

Design, Fabrication and Performance Evaluation of Super Tine Cultivator

K. Kopithan^{1*}, V.Vijitha¹, S. Sayanthan¹ and M. Prabhakaran²

¹Department of Biosystems Technology, Faculty of Technology, University of Jaffna

²Department of Agricultural Engineering, Faculty of Agriculture, University of Jaffna

*kopithankiru@gmail.com

Tillage is an inevitable aspect in agriculture and various tillage methods are being utilized in Sri Lanka. Considerable amount of money is spent on tillage. Mechanical tillage activities are not much accessible by poor farmers. This study was aimed to design and fabricate a super tine cultivator as an attempt to solve this issue. Objective of this research is to modify the spring loaded tine cultivator in to super tine cultivator for secondary tillage and to evaluate the performance of modified cultivator in terms of fuel consumption and time requirement for field performance. By considering the availability, cost, strength and durability the iron bar was selected as the material to design the super tine cultivator. The time needed to till the land area of one acre and the volume of fuel required for such tillage were recorded. The fuel consumption was found to be lowest for super tine cultivator for clay, sandy and loamy soil compared to spring loaded tine cultivator. While considering the time required for tilling one acre of land, the lowest time duration was observed for super tine cultivator for all three kind of soil. The lowest fuel consumption (2.5 Liter/acre) was recorded for the super tine cultivator in sandy soil while the highest fuel consumption (4.88 Liter/acre) was recorded for the spring loaded tine cultivator in clay soil. The lowest time required (0.43 hour/acre) was observed in sandy soil with the usage of super tine cultivator whereas the highest time duration (0.75 hour/acre) was recorded for spring load tine cultivator in clay soil. In addition, tillage with 15-30 cm depth is achieved in super tine cultivator without any struggle in soil. As the toggle and link assembly and heavy coil spring have been excluded in the design, totally the weight of 60 kg is reduced in super tine cultivator which facilitates easy hitching of implement. Therefore, it can be concluded that the super tine cultivator performed efficiently than spring load tine cultivator. Tillage of larger land area with lower time duration and fuel requirement is possible with super tine cultivator. The super tine cultivator can be sold in the market for sixty-nine thousand Sri Lankan rupees.

Keywords: Fuel consumption, Field performance, Modification, Spring loaded