

## Field trials of enhanced weathering combined with corn farming in Germany

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Natural chemical rock weathering globally removes ca. 1 Gt of CO<sub>2</sub> from the atmosphere every year. As a low-tech, long-term carbon storage method, we propose enhanced weathering (EW) by applying rock flour to agricultural fields. Not only would this not compete with growing crops; in combination with biochar, it could even be beneficial to crop yield and soil quality.

The potential for carbon removal is expected to vary with climate, soil, crop and rock type. Therefore, field trials are urgently needed to quantify the carbon sequestration efficiency. Under the umbrella of Project Carbdown, multiple field trials, next to pot and lab experiments, are carried out across Europe. We test locally relevant EW treatments in experimentally aligned and complementary projects (see poster by Smet et al. [1]).

In a project based in north-west Germany we combine EW with growing corn, a widely cultivated crop in that area. One control and four treatments with (ultra) mafic rock flour (4kg/m<sup>2</sup>) are applied to 3x12m plots, with and without the admixture of biochar (0.3kg/m<sup>2</sup>), each in four replicates. The plots are covered by a mixture of wild flowers. On a larger plot of 12x90m, treated with basalt and biochar, corn is grown for comparison with a large neighboring field where corn is grown as usual without any experimental amendments. The test field is managed according to local farming practices. For comparison, we also run a smaller field experiment with corn, basalt and biochar in the south-east of Germany.

To quantify CO<sub>2</sub> removal we regularly analyze soil water for pH, alkalinity, DIC and conductivity. As a further constraint on the weathering intensity, we will measure selected isotopes (Si, Mg, Fe and Li). At the beginning and end of the experiment we will determine CEC, DOC, N, P, K, Ca and Cr. In order to examine EW effects on the crop, plant tissue collected at the blooming stage is examined for Ni, Cr and major elements. Soil temperature, moisture and CO<sub>2</sub> are monitored throughout the field trial.

[1] Smet et al., Field trials of enhanced weathering combined with cotton farming in Thessaly, Greece.