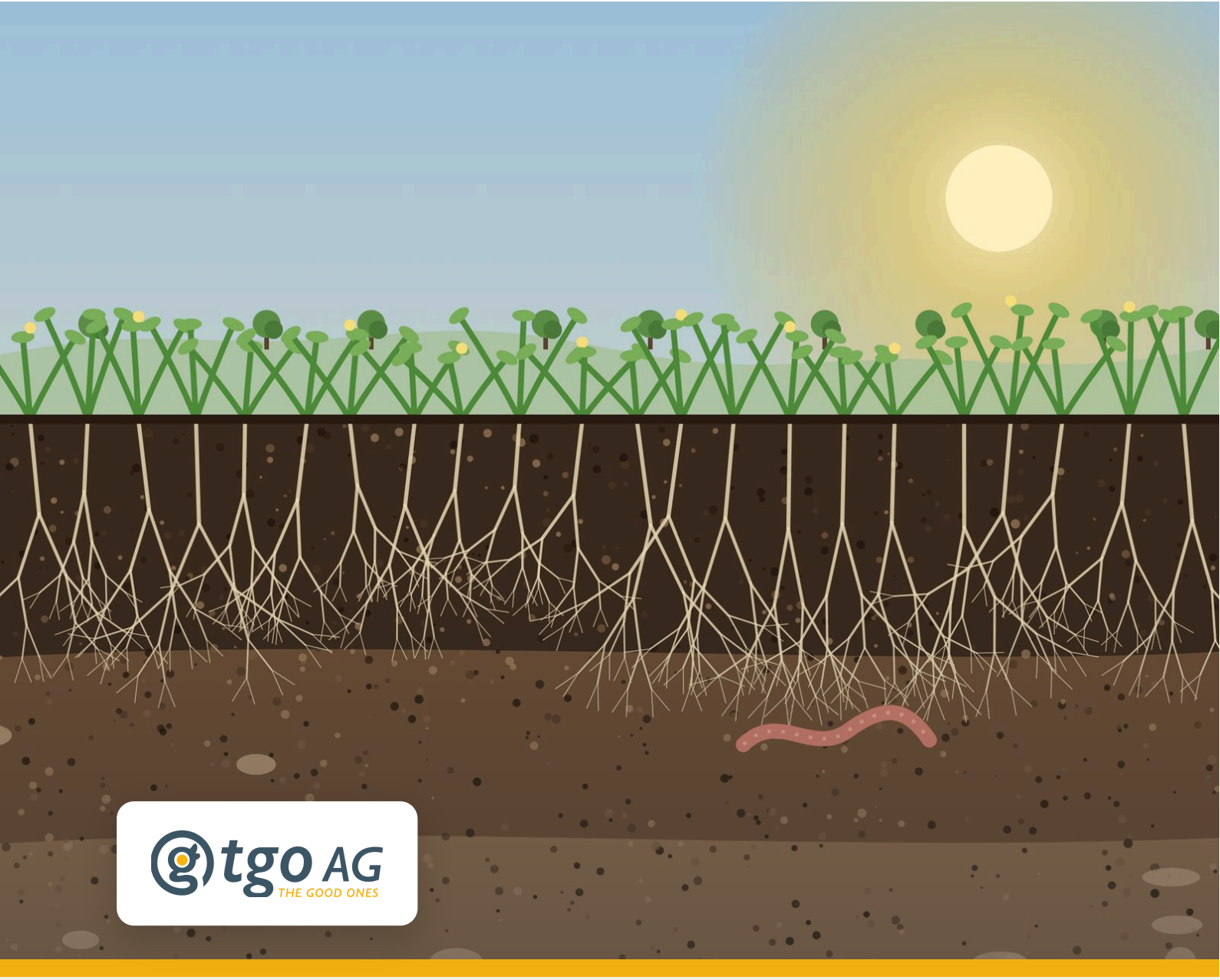


GUIDE · SOIL HUMUS & CARBON FARMING

Building soil humus – measured honestly, paid fairly

What really works on your site, how humus is measured and where the money for the transition can come from.

1 Measures with realistic values

2 Honest numbers for soil carbon certificates

3 Farm check with traffic light

SOIL HUMUS & CARBON FARMING

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How to use this guide: The table of measures shows realistic values – deliberately conservative. The self-check at the end shows whether your farm is a candidate for a supply chain programme.

Building soil humus – measured honestly, paid fairly



Who it is for: Farmers who want to improve their soil and know what really pays off – and companies whose raw materials come from the field and who want to support their suppliers in doing so.

What you can do after reading it:

- assess which measures build humus on your site and what impact you can realistically expect,
- understand how humus is measured and why a single sample is not enough,
- judge honestly what soil carbon certificates deliver – and where the money for the transition can really come from,
- understand the EU framework for carbon farming (CRCF).

> **Our stance:** We calculate with conservative values. Better to promise one tonne less and prove it reliably than the other way round.

What humus does – and what it does not

Humus is above all a working asset for the farm: it holds nutrients, stabilises soil structure and protects against erosion. As a climate store it is valuable, but limited and reversible.

61 t
of carbon per hectare is stored on average in the top 30 cm of German arable soils (grassland: 88 t)

−0.19 t
of carbon per hectare and year is lost on average by arable soils on long-term monitoring sites

2–5 mm
of additional plant-available water results from one percentage point more organic carbon in 30 cm

- **Stock:** German arable soils store on average 61 t of carbon per hectare in the top 30 cm, grassland 88 t (Thünen Institute, Agricultural Soil Inventory).

- **Trend:** On long-term monitoring sites, arable soils lose on average about 0.19 t of carbon per hectare and year. Simply maintaining humus is therefore already a success.
- **Water:** One percentage point more organic carbon realistically stores about 2–5 mm of additional plant-available water in the top 30 cm (Minasny & McBratney 2018). The frequently quoted 19 mm is an overestimate – the bigger effect comes from better infiltration and less surface sealing.
- **Limits:** Humus does not grow endlessly, but towards a new equilibrium. And it can be lost again through ploughing up or changed management.

Measures and their realistic impact

Not every measure that is good for the soil is also a climate benefit. We use conservative values from the scientific literature – better to promise too little.

Measure	Realistic climate impact	Storage	Note
Cover crops and undersowing	0.1–0.3 t CO_2 per ha and year; 1.2 t is the upper limit from older studies	humus, temporary	Newer analyses with deeper sampling find considerably less (Poeplau & Don 2015; Chaplot & Smith 2023)
Agroforestry on arable land	soil approx. 0.8–1.0 t CO_2 per ha and year, plus wood growth	humus and wood, temporary	Large variation between sites (Cardinael et al. 2018); German eco-scheme €600 per ha of woody area
New hedges	around 25 t CO_2 per ha of hedge area and year over 20 years, about 80 % of it in wood	wood and soil, temporary	Thünen measurements at 23 sites (CarboHedge)
Grass-clover and legumes	measurable only with at least 3 years of grass in a 5–6 year rotation	humus, temporary	Also saves mineral fertiliser – that is a reduction (Rothamsted)
Keeping grassland	ploughing up costs 31–36 % of soil carbon	humus	Preservation is the most effective and cheapest measure
Reduced tillage	about zero across the whole profile	–	Carbon is only shifted upwards (Powlson et al. 2014); good for diesel and erosion, but not a sink
Compost and manure	humus rises, but the carbon comes from elsewhere	–	No net removal as long as it is only relocated (Thünen)
Biochar	permanently bound, centuries and longer	biochar, permanent	Own EU methodology since 7 May 2026; durability measurable via reflectance (Sanei et al. 2024)

> **What this means:** The biggest climate effects come from hedges, agroforestry and biochar. Cover crops and grass-clover pay off mainly for soil, water and fertiliser savings – as a certificate alone they rarely carry themselves.

Measure rather than estimate

Only a measurement shows whether humus really increases – and it takes patience. Even with considerably more carbon input, a change can usually only be reliably proven after 6–10 years (Smith 2004).

How to measure properly:

1. **Baseline before the first measure:** composite samples per field or per uniform zone, with GPS points so that re-measurement takes place at the same spot later.
2. **Deep enough:** about one fifth of the management effect lies between 30 and 50 cm – we recommend at least 50 cm (Thünen, Skadell et al. 2023).
3. **Measure bulk density too:** without it, no stock in tonnes per hectare can be calculated. Comparisons are made on an equivalent soil mass, otherwise apparent gains appear (Powlson et al. 2014).
4. **Many fields instead of one:** individual fields deliver uncertain values. Results become robust at project level with many fields, dense sampling and control plots (Bradford et al. 2023).
5. **Re-measure and buffer:** re-measurement after several years; a safety deduction for measurement uncertainty and reversal risk is applied to the result.

What a sample costs: A standard analysis plus organic carbon costs about €30–45 net per sample in the laboratory. Field sampling, deep sampling and bulk density come on top – realistically around €100 per hectare for a baseline measurement to certification standard.

Temporary or permanent: Humus counts as a temporary removal – it only stays as long as the management is right. Biochar is a permanent removal. Both have value, but not the same price.

Honest numbers: when carbon farming pays off

With normal humus build-up, a soil carbon certificate sold on its own often does not even cover the soil sample. The money for the transition therefore usually comes from other sources – above all from buyers in the supply chain.

Example calculation per hectare and year (conservative):

Item	Value
Humus build-up through cover crops	0.3 t CO_2

Item	Value
minus 20 % safety buffer	0.24 t CO_2
Revenue at €30 per tonne	**around €7**
Baseline and re-measurement (around €100 per measurement, re-measurement after 5 years), spread over 5 years	**around −€40**
Result	**around −€33 per hectare and year**

How it still pays off:

- **The buyer pays for the measurement.** In the supply chain programme, the company that buys your harvest covers sampling and support – it needs your primary data for its own climate footprint. Your data still remains yours.
- **Measure together.** Similar areas are sampled as one zone, many farms together as one project – this lowers the cost per hectare and makes the result more robust.
- **Use funding.** In Germany, agroforestry is supported with €600 per hectare of woody area via the eco-scheme; for peatland rewetting there is the federal Palu programme with a 20 % bonus for applications up to 16 Apr 2027.
- **See the soil as a working asset.** Better structure, water uptake and erosion protection pay off in dry and wet years – even without a certificate.
- **Combine with permanent removals.** Biochar from your own wood or hedge trimmings achieves about €130–155 per tonne of CO_2 on the market – many times the value of humus.

> **Our principle:** The farm does not pay for the humus proof. Whoever uses climate data from the supply chain also bears the cost of verifying it.

The EU framework: carbon farming under the CRCF

On 9 Jul 2026 the EU adopted the first carbon farming methodologies; they are expected to enter into force at the end of 2026. The first certified units can be expected at the end of 2027 at the earliest.

- **What is covered:** agriculture and agroforestry on mineral soils, rewetting of peatlands and organic soils, afforestation.
- **Status:** The European Parliament rejected an objection on 20 Oct 2026. Certification schemes can only apply for recognition after that; none has been recognised yet.
- **Temporary, not permanent:** Carbon farming units only apply for the monitoring period. Humus can be broken down again – which is why it is something different from a permanent removal through biochar, which has had its own CRCF methodologies since 7 May 2026.

- **Registry:** An EU registry is to be in place by the end of 2028 at the latest; until then the certification schemes keep their own registries.
- **Corporate accounting:** From 1 Jan 2027 the new GHG Protocol Land Sector and Removals Standard applies. Companies may only count humus build-up in their supply chain if it is traceable to the field and monitored.

What this means for your farm: If you take a clean baseline measurement now and document your management, you will be ready as soon as the first schemes are recognised. If you only start in 2028, you lose years.

Self-check for your farm

Count how many questions you can answer with “yes”.

- [ ] I know the humus or organic carbon content of my most important fields from an analysis within the last five years.
- [ ] I know the depth that was sampled and whether bulk density was measured too.
- [ ] On at least half of my arable land there is a cover crop or undersown crop over winter.
- [ ] My crop rotation has at least four crops or includes grass-clover or legumes.
- [ ] I have hedges, tree strips or agroforestry on the farm, or am planning them.
- [ ] I apply organic fertilisers in a targeted way and know their nutrient contents.
- [ ] I document management, fertilisation and diesel so that I can still present them in three years.
- [ ] I know which of my buyers are interested in climate data from the supply chain.
- [ ] I know the funding programmes that match my planned measures.
- [ ] I know that humus can be broken down again and have a plan to keep it in the long term.



8–10
“Yes” answers

Green – Your farm is a good candidate for a supply chain programme.



4–7
“Yes” answers

Amber – With a clean baseline measurement and two or three measures you will make quick progress.



0–3
“Yes” answers

Red – Start with the free farm check – then you will know where you stand.

Your next step

Start with the free farm check: you see where your farm stands, which measures fit and whether a buyer can pay for the measurement.

Offer	Content	Price
Farm check on AGRICOIN	Record your farm, suggest measures, plan the baseline	free of charge
Farm onboarding	We set up your farm, you only send in your documents	free during the start-up phase
Humus and soil workshop	4 hours, from cover crops to biochar	€395 plus VAT
Supply chain programme (for companies)	Involve, measure and report on supplier farms	depending on scope

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Scan for more

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As of November 2026. All information without guarantee. The effects stated are averages from studies and may differ considerably on your site.