

## **Development and testing of a non-stop cultivator with leaf spring safety device for four wheel tractor**

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The plough has been used in its different forms for many centuries. It is still the primary implement used for the preparation of seedbeds. Good quality ploughing speeds up the making of a seedbed, at any time of the year.

Sri Lankan farmers' use imported coil spring loaded upland tine tiller for paddy cultivation. This plough is not appropriate implement for the flooded or puddles paddy fields. The springs are blocked by muddy soil during the working sessions and corrode very quickly. Specially this coil springs cannot be fabricated in village level workshops. Use of imported spare parts is beyond the financial capabilities of local paddy farmers. Considering the above facts, a low cost suitable cultivator for four wheel tractor was designed and constructed using locally available materials after testing first model plough in the field and implementing necessary modifications. The tines of the designed cultivator are leaf spring loaded with non-stop action. Therefore when the tine hits an underground obstruction, the leaf springs relieves the tension, allowing the tines to swing back wards. This non-stop action which is control by a tension control unit not only protect the plough but also permitted to the tractor to continue the ploughing operation without any interruption.

The field experiment was conducted in the paddy field to compare the performance of the designed cultivator with the imported tine tiller. The effective field capacity, effective working width, time per hectare, travel reduction, fuel consumption, and cost of production was considered as criteria for evaluation of the cultivator.

The results shows that the effective field capacity , effective working width , time per hectare, and travel reduction were 0.95 ha/ h, 2.07 m, 1.03 h and 6.6%, respectively. Above observation for imported tine tiller were 0.79 ha/ h 1.96 m, 1.25 h 17.64% respectively. Therefore, effective field capacity and time per hectare were greater by 20% and 17% respectively. These results are significantly different from imported tine tiller. The cost of production of design cultivator was Rs 25,000 but local selling price of the imported plough was around Rs 40,000 in year 2003. The overall field performance of designed plough (Patent no:13352) was very satisfactory. In additionally the plough has been tested in different kind of soils and shows satisfactory performance.

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