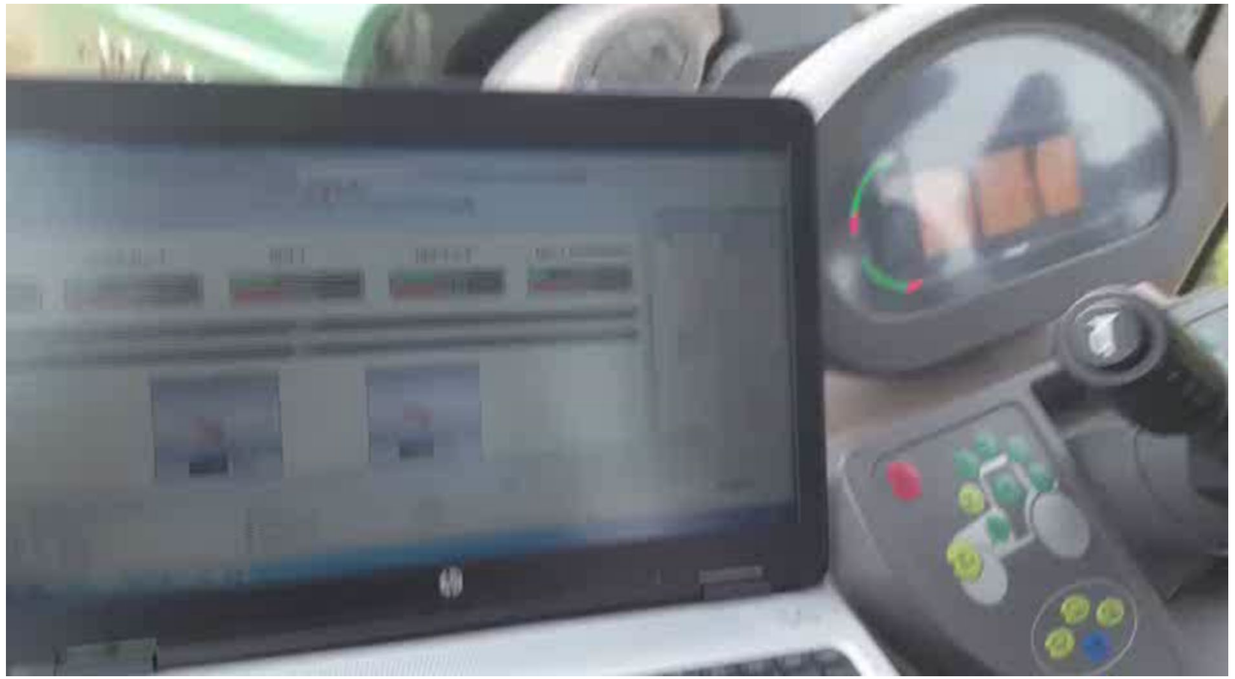


4. **Outlook –** TIM = Tractor Implement Management

ISOBUS-Standard→ next level high speed ISOBUS → logical next step „TIM“ → modular self-propelled harvester

Conditions:

- Trailled harvester have to be fully automatable and monitorable
- ISOBUS-control of all harvest function have to be possible
- Adjustability and measurement of the utilization rate



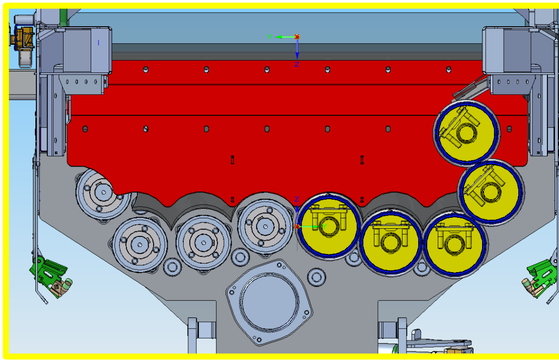
4. **Outlook –** Logistik

Logistik – overload & cleaning station on the headland

4. Outlook ROPA Kartoffeltechnik - Kartoffelmaus

Basis ROPA Cleaning loder Maus 5

- Adapted intake system
  - Closed chain intake combined with transport augers
  - Intake width 8 m
- New cleaning concept in the rear (feeder cleaner)
- Overload height 6 m / -widths 15 m
- Loading capacity **> 100 t/h**



5. Sumery & Conclusiones

- Due to the complexity of potato harvesting, in-house mechanization is still very high, as standardization of the harvesting process is only possible to a limited extent!

- The trend towards trailed two-row harvesting technology continues. Inexpensive entry-level models favor the switch to two-row technology.

- Optimization possibilities for trailed Two-row harvesters in the upper performance range through improved separation/automation as well as higher capacity utilization (e.g. through extended application possibilities) maintain the economic excellence with simultaneously higher flexibility compared to self-propelled technology

- Field edge stations and the creation of windrows can increase the capacity utilization of high-performance harvesters and buffer logistical bottlenecks

- Digitalization is also making further inroads into potato technology, with telemetry, assistance systems and their automation further increasing efficiency!

Grazie!
Thank You!
Danke!

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