

New concepts for grain logistic - organizational chains from the field to the agricultural trade

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Structure

- Introduction
- Different transport systems
- Example of transport models
- Conclusion

Introduction: The agricultural grain logistics in Europe and especially in Germany is in a process of radical change.

This has specific reasons:

- The introduction of **agricultural Quality Management Systems** with the legislate of EU Regulation to traceability (EU 178/2002), hygiene food (EU 852/2004) and hygiene feed (EU 183/2005) and the implementation of trading standards like GMP, GlobalGap or IFS.
- **Technical and organisational changes** like rising combine harvester capacity, increasing average distance to the agricultural trader and a continuous farm growth accompanied by a reduction of the manpower per area.

Truck or tractor for grain transport ?



Material and methods for practice road tests

	tractor	tractor with semitrailer	truck
Engine power [kW]	140	140	320
Empty load [t]	16.72	17.58	16.50
Vehicle payload [t]	23.38	22.5	23.44
Vehicle length [m]	18.30	16.55	13.60
Vehicle width [m]	2.57	2.57	2.50

Transport units for practice road tests



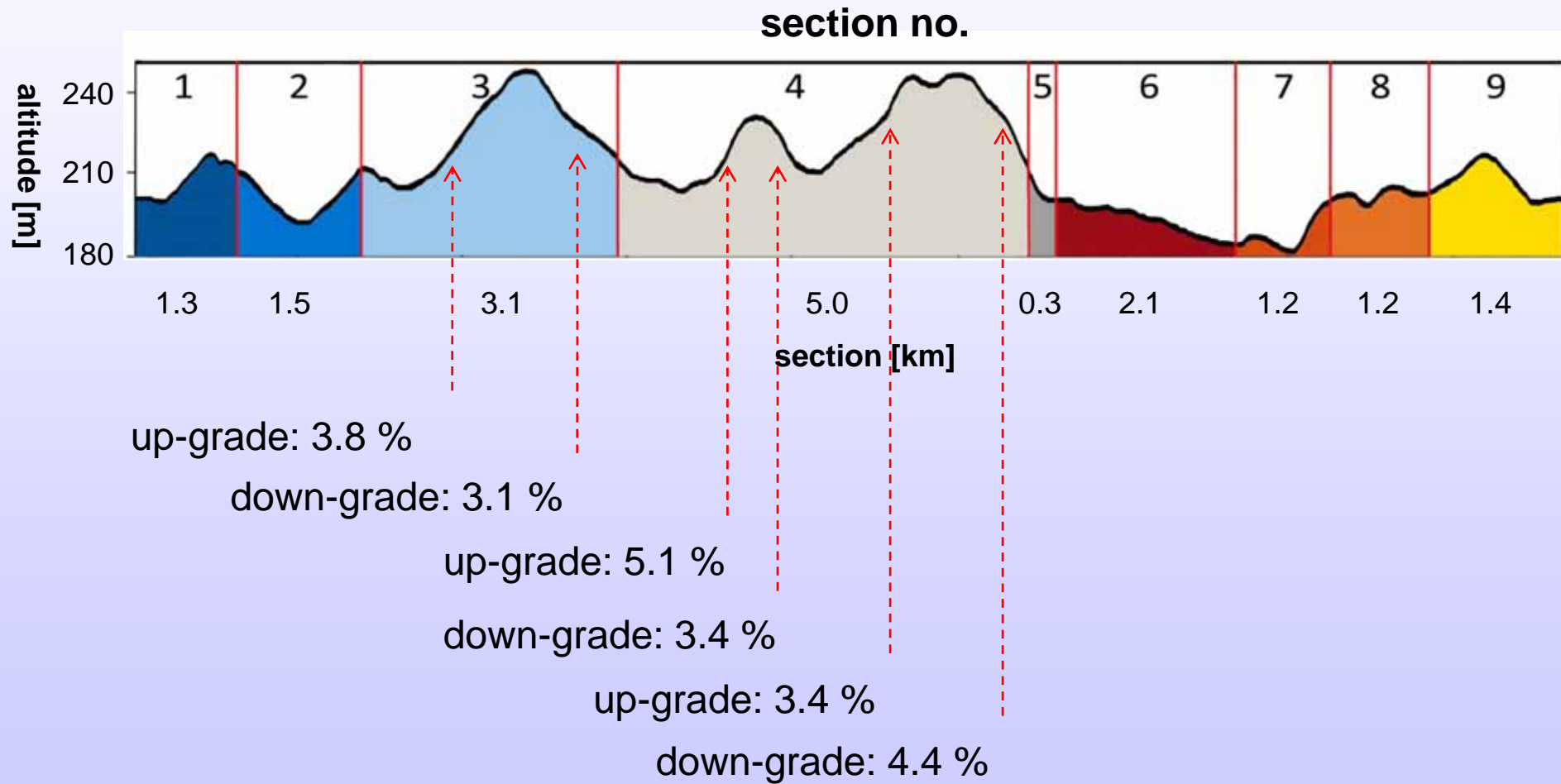
Test track

section no.	characterisation	distance [km]	accumulated distance [km]
1	farm track	1.30	1.30
2	wide cross town link	1.48	2.78
3	local road	3.15	5.92
4	main road	5.02	10.95
5	cross town link	0.33	11.27
6	minor local road	2.08	13.35
7	narrow cross town link	1.17	14.51
8	local road	1.22	15.74
9	farm track	1.39	17.13

Test track



Test track



Average fuel consumption of the examined vehicles

	tractor	tractor with semitrailer	truck
Unload drive [l/100km]	50	47	29
Load drive [l/100km]	73	68	53



Foto: dpa, 2011

Time of circulation of the examined vehicles

	tractor	tractor with semitrailer	truck
Unload drive [min]	21.8	22.1	17.4
Load drive [min]	27.3	26.4	18.1



Foto: dpa, 2011

Average speed of the examined vehicles

	tractor	tractor with semitrailer	truck
Unload drive [km/h]	39.4	38.9	49.6
Load drive [km/h]	31.4	32.6	47.5



Which organisation for grain transport ?



Bilder: Engelhardt, 2008; Claas 2011

semi trailers with a connection trailer



The system with semi trailers with a connection trailer is very practicable for a great farmer or a contractor. Flexibility and costs are clearly superior in comparison to an in-house solution with own transport and storage.

But especially the additional semitrailers which were used as buffers will cause problems if the system is used for larger regions.

Assuming a radius of 40 km around a typical grain trader the size of the arable land of about 13.3 km². The percentage of threshing goods is about 70 % so that the annual harvesting area is 9.3 km². Assuming that only contractors of the same size, with 700 ha threshing area and the same logistic system are working in this region trucks and semitrailers for about 133 farms must be provided. If each farm needs two trucks and 6 semitrailers 266 trucks and 798 semitrailers were necessary for this region.



interim storage



A solution for the great demand of semitrailers could be the intermediate storage.

Simplified this system can be described in the following way: The grain is transported by a agricultural transport vehicles to an intermediate storage, there it is weight and sampled and after a short time it is loaded again on trucks and transported to the agricultural trade. Hereby the transport can be uncoupled.

Assuming an average speed of 28.2 km/h for a tractor with two trailers the following maximum transport distances can be managed.

	Harvest capacity [t/h]	Max distance [km]
One tractor with trailer	30	2.49
	50	0.84
One tractor with swap chassis	30	12.78
	50	6.16
Two tractors with trailers	30	13.72
	50	7.10
Two tractors with swap chassis	30	25.18
	50	13.61

- **By the analysis of the two transport alternatives tractor and truck it can be shown that the truck has advantages for certain distances. A problem can be the transport on country lanes.**
- **In future it will not be possible anymore to plan the transport organization only for a single farm but bigger transport networks will become necessary.**
- **The development of a transport organization makes the extension of the transport data management necessary.**



Thank you for your attention.

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