



Multiple row systems for profitable agroforestry on cropland: double rows of poplar to mitigate impact on crop yields and optimize wood revenues.

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Agroforestry on cropland faces a major issue of competition between trees and crops for light, water and nutrients which can strongly affect the profitability. One of the main parameters is the distance between tree lines. The closer the lines, generally the higher the crop yield reduction when the trees reach full height.

Higher distances between trees are advised to tackle this issue also aligned with the evolution of agricultural machinery that becomes broader and broader. Tree lines composed of double-rows might be a solution to keep a sufficient tree density on the plot, while preserving crop production. A Chinese study on double row poplars, published in 2005, claims an increase of 46% on the benefit/cost ratio after 7 years¹.

The French Association for Agroforestry is going to publish soon a good-practices report for agroforestry systems mixing poplars to crops or poultry production. In this document, economic modelization, made with conservative factors taken from existing projects, shows that a double-row poplar system would outperform a single-row one in terms of EBITDA (with the same tree density).

The double-row system would get a 118€/ha EBITDA against a 56€ one for the single-row. This is mainly explained by the fact that a very dense single row would impact the wood production of the poplars with a 20% decrease compared to the double-row². However, it was impossible to measure the impact of the double-row or the single-row on the crop yields. This is to be investigated in the future to fully apprehend the potential of double-row agroforestry systems.

References:

¹Fang S. Poplar in wetland agroforestry: a case study of ecological benefits, site, productivity, and economics, *S Wetlands Ecology and Management* 13: 93–104, 2005.

<https://link.springer.com/article/10.1007/s11273-003-3104-5>

²Parizel A, et al., *Le peuplier agroforestier*, Association Française d'Agroforesterie, 2019 (in French)

<https://www.foretriveefrancaise.com/publications/voir/731/le-peuplier-agroforestier-techniques-et-couts-de-plantation/n:541>



Figure 1. Agroforestry system of poplars and maize in Haute-Garonne, France. Credit: Philippe Van Lerberghe © CNPF

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