INCREASING RESILIENCE OF UPLAND CROPPING SYSTEMS THROUGH A MODIFIED ALLEY CROPPING SYSTEM

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Alley cropping or hedgerow intercropping is an agroforestry system in which perennial, preferably leguminous trees or shrubs are grown simultaneously with an arable crop. Alley cropping is normally practised in Sri Lanka under rainfed conditions with lower spacing (2 to 5 m) in the alley. This study was aimed to study the land productivity of modified alley cropping system by making comparisons between alley and non-alley cropping systems, rainfed and sprinkler irrigated systems and lopping and non-lopping alley cropping systems. A field experiment was conducted at the Field Crop Research and Development Institute, Mahailluppallama. Gliricidia (*Gliricidia sepium*) was used as the alley hedge rows. Green gram (*Vigna radiata*) and Chilli *(Capsicum annuum)* were cultivated in existing alley crop field. Six treatments namely; rain fed condition using non-alley field (T_1), sprinkler irrigated non-alley field (T_2), rain fed condition using alley lopping (T_3), rain fed condition using alley non-lopping (T_4), sprinkler irrigated alley lopping (T_5), sprinkler irrigated alley non-lopping (T_6) were arranged in Randomized Complete Block Design (RCBD) with three replicates, each. Rain fed system failed due to insufficient rainfall during the studied time period. Significantly higher Green gram yield was observed in the sprinkler irrigated alley lopping system - T_5 (0.54 t ha^{-1}) and sprinkler irrigated alley non-lopping system - T_6 (0.50 t ha^{-1}), compared to the sprinkler non-alley system - T_2 (0.41 t ha^{-1}). There was no significant *($p>0.05$)* yield increase in Chili between alley and non-alley fields probably due to shading effect by alley hedge rows. Based on the Green gram yield and crop performance, it can be concluded that alley cropping system is better in improving the crop productivity and alley cropping incorporating sprinkler irrigation system is the best system among all the studied systems. However, further field studies will be conducted to confirm the findings.

Keywords: Alley cropping, Land productivity, Sprinkler irrigation