

FARMER PARTICIPATORY APPROACH TO EVALUATE NEW SUGARCANE VARIETIES

M.S. Perera, A. Wijesuriya, D.P.W. Pottewela, B.D.S.K. Ariyawansa and
A.P. Keerthipala

Sugarcane Research Institute, Uda Walawe, Sri Lanka

ABSTRACT

This study aimed to identify farmers' and field-level extension officers' perception on new sugarcane varieties, at their near commercial stage, to facilitate the adoption process of new sugarcane varieties in the local sugar industry. Twenty near-commercial varieties in each adaptability trial were evaluated at Uda Walawe and Siyambalanduwa, by two groups of experienced and innovative farmers and officers. One group from Sevanagala comprised of 19 farmers and 5 Agricultural Assistants, and the other from Pelwatte consisted of 8 farmers and 8 Field Assistants. Four main characteristics, i.e., general appearance, tillering, ground coverage, and easiness to harvest were considered and the aggregates and mean/medians of perception scores for each characteristic, and the aggregate score for each variety were calculated using a five point attitude scale. The significance of differences of median perception scores between test varieties and the standard variety were tested using Wilcoxon signed-rank test/t-tests. Whereas no variety was found with significantly high perception scores compared to the standard varieties in both evaluations, SL92-4918, SL8613, Co 775, SL 88116, M438/59, were the first five highest ranking varieties out of 11 varieties which were not significantly different from median perception scores on the standard variety Co775, at Uda Walawe. SL 88116, SL7130, AKOKI22, M438/59, and SL8306 were the first five highest ranking varieties out of the first 10 varieties which were not significantly different from the standard variety M438/59, at Siyambalanduwa.

Keywords: Extension officer, farmer, perception, sugarcane, varieties

INTRODUCTION

Introduction and popularization of improved cane varieties among farming communities are considered as one of the priority needs for increasing productivity and profitability of the sugar industry in Sri Lanka. Low adoption levels of new high-yielding varieties in the local sugar industry was one of the main contributory factors for the low level of cane yield and sugar recovery rates (Darmawardena and Krishnamurthi (1992) and Keerthipala, (1997)). A number of varieties with high cane and sugar yield including SLI 121, SL 88116 and SL 8306 had been introduced by Sugarcane Research Institute during the last two decades, to increase the use of high yielding varieties by farmers. However, Co 775 which was introduced in 1960s, is still predominantly cultivated by the majority of farmers in Sevenagala area from

where nearly one third of the local cane supply was provided (Perera, 2003). As Rogers (1995) opined, the diffusion research literature indicates that both people differences in innovativeness, as well as innovation differences (i.e. how the properties of innovations affect their rate of adoption), are important in the adoption and diffusion rate of new technologies. Maurya et al. (1988) and Sperling et al. (1993) indicated that farmer involvement in variety selection by observation and evaluation can enhance diffusion and adoption of improved varieties in crops like rice and beans in India and Rwanda. Farmer involvement in variety selection through identification of traits, which they prefer has facilitated the diffusion of improved pearl millet varieties to over 200 farmers within two years in West Africa (Omanya et al., 2006). The Mauritius Sugar Industry Research Institute (MSIRI) also uses regional meetings to evaluate superior sugarcane varieties with the participation of farmer representatives, extension officers and breeders. The experiences of extension officers and breeders involved in the varietal improvement program of the Sugarcane Research Institute (SRI) indicated that farmers' and extension officers' acceptance of new varieties is a primary requirement for the popularization and adoption of improved varieties. Information on perception of farmers and extension officers on the important characteristics of the new varieties at their near-commercial stage would be of practical significance to facilitate varietal introduction and adoption process in the local sugar industry. Considering this factual situation the present study was conducted to study farmers' and field-level extension officers' perception on new cane varieties at their near commercial stage.

METHODOLOGY

A participatory research method was adopted in this study to evaluate near-commercial varieties in two adaptability trials established at Uda Walawe and Siyambalanduwa by the plant breeding division of SRI. Farmers, extension officers and scientists participated in this study as evaluators.

Two groups of experienced and innovative farmers and officers; one from Sevanagala, and the other from Pelwatte, were selected purposively based on the recommendations of extension officers. The Pelwatte group consisted of 8 farmers (Figure 1) and 8 Field Assistants and the Sevanagala group consisted of 19 farmers

and 5 Agricultural Assistants, and they evaluated varieties at the Siyambalanduwa and Uda Walawe trials respectively.

Twenty varieties (Tables 1 and 2) were evaluated in each adaptability trial. Each group of farmers and extension officers was divided to 4 sub groups, and each sub group was assigned to evaluate varieties in one replicate of the particular adaptability trial so that varieties in all 4 replicates of the trial were evaluated. Every variety in a replicate was evaluated by each member of the group separately, using an evaluation sheet provided. Every sub group was guided by an experienced breeder or extension officer and the group members were allowed to discuss and identify varietal features.

Tillering, general appearance, ground coverage, and easiness to harvest were the four main characteristics considered. Perception on each characteristic of a variety was given by participants individually using a five point attitude scale. This was done by checking the following categories, good, fairly good, medium, fairly poor, poor. The weighting scores applied to the categories ranged from 5 to 1, with good receiving a score of 5 and poor receiving a score 1.

The attitude scale was tested for its reliability using SPSS ($\alpha > .80$). The total perception scores on all characteristics together and farmers overall ratings on each variety were also correlated (Spearman correlation test).

Data analysis

Information gathered in the above evaluations was analyzed using SPSS. The aggregates and mean/medians of perception scores for each characteristic and the aggregate score for each variety was calculated. Each variety was ranked according to its' median perception score. The significance of differences of perception scores between test varieties and the standard variety were tested using Wilcoxon signed-rank test/t-tests.



Figure 1. Conducting participatory evaluation by farmers

RESULTS AND DISCUSSION

Tables 1 and 2 show the overall assessment scores for each variety by two groups of farmers.

The varieties SL92-4918, SL8613, Co 775, SL 88116, M438/59, were the first five highest ranking varieties at Uda Walawe according to mean and median of scores. No variety was found with significantly high perception score compared to the standard variety Co 775. Median perception scores on the first 11 varieties (Table 1) were not significantly different from median perception scores on Co775, at Uda Walawe. However, medians of perception scores on the last 9 varieties (Table 1) were significantly different from that on Co 775 (Wilcoxon signed- rank test).

Table 1. Perception scores of the varieties at Uda Walawe (by the Sevenagala group)

Variety	Mean Perception score(N=24)	Standard Deviation	Median Perception scores(N=24)	Rank
SL92-4918	14.68	2.47	15.00	01
SL8613	14.36	1.47	14.00	02
Co 775	14.16	2.68	14.00	02
SL 88116	13.4	2.76	14.00	02
M438/59	13.33	2.67	14.00	02
SL7130	13.22	1.80	14.00	02
SL8306	12.95	2.92	13.00	03
SL89-16733	12.78	2.13	13.00	03
SLI 121	12.73	1.68	12.50	04
ONO	12.59	2.23	12.00	05
SL 88-238	12.59	2.48	12.00	05
SL89-2227	12.26	1.96	12.00	06
SL7103	12.21	2.41	12.00	06
SL92-5588	12.00	3.33	12.00	06
SL89-304	12.00	3.37	12.00	06
H78-1207	11.95	1.42	12.00	06
AKOKI- 22	11.27	2.27	11.5	07
H4430982	10.95	2.47	11.00	08
SL89111	10.87	3.41	11.00	08
HINAHINA	9.91	3.22	09.50	09

SL 88116, SL7130, AKOKI22, M438/59, and SL8306 were the first five highest ranking varieties at Siyambalanduwa according to mean and median scores. There was no variety with significantly higher perception scores compared to the standard

variety M438/59. Medians of perception scores on the first 10 varieties (Table 2) were not significantly different from that on M438/59, at Siyambalanduwa. However, medians of scores of the last 9 varieties were significantly different from M438/59 (Wilcoxon signed- rank test). The farmer preference ratings of each variety and the significance of some varieties compared to the standard varieties could be used as one of the primary information sources in the varietal selection and popularizing process of the sugarcane breeding program of SRI. The highest ranking varieties were already selected in the breeding program in which varietal characteristics such as cane and sugar yields, resistance/tolerance to pests and disease, and adaptability to different agro-ecological conditions, had been tested against the standard varieties. Continuation of this study up to ratoon crops of the same varieties would be important for further confirmation of the observations.

Table 2. Perception scores of the varieties on each variety at Siyambalanduwa (by the Pelwatte group)

Variety	Mean Perception scores (N=16)	Standard Deviation	Median Perception scores(N=16)	Rank
SL88116	16.14	2.45	16.00	01
SL7130	15.73	3.03	16.00	01
AKOKI22	15.08	2.78	15.00	03
M43859	15.00	1.50	15.50	02
SL8306	14.20	2.54	14.00	04
SL8613	14.20	1.57	14.00	04
SL891673	14.14	1.91	14.00	04
SL88238	14.07	3.43	14.00	04
SL882227	13.89	2.20	14.00	04
H44-3098	13.75	3.45	14.00	04
SLI121	13.54	1.94	14.00	04
SL925588	13.29	2.87	14.00	04
SLC9291	13.21	2.42	14.00	04
SL7103	13.19	2.64	14.00	04
C0775	12.86	1.83	13.00	05
HINAHINA	12.00	3.72	14.00	04
SL92-4918	12.00	3.44	11.00	07
H78-1207	11.92	3.07	12.50	06
SL89309	10.87	2.86	10.00	08
ONO	10.25	1.82	10.00	08

REFERENCES

- Dharmawardene, N. and Krishnamurthi, M. (1992). Outline Plan for Development of Sugar Industry of Sri Lanka. Sugarcane Research Institute. Pp. 6-64.
- Keerthipala, A.P. (1997). Sustainability of small-holder sugarcane-based production system in Sri Lanka, Unpublished PhD Thesis, University of Aberdeen, UK.
- Maurrya, D. M., Bottrall, A. and Ferrington, J. (1988) Improved livelihoods. Genetic diversity and farmers' participation. A strategy for rice breeding in rain fed areas of India. *Experimental Agriculture*, 24: 311-320.
- Omanya, G O., Weltzien-Rattunde., Sogodogo, D., Sanogo, M., Hanassens, N., Guero, Y., and Zangre, R. (2006) Participatory varietal selection with improved pearl millet in West Africa. *Experimental Agriculture*, 43: 5-19.
- Perera, M.S. (2003). Farmer knowledge and adoption of sugarcane farming practices in relation to farmer-level extension communication in Sri Lanka. Unpublished MPhil thesis. University of Peradeniya, Sri Lanka.
- Rogers, E.M. (1995). Diffusion of innovations. New York: The Free Press.