

Ailanthus excelsa L. based agroforestry systems to arrest land degradation in North-West India

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Abstract

Different *Ailanthus excelsa* based agroforestry systems (Bund/boundary, scattered trees in the existing farming systems) are practiced by the farmers in dry parts of north-west India. However, modern/improved *A. excelsa* based agroforestry systems are not popular among the farmers. Therefore, in this study improved *A. excelsa* based agroforestry systems with different tree densities were developed and assessed during initial years of establishment in nutrient poor, light textured soils to enhance soil fertility and productivity. In the present study, the yields of agricultural crops were not influenced by *A. excelsa* trees, irrespective of crop or tree geometry/density. This might be due to young age of *A. excelsa* trees. However, soil fertility status in terms of organic matter, available P and K improved under agroforestry systems as compared to sole cropping. Growth performance of *A. excelsa* under different tree densities and in association with crops was statistically at par. Maximum girth (47.10 cm) at breast height was recorded under 10 x 20 m spacing with cluster bean-wheat sequence, but it was at par with other treatments. Maximum carbon sequestration (9.64 t ha⁻¹ year⁻¹) was recorded in *A. excelsa* + cluster bean – wheat agroforestry system with 200 trees/ha. Cluster bean – wheat crop sequence sequestered more carbon as compared to pearl millet- Indian mustard. *A. excelsa* based agroforestry systems fetched higher net returns as compared to sole cropping. Two years experimentation showed maximum benefits under agroforestry with 10 x 5 spacing under both the crop sequences.

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