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## Section B

201/B

### A new device for demarcating furrow lines for sugarcane cultivation on undulating terrain

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Furrowing at a 1% slope has been recommended for planting sugarcane in Sri Lanka for improving irrigation efficiency and controlling soil erosion in sloppy lands. Furrows are constructed according to a horizontal baseline demarcated using a dumpy level, auto level, or a theodolite, keeping a uniform slope along the line. However, this method is not adopted properly by farmers, as it needs skill for handling levelling instruments, in addition to time consumption. Non-availability and/or expensiveness of necessary levelling instruments are other great limitations. Therefore, a simple, efficient, and inexpensive levelling instrument is required to popularise the correct furrowing method among sugarcane farmers in Sri Lanka. As such, a device for demarcating furrow lines in sugarcane lands was designed and fabricated using locally available low-cost materials. The total material cost of this new device was Rs 2,200 at the prices prevailing in the year 2016.

The pressure at equal levels of a fluid is the same if the system is open, and the pressure depends only on the vertical height difference between the base and the fluid surface. This principle was applied to design this furrow-demarcating device, with some modifications according to the specific requirements of sugarcane farming. The newly developed furrow linedemarcating device consists of three main parts, *i.e.*, a transparent plastic tube, an air relief valve, and an adjustable scale.

The newly developed furrow linedemarcating device was evaluated and compared with the performance of the dumpy level which is currently used for furrow line demarcating in sugarcane fields in Sri Lanka. Three different farmer fields situated in undulating terrain at UdaWalawe and Sevanagala were selected for testing the accuracy of the device and the labour efficiency. The results of field evaluation confirmed that the new device has sufficient accuracy for furrow line demarcating, compared to the dumpy level. The detected error for horizontal and vertical axes were 15.9 ±2.7 cm and 0.67 ±0.16cm, respectively. These errors were negligible when compared with the furrow spacing recommended for sugarcane, which is about 137 cm and the furrow depth is about 25 cm respectively. Moreover, the use of the newly developed furrow linedemarcating device increases the efficiency of labour by nearly 20% compared to the dumpy level.

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