Sustainable agriculture for the future

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Biochar to enhance soil fertility

The application of biochar to enhance soil fertility

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Small-scale farmers are often faced with significant challenges in terms of crop production. Researchers explore different systems that can increase soil fertility, which can in turn increase crop yields and help to address food security. To do this, various approaches are investigated and tested, for example infield rainwater harvesting, conservation agriculture, crop diversification or composting. One new biotechnology that could potentially facilitate in enhancing soil fertility, is biochar.

Biochar is a carbon-rich, porous material produced through the controlled decomposition of organic biomass in low-oxygen environments, like pyrolysis. In agriculture, its significance lies in enhancing soil quality and promoting sustainable production. Studies indicate that biochar improves water retention, nutrient absorption, and microbial activity, while at the same time mitigating environmental impacts.

To test the effectiveness and logistics around biochar production and application for small-holder farmers, the ARC-NRE conducted several on-farm trials in Limpopo and KwaZulu Natal Provinces. These trials aim to demonstrate production and application of biochar, test the effect thereof in a field trial, as well as having a demonstration workshop to display the process and disseminate information to farmers. Funding was obtained from the Department Agriculture, Land Reform, and Rural Development.

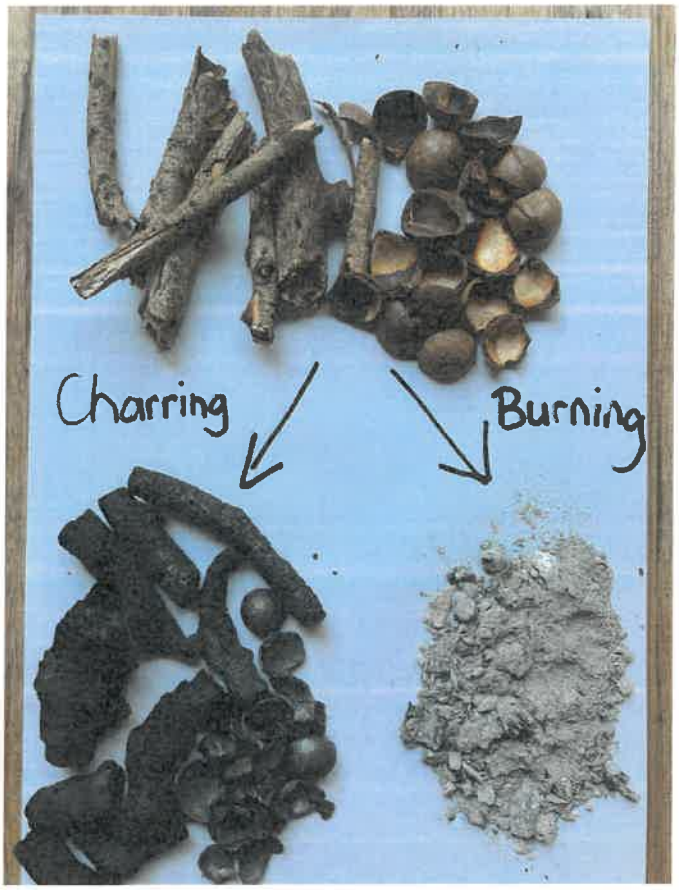
The demonstration trial in Limpopo Province was conducted in the Dzondo region of the Vhembe district. Three types of crops were planted: green beans, okra, and chillies. Treatments included biochar and no char application. Results were positive and yield increases of 49% for beans, 55% for chilli and 10% for okra were measured.

A demonstration workshop was held at the site with remarkable success. A total of 37 participants

Okra without biochar treatment

Okra with biochar treatment

Applying biochar to the treatment



The difference between charring and burning biomass

attended, and in general the participants were interested and actively participated in the discussions. The kiln that was used to produce biochar was donated to the community, so that they can continue to produce their own biochar. In conclusion, biochar does have clear advantages for small-scale farmers and increased crop production, but more research is needed to address some of the drawbacks and logistics.

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Raw material prior to biochar production