

## USING RESIDUES FOR EFFECTIVE FERTILISATION



Fragile soils suffer from deforestation and overuse. Replenishment with nutrients needs concepts for lasting impact.



Biochar from agricultural residues can hold nutrients through rainy seasons and improve the soil structure substantially.



High-quality organic fertilizer results from (vermi-)compost, biogas digestates and biochar co-composting.



Smallholder testing shall result in convincing fertilizer application receipts.

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Project partners develop receipts for organic fertiliser production and application to degraded soils in Oromia



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## BIO-POWER FOR HEALTHY SOILS

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## AGRICULTURAL TRANSFORMATION

The ETH Soil project aims at building on the available knowledge base regarding degraded soils in Oromia and contributing to soil amelioration. Effective biofertilizer production and application shall be supported by evidence-based recipes. Jointly with smallholder farmers and renowned experts, we want to test convincing solutions that make use of underutilized biomasses and biogenic residues like coffee husks, saw dust, invasive plants or food waste. Joint engineering, chemical and agricultural competencies of project partners will enable biogas and heat generation in modern plants and will provide digestate and biochar that shall be used for biofertilizer production. Thus, higher economic value and new income-earning opportunities will evolve alongside soil rehabilitation at scale.

### One world, no hunger

For decades, the German government has been supporting Ethiopian efforts to build technological capabilities, infrastructures and economic opportunities. With ETH Soil, DBFZ, the German institute for biomass research, now contributes its expertise to identify and pre-process suitable organic residues. These are employed for optimised biofertilizer production in combination with low emission energy generation. Capacity building will strengthen TVETs, university-based education as well as quality management and support the agricultural transformation. Ultimately, smallholder farms will benefit through increased food security and climate resilience of their operations.

### Community service

In Oromia, government-driven research efforts have generated a profound knowledge base on soils, crops, fertilizer and agricultural mechanisation. For degraded soils in particular, closing nutrient cycles is a crucial aspect to achieve soil amelioration. Implementation of closed nutrient cycles holds ample opportunities for ambitious entrepreneurs (male and female) to prosper while working towards livelihood improvements in rural communities. By 2026, joint forces of the ETH Soil partners will have led to feasibility studies and business models as well as demonstration plants that allow for the replication, roll-out and scale-up of the agricultural transformation strategy.

## ESSENTIAL PROJECT COMPONENTS



### Biogas plants

Anaerobic fermentation of organic matter not only generates biogas but also digestates. Purposeful feedstock selection leads to nutrient-rich digestates which could be used as organic fertilizer.



### Biochar

Pyrolysis devices produce biochar, a carbon-rich solid material, and heat. Quality assurance should precede widespread biochar application for nutrient fixation and the reduction of soil acidity.



### Composting

Co-composting of biochar with nutrient-rich biomass allows the fine-grained biochar to load and hold the nutrients. Local biofertilizer production could save foreign exchange (fewer imports).



### Pyrolysis cookstoves

Energy-efficient cooking with pyrolysis cook stoves can minimize harmful emissions. Furthermore, adoption of the new cooking practices could enable smallholder households to produce more effective biofertilizer by themselves.

