



## Wood Chip Production in Agroforestry for Mulch, Compost and Soil Conditioner Applications

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Sustainably produced wood chips from agroforestry can be used for material purposes, for example, to generate compost and soil improvement substrates.

Agroforestry practices offer innovative ways to make agricultural production more sustainable. For example, in addition to its energy potential, the production of wood chips opens up new possibilities for use as mulch, compost and soil conditioner, or alternatively as biochar feedstock

The main value chains associated with the use of wood chips are linked to (i) mulch which enhances soil moisture retention and helps regulate soil temperature, while suppressing weeds when applied in a 5–15 cm layer; (ii) compost, which increases organic matter, balances nitrogen-rich materials, and promotes aeration and decomposition; (iii) soil conditioners, which boosts organic matter content, microbial activity, and soil structure while reducing erosion and compaction.

Fast growing woody plants (e.g., poplar, willow) can serve as valuable input material yielding 8–15 Mg DM ha<sup>-1</sup>yr<sup>-1</sup>, producing between 3 and 5 m<sup>3</sup> ha<sup>-1</sup> yr<sup>-1</sup> of pruning residues. The optimum size for wood chip production is between 10 and 40 mm. The chips should be stored for between 3 and 6 months before use. Mobile chippers process 10–30 m<sup>3</sup> h<sup>-1</sup> at operating costs of €15–25/m<sup>3</sup>.

The chips have an extra value because the ramial wood (young branches and twigs) contain 2–3 times more nutrients. In addition, the compost blends with 30–50% wood chips optimize the C/N ratio. Also, biochar can be produced through the use of pyrolysis reaching premium prices between €500–800 per Mg. These products can cause cost savings by reducing the need for synthetic fertilizers. Sustainably produced wood chips from agroforestry systems, used as mulch, compost, or soil conditioners, offer numerous benefits as they improve soil quality, reduce the need for synthetic inputs while fitting well in the circular economy frame and strengthening regional value chains.



Daniel Fischer\*, Ahmed Manzim Ridwan\* and Peter Zander\*

\* Leibniz Center for Agricultural Landscape Research (ZALF), working group "Agricultural Economics and Ecosystem Services"



Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No GA 101086563. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union. Neither the European Union nor the granting authority can be held responsible for them.