

# SOILAssist – Sustainable protection and improvement of soil functions with intelligent land management strategies – a practical on-board assistance system for farmers –

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## Project SOILAssist

### Motivation

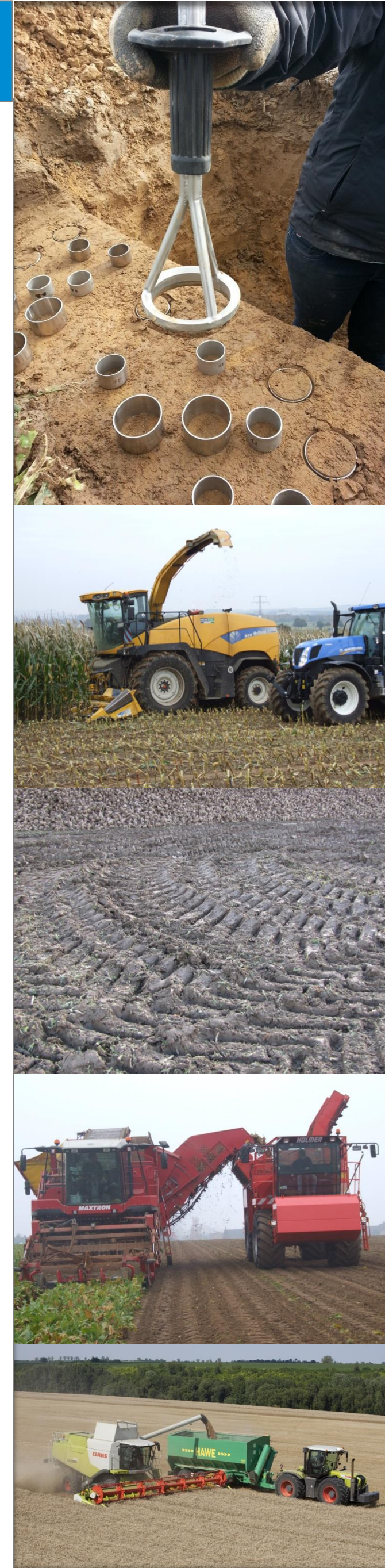
- Increasing sizes and masses of agricultural machinery may cause negative changes in soil structure and functionality and on soil fertility

### Methods

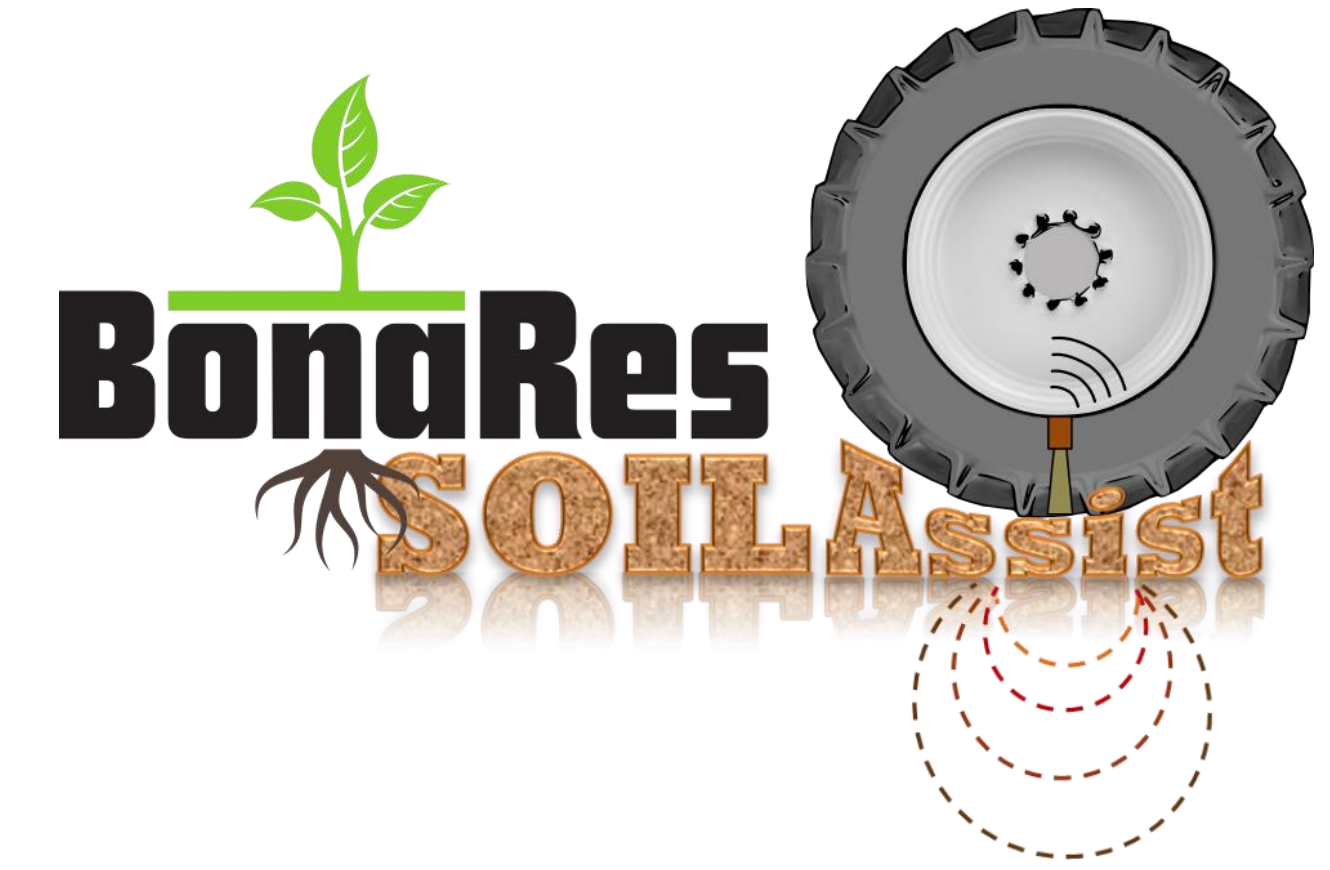
- Investigations of wheeling effects considering the characteristics of the machinery for typical crop rotations
- Continuous RTK-GPS surveys of agricultural traffic (field scale)
- Multi-Sensor-System measurements (e.g. deflection, rut depth, total mass, inflation pressure, contact area)
- Soil analysis, field and lab measurements (e.g. penetration resistance, hydraulic conductivity, pore size distribution)
- 2-3D soil modeling (integration of soil-information-model, field traffic model, soil pressure, deformation and functionality model)

### Objectives

- Prevention of negative changes in soil structure and functionality by agricultural field traffic
- Minimization of soil erosion and compaction
- Strengthening and protection of soil structure
- Optimizing field traffic, machinery specification and tillage practices



## Main Topics



On-board assistance system for soil protection

Decision matrix trafficability to support decision making of farmers for a foresighted planning

Recommendations for farmers, extensionists and political consultancy

Socio-economic assessment of different management options

## On-board Assistance System for Soil Protection

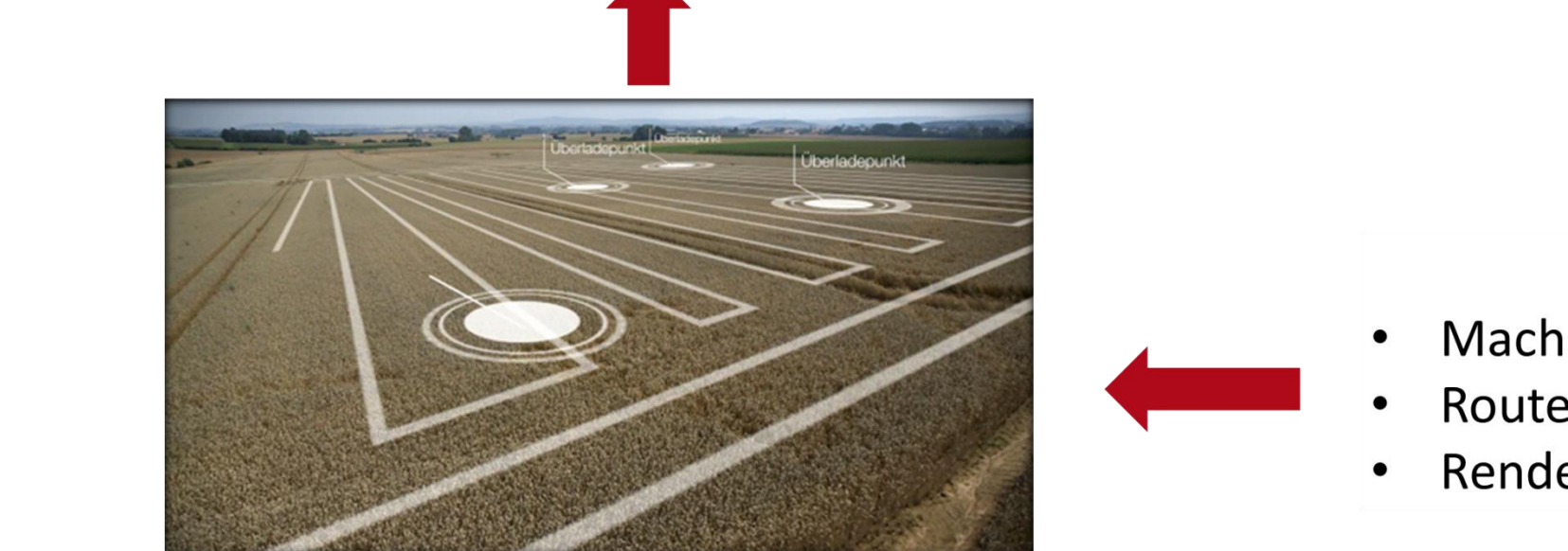
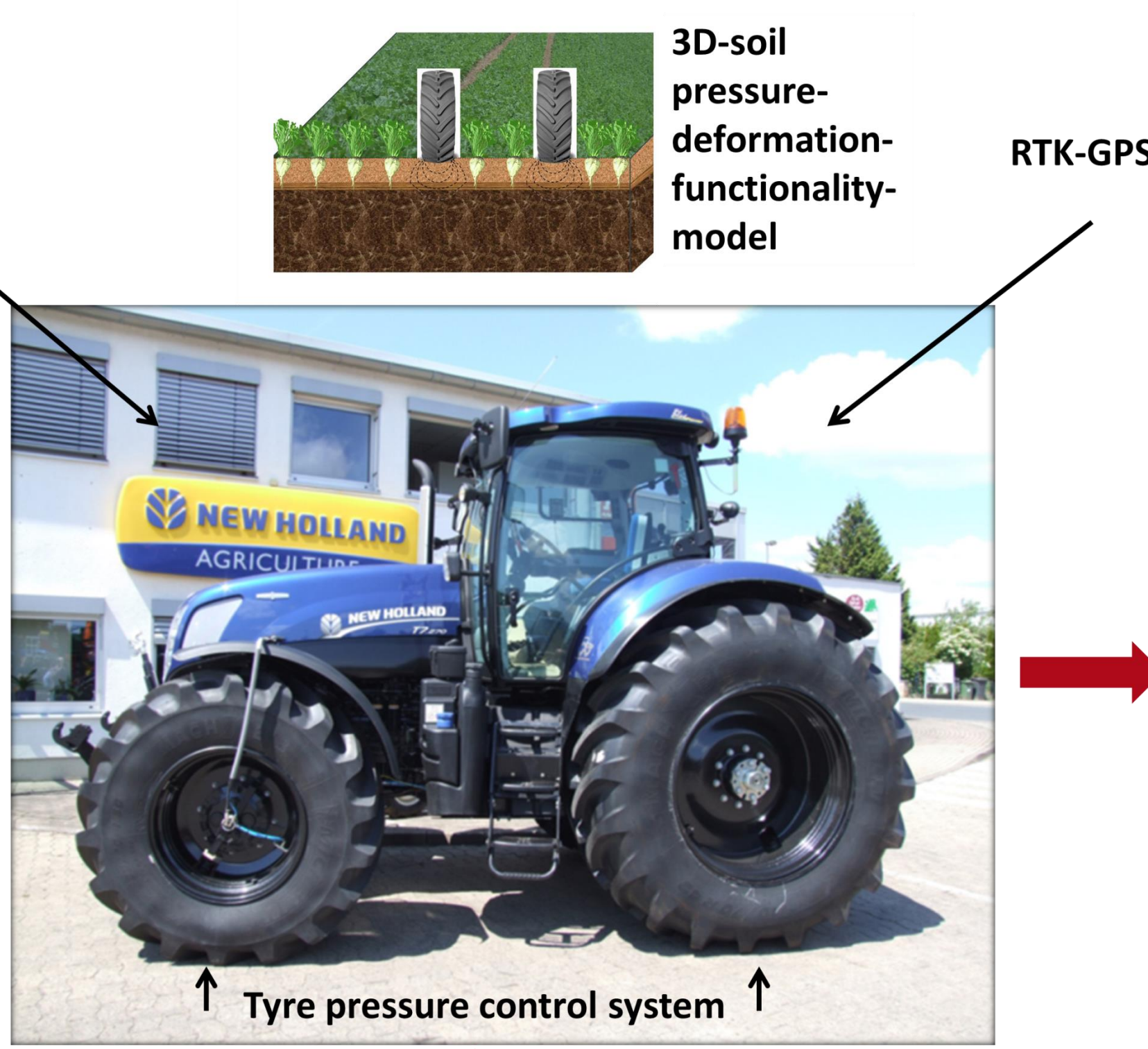
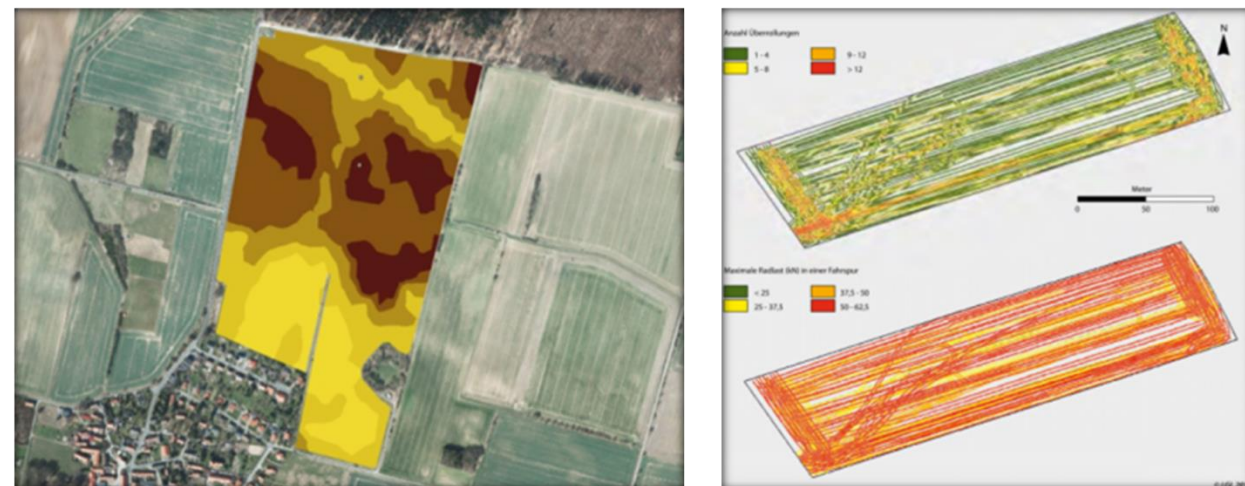
### Multi-Sensor-System on the machine



### Machine data/specifications

Bezeichnung	Hersteller	Modell	Motor	Task	Beschreibung					
Schlepper	Fendt	528 Vario	Deutz TCD 6.1 L6	286	280	6000	50	6000/70/30	710/70/42	
PS	Fastrac	430	Agro Power	300	317	6000	390	6000/70/30	710/70/30	
Valtra	1754	Agro Star	Power 5	321	350	6600	380	70	6000/60/28	710/70/38
Kubota	M2150	Kubota	1000R-CRS	320	330	6300	330	35	5400/60/28	620/60/38
John Deere	7200R	OPS PVA	watergate	205	278	5000	344	600	70/30	710/70/42
John Deere	5235R	PowerTech	P75.6	248	330	6800	400	30	6000/70/30	710/70/42
Deutz Fahr	7200 TTV	Deutz TCD 6.1 L6	124	236	6007	435	50	6000/70/30	710/70/38	
Case IH	Farmall 120 U Pro	PC	watergate	36	134	3400	130	0	4800/60/28	600/60/38
New Holland	18.30	Case IH	Secher	229	311	6700	375	80	750/70/30	800/60/42
Case IH	Adion 600 Cab	watergate	5	129	175	6788	330	0	5400/60/28	600/60/38
Deutz Fahr	6860 TTV	Deutz TCD 6.1 L6	113	244	6508	330	28	5400/60/28	620/60/38	
Massey Ferguson	MF 7635 Dyna 4	AgroPower	60 A8M	130	130	6600	305	30	5400/60/28	620/60/38
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Deutz Fahr	6860 F	Deutz TCD 6.1 L6	113	244	6507	330	30	5400/60/28	600/60/38	
McCormick	305.30	Praxis	SD4E 4307	63	86	3400	380	70/30	24	480/70/34
Fendt	535 Vario	Deutz TCD 6.1 L6	113	244	6507	330	31	5400/60/28	620/60/38	
John Deere	6200R	PowerTech	P75.6	324	320	6900	400	0	6000/70/30	710/70/42

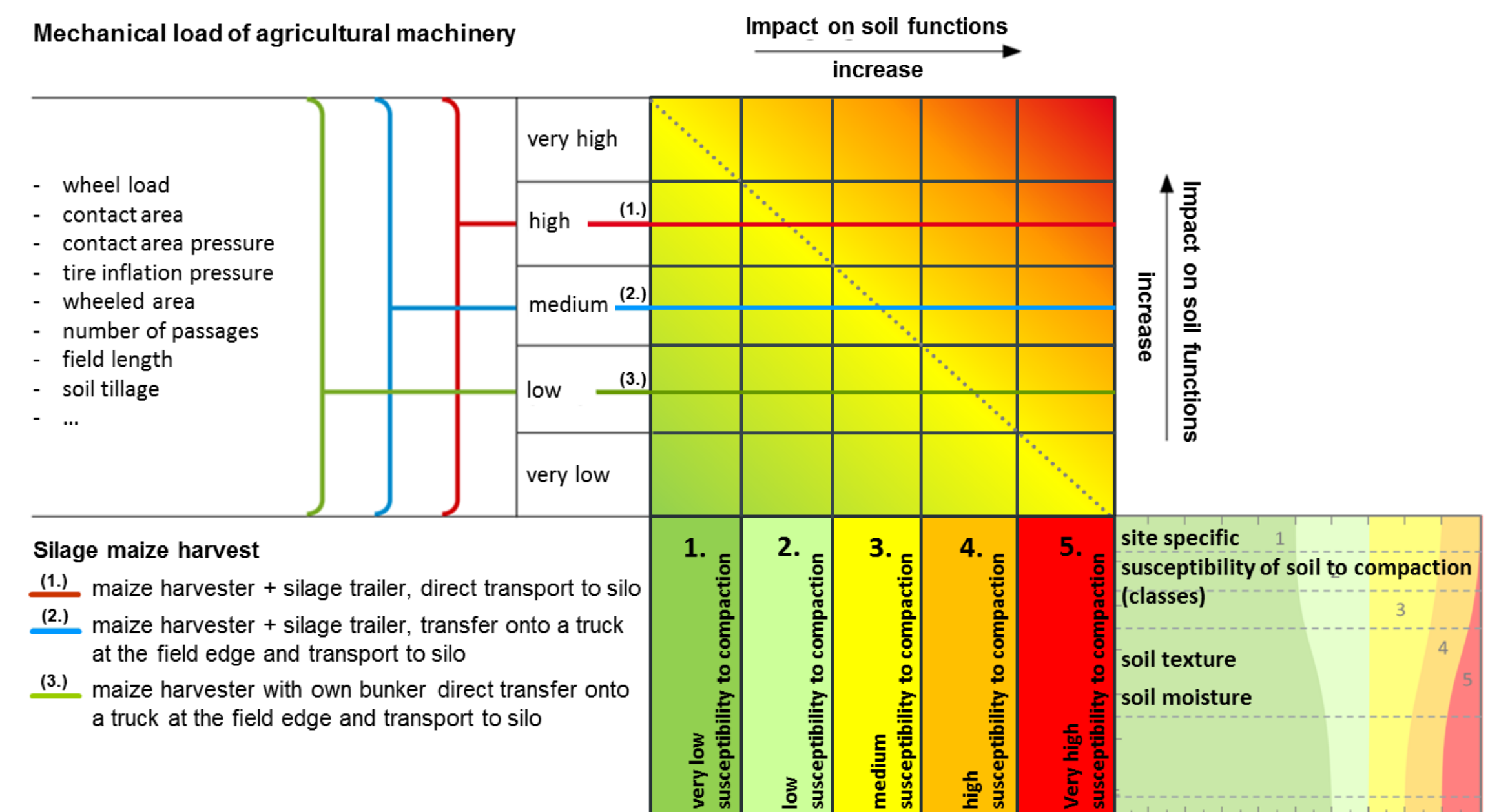
### Spatial information



**Optimization of:**

- Machine parameters/specifications
- Routes in the field
- Rendezvous points of machinery

## Decision Matrix Trafficability



## Socio-economic Assessment and Recommendations

- Temporal and spatial differentiated risk analysis in terms of soil compaction
- Identification of locally adapted mitigation strategies and soil protection measures
- Evaluation of mitigation strategies and soil protection measures on farm scale concerning costs and benefits
- Acceptance of on-farm soil protection measures
- Stakeholder knowledge improves knowledge transfer and the transfer of research to soil management
- Stakeholder-oriented communication and advice strategies
- Promoting new governance principles to guide decisions on field traffic

## Stakeholder Integration

