EVALUATION OF COCONUT BASED (*Gliricidia sepium*) AGROFORESTRY SYSTEMS TO IMPROVE SOIL PROPERTIES OF INTERMEDIATE AND DRY ZONE COCONUT GROWING AREAS

I. M. P. S. Ilangamudali[1], S. H. S. Senarathne[2] and W.C.P. Egodawatta[1]

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

[2] *Coconut Research Institute of Sri Lanka, Bandirippuwa Estate, Lunuwila.*

This study was intended to assess the potential of using coconut based *Gliricidia sepium* agroforestry systems to improve soil fertility of degraded coconut lands in intermediate and dry zones of Sri Lanka. Study locations were Rathmalagara Estate and Pallama Estate of Coconut Research Institute of Sri Lanka, which belong to Andigama soil series in low country intermediate zone (IL_1) and Ambakele soil series in the low country dry zone (DL_3), respectively. Experiment was conducted in a Randomized Complete Block Design with five treatments and three replicates. Main treatments were coconut based agroforestry systems intercropped with *G. sepium*, and sole coconut. A fallowed land and a sole *G. Sepium* land were used as benchmarks. Soils from three depths *i.e.* 0-15 cm, 15-30 cm and 30-45 cm were analyzed for its chemical, physical and biological properties. Results showed a significant ($p<0.05$) accumulation of soil organic matter (SOM) due to incorporation of *G. sepium*. Mean SOM in top soil of *G. sepium* intercropped fields were 0.87% compared with 0.49% in sole coconut, though the values were quantitatively low compared to typical fertile soils. Higher soil total nitrogen (TN) was observed in *G. sepium* intercropped lands in both estates compared to sole coconut in same climatic zone, though the quantity varied on degree of management of *G. sepium* such as lopping frequency. Exchangeable potassium (K) and magnesium (Mg) were observed in significantly high quantities in *G. sepium* intercropped fields than in sole coconut. Significantly higher soil microbial activity (SMA) was observed in *G. sepium* managed and unmanaged conditions in both estates in contrast to sole coconut. This study reconfirms the promising results of integrating *G. sepium* for replenishing soil fertility of degraded coconut growing soils in intermediate and dry zones.

Key words: Agroforestry, Coconut, Dry zone, *Gliricidia sepium*, Intermediate zone