

Construction of Fuel Wood Value Index (FVI) for Common Fuel Wood Species and Compare the Performance with Rarely Use Invasive *Prosopis juliflora*

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Abstract

Sustainable Energy Authority of Sri Lanka has recently introduced several fuel wood species for the country's energy fulfillment as a solution for nation's over dependency on imported fossil fuels. Though country has identified some common fuel wood species there is no proper mechanism to evaluate and compare overall performances to identify species with optimal performance. Countries like India and Kenya have developed an index known as Fuel wood Value Index (FVI) to evaluate overall performance of fuel wood species.

Prosopis juliflora has been identified as a major Invasive Alien Species (IAS) in Bundala national park in southern dry zone, Sri Lanka. Though it is an uncommon fuel wood species in Sri Lanka it is widely used as a dry matter fuel wood in certain countries. The study was designed with the primary objective of constructing FVI for invasive *P. juliflora* and other widely use fuel wood species. Secondary objective of the study was to estimate the amount of fossil fuel that can be replaced by 1 kg of each fuel wood species.

Part of the Bundala national park where *P. juliflora* is abundant was selected as the study site according to a reconnaissance survey. Fourty individuals were randomly selected and moisture content (oven dry method), density (Archimedes principle), ash content (loss on ignition method) and calorific value (ASTM D 5865) were obtained. Energy characteristics of other commonly used fuel wood species for FVI construction were obtained from secondary sources. Constructed FVI for *P. juliflora* was 3276 ± 274 respectively. FVI values obtained for other fuel wood species were *Leucaena leucocephala* 3336 ± 389 , *Gliricidia sepium* 1,686, *Acacia auriculiformis* 902, *Casurina equisetiflora* 3,552 and *Pterocarpus indicus* 2,733.

Study findings revealed that 0.50 L of diesel and 0.45 L of furnace oil could be replaced by 1 kg of *P. juliflora* wood. 1kg of *G. sepium*, *L. leucocephala*, *A. auriculiformis* and *C. equisetiflora* wood could replace 0.54 L, 0.48 L, 0.53 L, 0.55 L, of diesel and 0.49 L, 0.43 L, 0.49 L 0.50 L of furnace oil, respectively.

Keywords: FVI, Renewable energy, Fuel wood, Fossil fuel, IAS