

Comparative costs and minimum extent of utilization

Costs of internal mechanization

Costs for service provider

$$\begin{aligned} \text{Fixed costs} + \text{Variable costs} + \text{Wage claim} &= \text{Billing rate} \\ \frac{41.000 \text{ €/y.}}{X \text{ ha/y.}} + 41,10 \text{ €/ha} + 8,40 \text{ €/ha} &= 125 \text{ €/ha} \end{aligned}$$

Additional technological disadvantage:

Due to the longer operating life of the machine compared to the service provider, (= on average older machine) internal mechanization is causing higher losses 0.5% of the yield compared to the service provider.

(Yield = 70 dt/ha, Grain price = 18 €/dt)

$$0,5\% \times 70 \text{ dt/ha} \times 18 \text{ €/dt} = 6,30 \text{ €/ha}$$

Minimum extent of utilization

$$X \text{ ha/y.} = \frac{41.000 \text{ €/y.}}{125 \text{ €/ha} - (41,10 \text{ €/ha} + 8,40 \text{ €/ha} + 6,30 \text{ €/ha})} = 592,5 \text{ ha/y.}$$

$$0,5\% \times 70 \text{ dt/ha} \times 18 \text{ €/dt}$$

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Costs of internal mechanization

Costs for service provider

$$\begin{aligned} &\text{Fixed costs} + \text{Variable costs} + \text{Wage claim} \\ &\frac{41.000 \text{ €/J.}}{X \text{ ha/J.}} + 41,10 \text{ €/ha} + 8,40 \text{ €/ha} \end{aligned}$$

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Billing rate

125 €/ha

**Additional disadvantage
„Timeliness costs“**

Due to untimely harvest, additional drying costs for 20% of the yield are incurred.
(Yield = 70 dt/ha, Drying costs = 1,60 €/dt)

Additional technological disadvantage:
Due to the longer operating life of the machine compared to the service provider, (= on average older machine) internal mechanization is causing higher losses of 0.5% of the yield compared to the service provider.
(Yield = 70 dt/ha, Grain price = 18 €/dt)

$$20\% \times 70 \text{ dt/ha} \times 1,60 \text{ €/dt} = 22,40 \text{ €/ha}$$

$$0,5\% \times 70 \text{ dt/ha} \times 18 \text{ €/dt} = 6,30 \text{ €/ha}$$

Minimum extent of utilization

$$X \text{ ha/y.} = \frac{41.000 \text{ €/y.}}{(125 \text{ €/ha} + 22,40 \text{ €/ha}) - (41,10 \text{ €/ha} + 8,40 \text{ €/ha} + 6,30 \text{ €/ha})} = 447,6 \text{ ha/y.}$$

$$20\% \times 70 \text{ dt/ha} \times 1,60 \text{ €/dt}$$

$$0,5\% \times 70 \text{ dt/ha} \times 18 \text{ €/dt}$$

Internal mechanization at 600 ha/year

Fixed machinery costs per ha	68,33	Euro/ha
+ Variable machinery costs per ha	41,10	Euro/ha
+ Wage claim per	8,40	Euro/ha
= Procedural costs per ha	117,83	Euro/ha

Mechanization through service provider

Billing rate per ha	125,00	Euro/ha
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Minimum extent of utilization

At equal work quality	543,0	ha/year
With timeliness costs through the service provider	418,8	ha/year
With higher losses through internal mechanization	592,5	ha/year
With both (Timeliness costs / losses)	447,6	ha/year