

# RESTORATION OF DEGRADED SODIC SOILS THROUGH SILVIPASTORAL SYSTEMS IN INDO-GANGETIC PLAINS

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## Abstract

Present study was conducted to analyze the role of silvipastoral systems to improve soil properties for restoration of degraded sodic soils. Ten years old tree species of *Acacia nilotica*, *Casuarina equisetifolia* and *Eucalyptus tereticornis* planted in a highly sodic soil (pH 10.6, EC 1.43 dSm<sup>-1</sup> and ESP 89) were used for understory plantation of grass species like *Chloris gayana*, *Panicum maximum* and *Pennisetum purpureum*. Maximum growth and yield of understory grasses was recorded from treatment T4. Among the grass species, the highest nutritive value (N, P, K) was recorded in *P. purpureum* however, highest neutral detergent fiber and acid detergent fiber in treatment T4 and T11 respectively. The N, P, K and Na<sup>+</sup> uptake in treatment T4 and T10 was significantly higher over rest of the treatments. A significant improvement in soils physical properties was recorded under treatment T7 and T4 which was attributed to reduced sodicity, addition of leaf litter, and increase in microbial activities due to tree and grass roots, better plant growth, and fine root decay. However, improvement in soil chemical properties was recorded under treatment T4 which may be attributed to more release of CO<sub>2</sub> by grass roots and solubilization of CaCO<sub>3</sub>. The highest MBC and MBP was recorded in treatment T7 however, highest MBN and dehydrogenase activities were recorded under treatment T4. On the basis of improvement in soil physico-chemical and biological properties in the tree+grass systems, *A. nilotica*+*C. gayana* silvipastoral system could be highly ameliorative and biomass producing system for restoration of degraded sodic soils of Indo-Gangetic plains.

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