

## Performance Study of Sugarcane Hand Detrashers

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### ABSTRACT

Two hand detrashers (a) Fixed type and (b) Spring type were developed in Agricultural Engineering Workshop of Sugarcane Research & Training Institute (SRTI), Ishurdi and tested their performances (during 1991-92) in SRTI farm. The performances were tested in three cases namely Case-I, Case-II & Case-III and were compared with the performances of a conventional hasua (curve knife). In all three cases fixed type hand detrasher showed better performance over spring type hand detrasher and conventional hasua. For Case-I, Case-II and Case-III the fixed type hand detrasher covered 46.3, 58.3 and 188 square meters of land area per hour respectively.

### INTRODUCTION

Sugarcane produces on an average 15 to 30 leaves (trashs) from its seedling to maturity. Sugarcane by its green leaves prepares sugar which is accumulated in the stem. But when the sugarcane grows up, its lower old leaves dry up and become useless to prepare sugar. Besides, The old dry leaves hinder air flow and sunshine inside the sugarcane field which cause low sugar content and low yield of Sugarcane (Miah and Sarkar, 1981). According to Parthasarathy (1972) detrashing increased the cane yield and improved the individual cane weight and number of millable cane. Miah and Sarkar (1982) found that maximum tillering completed by the month of May and 54-60% tillers died by the following months. The rate of mortality of tillers was found to be lower when defoliation (detrashing) was done during July resulting in higher number of millable cane in the detrashed cane plot. They concluded that higher yield might be obtained if 50% leaves are removed and stalks are not tied up or 25% leaves removed and stalks are tied up together once in the month of July. Besides, trashs may cause lodging of cane resulting in serious decrease in yield. It was observed that propping increased yield and maintained better cane quality keeping the cane erect as compared to the lodged cane (Lakshmikonthan, 1960; Parthasarathy, 1972).

On the other hand, the lower old and dry leaves favour the diseases and pest infestation as well as hinder the sun light and air flow in the cane field. So to have higher sugar content and better yield of sugarcane it is necessary to remove the

lower old and dry leaves (trashies) from the field in due time. But presently in Bangladesh there is no suitable machine or hand tools to remove the leaves (trashies) of sugarcane. Now-a-days in the rural area, people use sharp edged sickle called hasua (Figure 3) for this purpose. To overcome this problem two hand detrashers : (a) fixed type and (b) spring type were developed in Agricultural Engineering Workshop of SRTI and tested their performances during 1991-92 in the SRTI farm.

The main objectives of this study were : 1. to test the performance of the detrashers in removing trashies from the canes without damaging or injuring the cane stalks and 2. to compare the performance of the tools with that of conventional method.

### MATERIALS AND METHODS

Two hand detrashers (a) Fixed type (Figure 1) and (b) Spring type (Figure 2) were fabricated in the black smith shop of Agricultural Engineering Workshop of Sugarcane Research & Training Institute (SRTI), Ishurdi, Pabna using mild steel, spring, nut & bolt and wood as fabricating materials.

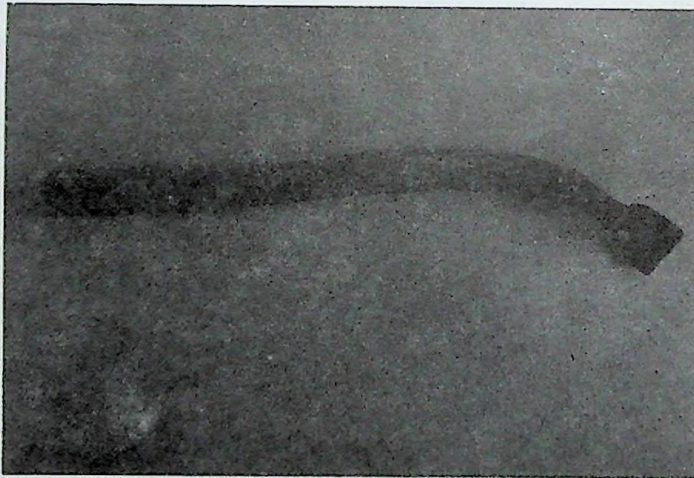
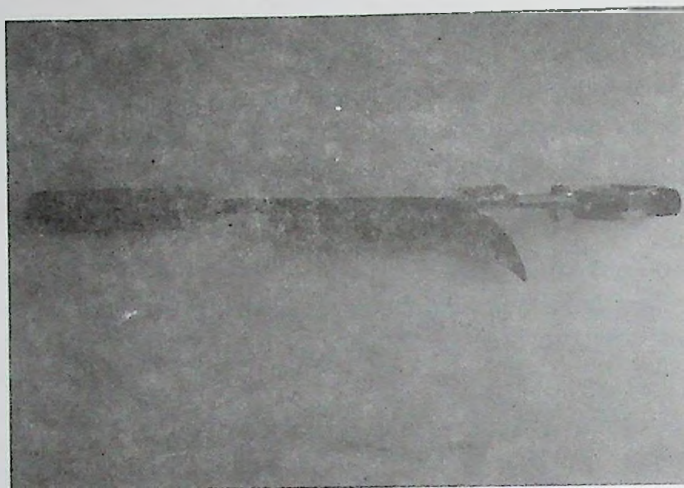


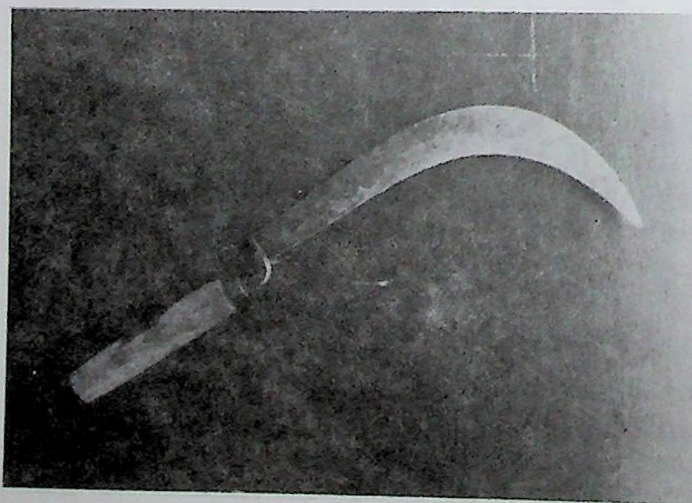
Figure 1. Fixed type hand detrasher.

**Working principle of fixed type hand detrasher :** The fixed type hand detrasher consists of a sharp edged sickle and a U-scraper at the end of the sickle fixed by a bolt and a guide pin. There is a provision of attaching U-scraper of different sizes so as to match with the diameter of the cane during detrashing since the diameter of cane varies with different varieties and soil conditions. The cane stalks are fed into the U-scraper and then by one down stroke the leaves are detrashed (Figure 4).



**Figure 2. Spring type hand detrasher.**

**Working principle of spring type hand detrasher :** The spring type hand detrasher contains a sharp edge knife and a spring operated normally closed U-scraper fixed at the end of the body. By pushing the U-scraper against cane the cane stalk is fed into the scraper and then with one down stroke the leaves are detrashed (Figure 5). With the knife of the detrasher the top or any part of the cane stalk can be cut as desired.



**Figure 3. Conventional detrasher (Hasua).**



Figure 4. Fixed type hand detrasher in operation.



Figure 5. Spring type hand detrasher in operation.

**Experimental investigation :** Three labourers were selected from SRTI farm to test the performance of the detrashers. Each of the labourers was allowed to work (i.e. detrash cane) with conventional hasua, fixed type hand detrasher and spring type hand detrasher in a plot size of 12 sq meter with three replications. The leaves of the canes were detrashed in three sequences namely case I, case II and case III. In case I—all the old & matured green leaves including tops of the canes were detrashed. In case II—all the old and matured green leaves except tops were detrashed. In case III—only the tops of the cane were detrashed. Data on the total

number of sugarcane detrashed and area covered with their number of trash removed for the two detrashers and a hasua were recorded and tabulated.

### RESULTS AND DISCUSSION

Since sugarcane produces leaves in two opposite sides of the stalk, two stokes in the two opposite sides are needed by conventional hasua to remove all the trashes from the cane stalks. But by the hand detrashers both fixed type and spring type only one stoke is sufficient to remove all trashes from the cane stalks.

The result obtained from the investigation is shown in Table 1. The average Number of leaves per cane in the investigated field was found 18. In the case-I the number of cane detrashed per hour by conventional hasua, fixed type detrasher and spring type detrasher were 296, 510 & 463 respectively and the area covered 25.3, 46.3 & 39.7 sq meter respectively. In the case-II when 15 leaves out of 18 were detrashed, the number of cane detrashed per hour by conventional hasua, fixed type detrasher and spring type detrasher were 362, 683 & 625 respectively and area covered 31.7, 58.3 & 52.3 sq meter respectively. In the case-III when only tops (3 leaves) were removed (detopped), the number of cane detopped per hour by conventional hasua, fixed type detrasher and spring type detrasher were 1485, 2168 & 1752 respectively and area covered 128, 188 & 148 sq meter respectively.

Table 1. Comparative performance of different types of detrashers.

|                                 | Type of detrasher | No. of leaf detrashed | Average No. of cane detrashed/man-hr |                         | Area detrashed (m <sup>2</sup> /man-hr) |
|---------------------------------|-------------------|-----------------------|--------------------------------------|-------------------------|-----------------------------------------|
|                                 |                   |                       | Original                             | After In transformation |                                         |
| Detrashing cane with top        | 1*                | 18                    | 296                                  | 5.6896                  | 25.3                                    |
|                                 | 2*                | 18                    | 510                                  | 6.2342                  | 46.3                                    |
|                                 | 3*                | 18                    | 463                                  | 6.1358                  | 39.7                                    |
| Detrashing cane without top     | 1*                | 15                    | 362                                  | 5.8910                  | 31.7                                    |
|                                 | 2*                | 15                    | 683                                  | 6.5264                  | 58.3                                    |
|                                 | 3*                | 15                    | 625                                  | 6.4373                  | 52.3                                    |
| Detrashing top only (detopping) | 1*                | 3                     | 1485                                 | 7.3031                  | 128.0                                   |
|                                 | 2*                | 3                     | 2168                                 | 7.6800                  | 188.0                                   |
|                                 | 3*                | 3                     | 1752                                 | 7.4683                  | 148.0                                   |

LSD (5%) = 0.0798,

LSD (1%) = 0.1100.

1\* = Conventional hasua, 2\* = Fixed type hand detrasher, 3\* = Spring type hand detrasher.

In all three cases numbers of cane detrashed (510, 683 & 2168 Nos) and area covered (46.3, 58.3 & 188m<sup>2</sup>) by the fixed type detrasher were highly significant over the conventional hasua and spring type detrasher. In the case-II, which is suggested to be practiced in Bangladesh during July-August (Miah and Sarkar, 1982) total 22 man-days are required by fixed type detrasher, 24 man-days by spring type detrasher and 40 man-days by conventional hasua for detrashing one hectare of sugarcane field.

Although the spring type detrasher was expected to show better performance over fixed type detrasher because of its adroit mechanical soundness, due to lack of appropriate spring the operation was frequently disrupted, which caused a loss of time in the field. This may be one of the reasons for lower performance of the spring type hand detrasher.

Spring type hand detrasher is more complicated in its design (Figure 2) than the fixed type hand detrasher (Figure 1) and consequently it takes more effort to push sugarcane stalk into the U-clamp of the detrasher. On the other hand fixed type hand detrasher is less complicated and may be fabricated in the village black-smith shop with less effort. More over, the performance of the fixed type hand detrasher is better than that of the spring type hand detrasher and conventional hasua. So fixed type hand detrasher may be recommended for commercial use in the farmers' field for removing sugarcane trashes.

#### REFERENCES

- Miah, M. A. S. and Sarkar, M. A. A. 1981. Preliminary investigation on the effect of artificial defoliation on cane quality. *Bangladesh J. Sugarcane*, 3 : 55-57.
- Miah, M. A. S. and Sarkar, M. A. A. 1982. Effect of Artificial Defoliation and Stalks Binding on the Cane Quality. *Bangladesh J. Sugarcane*, 4 : 51-55.
- Parthasarathy, S. V. 1972. Sugarcane in India. K. C. P. Ltd., Madras-6, India. pp. 292-297.
- Dillewijn, C. V. 1952. Botany of Sugarcane. Chromica Botamica Co., Waltham, Mass, U. S. A. pp. 330-331.
- Panje, R. R. and Rao, T. R. 1965, 66. Effect of defoliation on the flowering, cane yield and Juice quality of Co. 740. Annual Report, Indian Institute of Sugarcane Research, Lucknow, India. pp. 67-68.
- Lakshmikanthan, M. 1960. Soil cultivation and cultural practices in Sugarcane Farming. *Sugarcane Herald*, 3(2) : 3-6.