

# TRABBIO – Transforming Brazilian organic residue masses into recyclable materials and energy sources

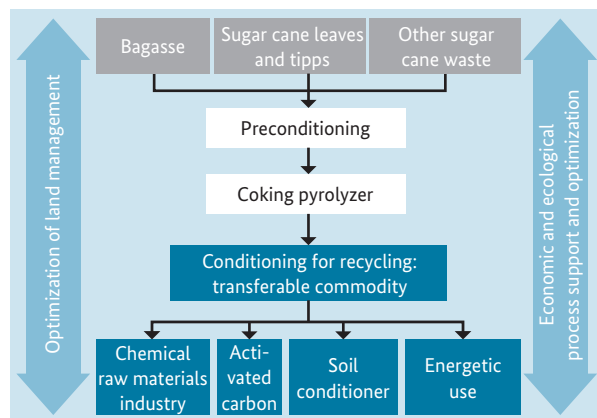
## Client II – International partnerships for sustainable innovation

At present, the potential for reuse of organic residue masses from agricultural and processing industries, as well as bioenergy production, often goes unused. However, this potential offers opportunities for sustainable economic and energy use. In Brazil, in particular, large amounts of organic residue masses are produced from sugar cane processing. The German-Brazilian project “TRABBIO” aims to intensify the potential for developing and implementing efficient and innovative technologies for environmentally friendly, material, and energetic use of organic residue masses.

### Organic residue masses are turned into energy

The organic residue masses created in agriculture, processing, and bioenergy production have been treated mostly as pure waste materials up to now, although there is great potential for the energetic and commercial use of these materials. This potential needs to be further explored and exploited, in particular, given the challenges of climate change.

The German-Brazilian project “TRABBIO” aims to develop methods and measures to establish organic residue masses from sugar cane cultivation and utilization as a sustainable and transferable biocoke product for different applications. The potential applications of this biocoke product are both in its material use in the raw materials industry and CO<sub>2</sub>-neutral substitution of energy sources. “TRABBIO” also investigates the use of biocoke as an input material in the chemical raw materials industry for the production of polymers currently obtained by gasification of fossil petroleum coke. In addition, the project investigates the biocoke recovery pathways as activated carbon or soil conditioners.



Planned innovative solution.

The “TRABBIO” project also aims to obtain biogenic energy sources as convertible goods and condition them for further applications. In general, such a procedure has already been tested and established for input materials, for example. The innovative character of “TRABBIO”, however, lies in the holistic research and development of the accruing organic residues masses from sugar cane harvests and the subsequent refinement and stabilization as a convertible product and for which there are no stable holistic procedures for this to date. Developing the individual steps in the process chain is risky and requires further research.

### Developing holistic procedures

With current harvesting techniques, soil particles such as sand or ferrous soils enter the processes along the entire harvesting, processing, and recycling chain. This causes a significant reduction in the quality of the organic residue raw material and increased wear of all machines. Therefore, another of “TRABBIO”’s main research areas is the overall harvesting technique, as well as the collection and resource-efficient use of sugar cane leaves and tips remaining in the fields. Whereas these organic residues masses prevent soil desiccation and ensure natural fertilization of the soil, their presence on the ground prevents the sugar cane plants from budding and growing again, causing crop damage. The project aims to develop innovative and complete or partial harvest concepts that are adapted to the respective region and which prevent soil desiccation on the one hand without leading to crop failures on the other. The aim is to prevent the contamination of the residual masses and to develop a concept for preconditioning. Various parameters are examined and adjusted to ensure maximum output for subsequent coking of the residual masses.

Detailed knowledge of material flows along the value chain is indispensable for the development of integrated

sustainable technologies. This also includes integrated land management, including yield management for both the sugar/ethanol products and the organic residue mass. Furthermore, harvesting and processing techniques, as well as logistics and cooperation models adapted to the emerging biocoke material flow, must be considered and developed into a holistic approach. This helps to optimize resource efficiency on the one hand and to protect the ecosystem by mitigating negative effects on the other.



Organic residue masses from sugar cane cultivation.

### Sustainability meets economics

The project's process development aims to include a scale-up with industrial trials to ensure the adaptability of the concepts to industrial use. Envisaged goals include a significant reduction of climate-damaging gas emissions, the first-time utilization of previously unused biogenic material flows, and the optimized use of organic residue masses. This will occur by means of temporal and spatial decoupling of accrual, and use by producing a convertible and storable, stable material with high substance and energy density. "TRABBIO" not only makes an important contribution to exploiting the great potential of organic residue masses, but also offers approaches for developing new, sustainable value chains in the agriculture and raw materials industry. This combination of economy and ecology is gaining in importance against the background of climate change and its impact.

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Client II – International partnerships for sustainable innovations

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