Design and development of a power tiller operated sugarcane harvester

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Sugarcane is a tropical plant belonging to the family Gramineae. Its harvesting should be so timed that the cane has attained peak maturity and maximum yield level under the given growing conditions. The method of harvest should be such that maximum of the cane produced is harvested to the ground level and all extraneous matters such as tops, trash, roots etc. are excluded to the extent possible.

In Sri Lanka, harvesting is done manually using various types of hand knives. This method of harvesting does not only consume much time but also requires much skilled labourers. But nowadays labourers are becoming scarce and costly, particularly in the sugarcane cultivation areas. This is due to diversion of labour to other more remunerative work in industry, construction, business and diversion of labour to other crops.

In countries where sugarcane cultivation is highly mechanised, huge harvesters are employed. In these countries, sugarcane is grown on large plantation scales in large farms owned by either mills or big farmers. However, it is difficult to employ such machines in Sri Lanka due to various reasons such as, fragmented and small holdings with small and irregular fields, diverse cropping patterns followed, the cultivation practices which have been developed for manual harvest and poor farmers who cannot afford costly machines. Therefore power tiller operated whole stick harvester prototype was designed

and constructed. The designed machine consists of reversible cutting device, power transmission unit with clutch mechanism and cane shifting device.

The maximum cutting width, machine capacity and traveling speed were considered as criteria for comparison of merits and demerits with existing manual method. The results show that the maximum cutting width, machine capacity and traveling speed were 1.2m, 0.8 ha/day and 0.75 km/hr respectively. The cost of production of the designed sugarcane harvester was 20,000 rupees.

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