

EVALUATION OF COCONUT BASED GLIRICIDIA, WILD SUNFLOWER AGROFORESTRY SYSTEMS TO IMPROVE ITS SOIL PROPERTIES IN A WET ZONE COCONUT PLANTATION

A.U.I. Fernando¹, S.H.S. Senarathne² and W.C.P. Egodawatta¹

¹*Department of Plant Sciences, Faculty of Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka.*

²*Agronomy Division, Coconut Research Institute, Lunuwila, Sri Lanka.*

Aim of this study was to evaluate the potential of using Coconut based Gliricidia (*Gliricidia sepium*) and Wild sunflower (*T. diversifolia*) agroforestry systems, to improve soil fertility of degraded lands in the low country wet zone and to demonstrate the potential such approaches for increasing the land productivity to meet the increasing demand for coconut in the future. Study location was Ketakalapitiya estate of Kurunegala plantations, which belongs to Boralu soil series in the low country wet zone (WL₃). *G. sepium* and *T. diversifolia* loppings were added to the manure circle of the coconut palms under the supervision of the Coconut Research Institute of Sri Lanka. The experiment was conducted in a randomised complete block design with four treatments and three replicates. Treatments were Coconut based agroforestry system with *G. sepium*, with *T. diversifolia*, with both species and sole Coconut. Soils from two depths, 0 – 15 cm (topsoil), 15 – 30 cm (subsoil), and two locations, from manure circle and coconut square were analysed for chemical, physical and biological properties. Results showed a significant ($p < 0.05$) accumulation of soil organic matter in agroforestry systems *G. sepium*, *T. diversifolia* and both, and it was localised to manure circle. Manure circle was significantly ($p < 0.05$) rich in total nitrogen in systems intercropped with *G. sepium* compared to the rest. Available Phosphorous content was the highest in the manure circle of the system intercropped with *G. sepium*. *T. diversifolia* showed the highest exchangeable potassium, nonetheless limited to the manure circle. Soil microbial activity was significantly high in *G. sepium*, and *T. diversifolia* intercropped fields within the manure circle. This study confirms that addition of *G. sepium* or *T. diversifolia* loppings to the manure circle of coconut fields replenish soil fertility of degraded coconut growing soils in the low country wet zone of Sri Lanka.

Keywords: Coconut, *Gliricidia sepium*, Low country wet zone, *Tithonia diversifolia*