THE USE OF CROP DATA FROM COMPARABLE FARM GROUPS AS AN EXTENSION AID

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Abstract

The value of reliable yield data obtained from homogeneous groups of farms is examined. Data from a group in the Nkwalini Valley and from another in the Melmoth district are considered. Analysis reveals interesting trends in both the suitability of varieties and the optimum age at which to harvest them in these districts and it suggests that reliable yield data for an area can be used to indicate likely productivity. The information so obtained helps extension officers to motivate beneficial change and indicates how important it is to encourage cane farmers to keep adequate records.

Introduction

The limited information available to the cane grower in the Republic on such important aspects of cane production as the performance and productivity of his different varieties and the optimum age at which to harvest them in the specific environmental conditions in which he is farming, is obtained exclusively from research farms and miller-cum-planter estates. There is at present no effective system for collecting and collating the large amount of data which could be stored in records kept by individual farmers.

Sugar industry extension workers encourage and help farmers to improve and standardise their farm records. They could conceivably evaluate these data and use them to help identify problems and to provide the solutions peculiar to a specific area. By identifying farms which are reasonably similar in terms of climate and soil, farmers in group studies may be persuaded to analyse problems specific to their own areas, and to set realistic production objectives.

This paper is intended to create a greater awareness by both technologist and cane grower of the need for more widespread, uniform and accurate record keeping; the need to evaluate properly the data obtained so that it can be used effectively; and the need to demonstrate the value of these data as an important aid in extension activities. In this case, the data used have been obtained from reliable records kept for a six-year period in two different homogeneous groups in Zululand, namely those in the Nkwalini Valley and at Melmoth. They indicate the scope that such data provide for inducing changes in farming standards.

The areas

The Nkwalini Valley is a low rainfall zone with an average annual precipitation of 600 mm. Sugarcane is grown as an irrigated crop. Data have been collected from seven reasonably similar farms which in general typify the growing conditions of the area as a whole. They are situated mainly on soils of the Clansthal, Shorrocks and Longlands series. Nematode, drainage and salinity problems are not particularly noticeable. The productivity of the farms is above the average for the area as a whole.

Melmoth is a high altitude district with a well-distributed rainfall averaging 1 115 mm per annum. The seven farms from which data have been collected are similar in terms of situation, while the soils are confined almost entirely to the Inanda series, which is widespread and typifies the district as a whole. The only noteworthy hazard relates to the acidic nature of the soils and the associated phosphate fixation property.

All performance figures subsequently quoted in this paper refer to the seven farms in either the Nkwalini Valley area or the Melmoth area.

Collated data

Nkwalini Valley

Mean yield of cane . . .	125,5 tons cane/h
Mean age at harvest . .	16,5 months
Annual productivity standard	94,1 tons cane/h/annum

The three principal varieties grown in the area are NCo 376, NCo 310 and N55/805. The relative performances of these varieties are given in Figure 1.

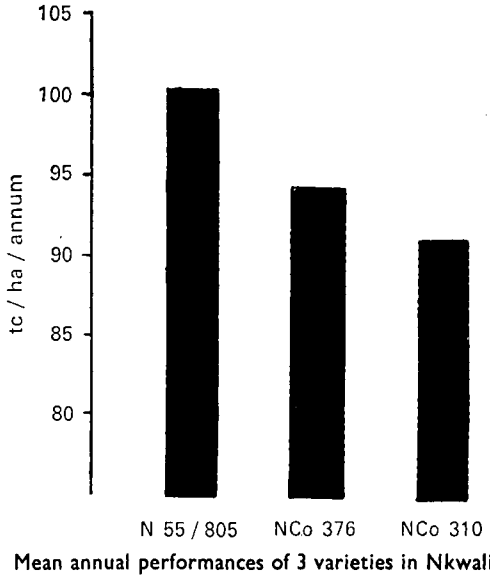

FIGURE 1 Mean annual performances of 3 varieties in Nkwalini.

Although the differences in yield are apparently small, N55/805 seems to be capable of outyielding the other varieties. The performance of this variety, as illustrated in Figure 2, is even more impressive. From the ratoon performances shown

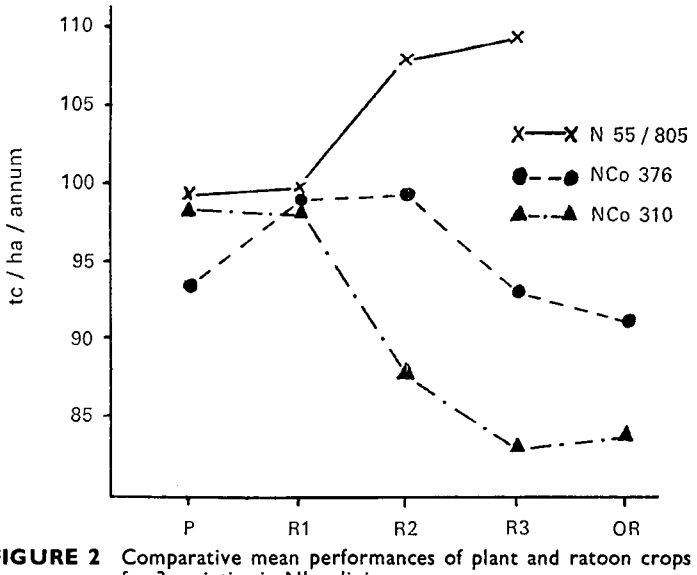

FIGURE 2 Comparative mean performances of plant and ratoon crops for 3 varieties in Nkwalini.

here it can be seen that N55/805 improved its productivity in successive ratoons up to the third, whereas the yields of the other varieties declined after the first ratoon.

Figure 3 shows how all three varieties yielded best when harvested between 11 and 14 months. Their performances declined steadily with increasing age at harvest. It should be noted that the mass of cane and not the ERS has been used as the productivity standard, the latter not being easily or accurately determinable from farm records.

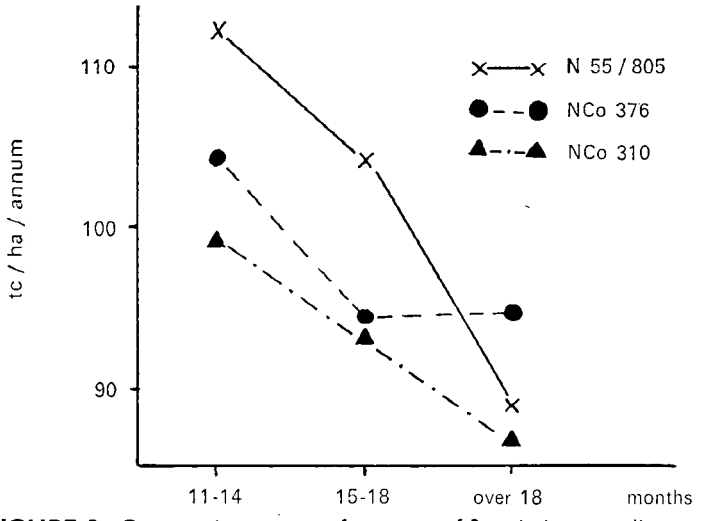

FIGURE 3 Comparative mean performances of 3 varieties according to age at harvest in Nkwalini.

Melmoth

Mean yield of cane . . .	119,8 tons cane/h
Mean age at harvest . .	22 months
First productivity standard .	65,4 tons cane/h/annum
Second productivity standard	5,68 tons/h/100mm rain

The relative performances of the two principal varieties grown in the area, namely NCo 376 and NCo 293, are shown in terms of tons cane/hectare/annum in Figure 4. The mean yields of the two varieties per annum are similar. However, it is generally accepted that, for rainfed crops grown at different times and being subject to different climatic conditions, this standard is not necessarily reliable, so yield per hectare per 100 mm of rain is a more acceptable criterion. These data are shown in Figure 5, where it can be seen that the results for the two varieties are almost identical.

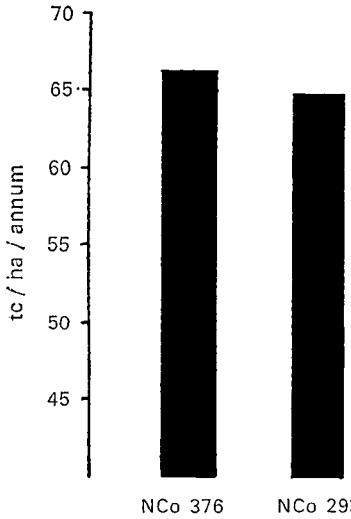

FIGURE 4 Mean annual performances of 2 varieties in Melmoth.

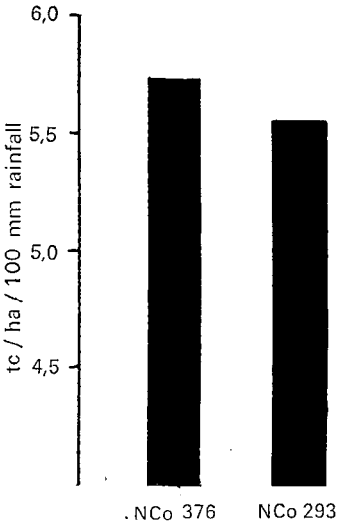

FIGURE 5 Mean performances of 2 varieties according to rainfall, in Melmoth.

The relative ratoon performances of the two varieties are shown in Figure 6. Both follow the expected pattern of a general decline, but there is a tendency for yields of NCo 376 to fall away more rapidly than do those of NCo 293.

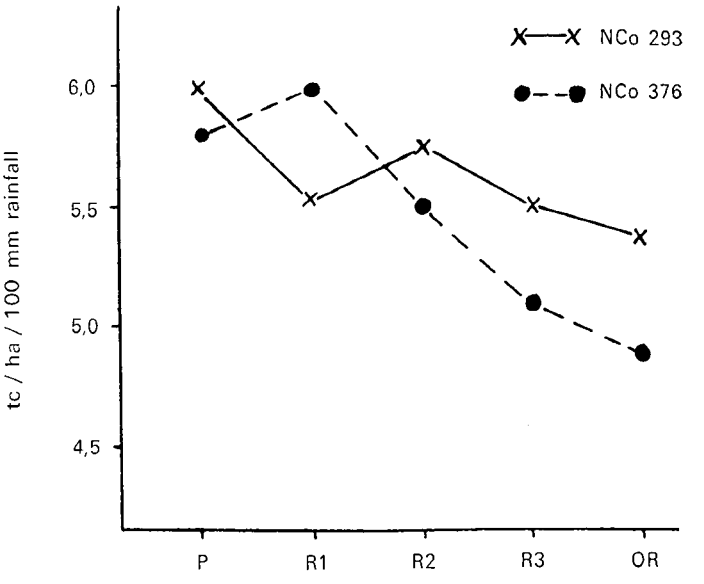

FIGURE 6 Comparative mean performances of plant and ratoon crops for 2 varieties in Melmoth.

The effect of age at harvest on the varieties is shown in Figure 7. It seems that in the cooler and therefore slower growing conditions of Melmoth, there is a wider range over which peak productivity occurs in relation to age, yield per unit of time falling away sharply only after 24 months.

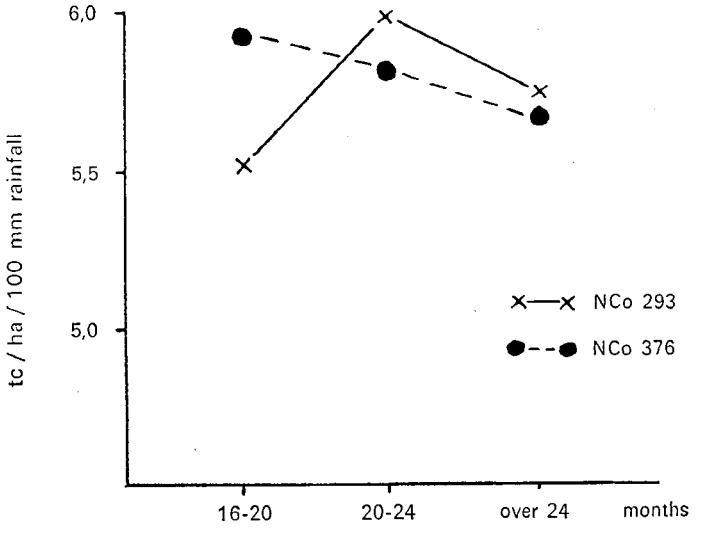

FIGURE 7 Comparative mean performance of 2 varieties according to age at harvest, in Melmoth.

Discussion

Nkwalini Valley

The overall mean productivity of 94,1 tons per hectare per annum provides a new standard for the group as a whole, and also provides a basis for reliable assessment of the potential yield for the area. Currently, NCo 376 is the main variety grown and comprises some 60% of the total. For some time NCo 376 has been replacing NCo 310 as the leading variety, but recently N55/805 has been planted on an increasing scale. The data indicate that the three varieties are all well suited to the area and, in view of the known superiority of NCo 310 and

N55/805 over NCo 376 in terms of ERS content, the absence of smut disease as a hazard, and the effect of the elimination of RSD in NCo 310 by means of hot water treatment of seed, there is good reason to propose a more balanced distribution of these three varieties. To obtain higher productivity in this area, a reduction in the average age at harvest is clearly justified. The indication is that crops should be cut when they are 12 to 15 months old.

Melmoth

NCo 376 is the dominant variety in this area and comprises more than 80% of the crop. The comparable performance of NCo 293 and the need to avoid having 'all one's eggs in one basket', suggest that there is scope for the proportion of this variety to be increased. In certain circumstances it is known to be superior to NCo 376, and there appears to be a tendency for later ratoons to be superior to those of NCo 376.

The data suggest that, in this particular area, there is considerable latitude in choosing the optimum age for harvest which ranges from 18 to 23 months. After 23 months there is a rapid decline in productivity.

Conclusions

It is apparent that good use can be made of farm records, yet relatively few cane growers keep them adequately and those who do rarely evaluate them extensively to their own advantage. There is a clear need for the extension worker to motivate the farmer to keep suitable records and to use them in the manner described. Such an effective source of information can be used to provide a grower and his neighbours with sound conclusions which refer to their specific locality, and which constitute a real means of motivating improved productivity.

As the sugar industry moves towards the use of computers for the storage and retrieval of field data, it is important that the grower should be made fully aware of the potential benefits obtainable from his records. The extension worker who has access to this information becomes more highly motivated to stimulate effective change.