REFOREST

ABSTRACT 8

Turning woody biomass into long-term soil capital in agroforestry

Problem:

Agroforestry systems continuously produce woody biomass through pruning, thinning, coppicing, and other tree management practices. Farmers often recognise the potential of biochar but face practical barriers, including uncertainty about suitable technologies, regulatory requirements and the economic viability of on-farm production.

Solution:

Biochar can be integrated into a circular agroforestry system in which woody biomass generated by trees is returned to the land as a stable soil amendment. We demonstrated how woody waste biomass can become a valuable farm resource that supports soil health, carbon storage and the long-term productivity of agroforestry systems. Biochar also creates opportunities for new business models by linking sustainable biomass management with emerging carbon and environmental markets.

Benefits and Practical Recommendations:

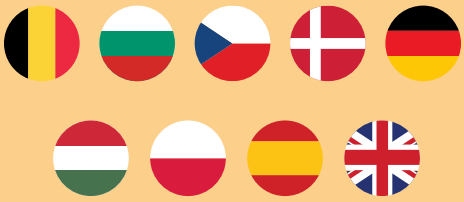
Use locally available biomass. Agroforestry prunings, coppice material, shelterbelt management residues and other woody biomass are suitable feedstocks. The properties of the final biochar depend on both the raw material and the production process.

Select technology appropriate to your scale. Small farms may benefit from low-cost flame curtain kilns, while larger operations can consider retort kilns or continuous pyrolysis systems. The choice should reflect projected biomass quantity, investment capacity and future business ambitions.

Understand the regulatory framework. In many countries, biochar can be used on the farm where it is produced with relatively few restrictions. Commercial sales generally require product testing and registration, while access to premium markets may require certification.

Integrate biochar into soil management. Biochar should be considered as part of a broader soil health strategy alongside organic matter management, cover crops and agroforestry design. It can improve soil structure, increase water-holding capacity, support soil health and support more resilient production systems.

Geographical Location:



How to use the results:

Do not think of woody biomass as a waste product. Prunings, coppice material and other residues from agroforestry systems can become a valuable on-farm resource, improving soil health while creating opportunities for long-term carbon storage and new income streams.

The first step is to estimate how much woody biomass your agroforestry system produces each year and assess whether it can be converted into biochar. Small-scale production and trial applications are recommended, allowing evaluation of effects on local soils and crops before wider adoption. Biochar should be integrated into a broader soil management strategy alongside organic matter additions and good agroforestry practice.

If commercial production is being considered, investigate national regulations and certification requirements early in the planning process. Access to premium markets may require recognised standards such as the European Biochar Certificate (EBC), while emerging carbon and environmental markets may create additional opportunities for value generation.

The ReForest research demonstrates that biochar is more than a waste management solution. By converting surplus woody biomass into a stable soil amendment, farmers can start closing carbon and nutrient cycles, strengthen the resilience of their agroforestry systems and transform a disposal cost into a long-term environmental and economic asset.

For practical guidance and examples from the ReForest Living Labs, visit www.agroreforest.eu

https://eu-cap-network.ec.europa.eu/projects/practice-abstracts/turning-woody-biomass-long-term-soil-capital-agroforestry_en