



## Repair costs at the KTBL

### Methods, Advantages and Struggles

Darmstadt, 15.02.2019



## Agenda



1. Why do we collect and evaluate data?
2. What approaches regarding repair cost analysis are possible?
3. Advantages and disadvantages of the different approaches
4. What are the challenges we face, collecting and analysing the data?
5. The status quo

## Motivation for repair cost analysis

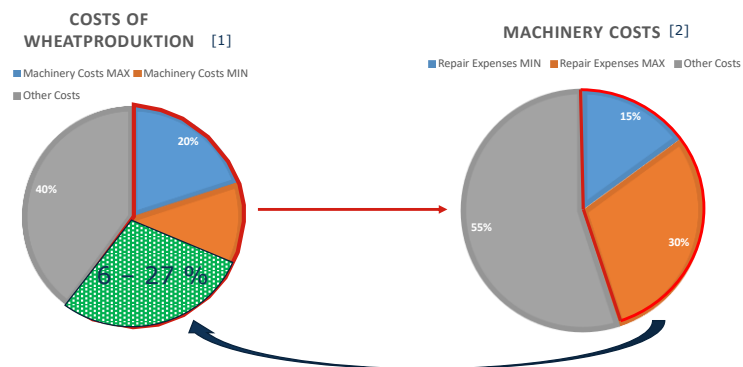


### Our general goal

- providing fundamental data for expense budgeting regarding agricultural implements and agricultural processes

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## Motivation for repair cost analysis: Example



- The expenses for repair and maintenance of agricultural implements necessary for wheat production vary in international comparison between 6 to 27 percent.

[1] Zimmer et.al., 2015  
 [2] Burose F., Sauer N., 2011

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## Approaches



1. Rule of Thumb:
  - i.e.: 2,5 % of the implements cost value correspond to the yearly expenses for repair and maintenance
2. Top Down Method:
  - Collecting existing data and attempting to analyse it
3. Bottom Up Method:
  - Generating a price quantity scale through questioning or testing

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## Rule of Thumb



→ Defining a percentage of the cost value (cv) as yearly repair and maintenance cost

Example: Plow, estimated repair and maintenance cost 2% of the cv  
 $I_0$ : 20.000 € → yearly repair and maintenance cost = 4000€

Advantage:

- Fairly easy to estimate, no need for deeper research

Problem:

- Implements vary strongly regarding their wear-out and or need for maintenance
- Repair and maintenance costs depend on the range of usage
- General estimations will never cover all implements
- Adding the variable cv makes this approach more imprecise

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## Top Down Method



→ Generating data by questioning farmers and agricultural companies

Advantage:

- Data is already existing
- Data covers all repairs that can occur in practice

Problems:

- Is there enough data?
- How many farmers note the repair events on their farm?
- Is it possible to access a sufficient number of farmers?
- We need long term data on repair costs, given the endurance of farm implements

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## Bottom Up Method



→ Breaking down an implement to its spare parts and observing their change intervals either through testing or through questioning

Advantage:

- Possible to generate price quantity scales
- Updating prices of the spare parts will keep the repair costs up to date

Problems:

- Can we generate enough data?
- Some implements are more complicated than others (combine harvester vs. cultivator)
- Generating data through testing can be very expensive, depending on the implement
- Demand for high expertise

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## Challenges



- Collecting data on farms is very difficult:
  - Only few note the repair events and practice exact controlling
  - Collecting data is very time-consuming
- Analysing data
  - Since no standards are existing on how to note data, regarding the file type or the necessary statements, the analysing process can be very laborious
- Insufficient data
  - Most of the data gathered is missing important information or reference values
    - **Utilization**
    - Own labour (often maintenance activities)
- Unknown parameters
  - Weather conditions, operators, quality... have a significant impact on repair and maintenance costs

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## Challenges



- Conclusion:
- Most of the given problems can only be solved by creating an adequate data basis

How are we able to get enough data to reach our general goal?

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## Status Quo



- New KTBL Standard
  - Dividing repair costs in costs for wear-and-tear repairs and maintenance repairs
  - Dividing repair costs in costs for parts and costs for labour
- Cooperation with the College of Nürtingen:
  - Testing wear intensive implements, such as cultivators or movers, as an approach to generate data for price quantity scales
- Bachelors thesis on a standardized procedure for data collection on farms
  - Goal:
    - Making data gathering more efficient
    - Implementing the developed procedure in an application for mobile use
    - “Gathering data when it occurs”

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## Recommendations



- Data gathering (either through testing or through questioning) must be very well planned
  - Determine the utilization (hectares, hours, tonnes, m<sup>3</sup>)
- Providing enough resources for the research (both labour and money) is substantial
- Give it time
  - Repair and maintenance occurs during the whole lifetime of an implement which can reach up to 20 years
- Build long lasting partnerships with the people collecting the data (farmers)
  - Stay in touch
  - Give feedback
  - Provide cost analysis for their implements
- Study the existing literature
  - Publications by the ASABE (USA), KTBL (Germany), Agroscope (Switzerland), ÖKL (Austria)

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**Thank you**

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## Literature

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1. Zimmer Y. et al., 2015: Agri Benchmark Report, [http://www.agribenchmark.org/fileadmin/Dateiablage/B-Cash-Crop/Reports/F\\_Cash\\_Crop\\_Report\\_2015\\_web.pdf](http://www.agribenchmark.org/fileadmin/Dateiablage/B-Cash-Crop/Reports/F_Cash_Crop_Report_2015_web.pdf), 07.12.2018
2. Burose F., Sauer N., 2011: Reparatur- und Wartungskosten - Ergebnisse einer Umfrage, Landtechnik **11**, 259-263

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