

Sustaining sugarcane production in western zone of Tamil Nadu

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ABSTRACT

Tamil Nadu is one of the major cane growing states in India. Sugarcane productivity was 126.66 t/ha in safe and semi-critical areas while it was 123.72 t/ha in critical and over exploited blocks in the Western Zone. The total cost of cultivation (variable cost) was Rs.79272 per ha in critical and over exploited blocks whereas it was only Rs.75802 per ha in safe and semi-critical blocks. Strategy to maintain or increase the current Western Zone cane production can be done by continuation of sugarcane production only in the safe and semi-critical blocks (13 blocks) and expansion of the sugarcane area in safe and semi-critical blocks, which presently has minimum area under sugarcane cultivation.

INTRODUCTION

India is the largest producer of sugarcane next to Brazil and this crop is cultivated under diverse situation in India. It forms the basis for many important industries like Gur, molasses, alcohol, sugar beverages, chipboard, paper, confectionery and provide raw materials to mainly other industries such as chemicals, plastics, paints, synthetics, fibre, insecticides, detergents etc. (Alam, 2007). The area under sugarcane rose from 1.47 million hectares in 1954-1950 to 4.08 mha in 1998-99 before declining to 2.995 mha in 2003-04 at all India level. The production of cane also increased accordingly from 50.14 million tones to 293.73 million tons before declining to 230.18 million tons, respectively, in the above periods. However, the average productivity of sugarcane has increased from 34.13 tons to 78.86 t/ha. Sugar and its by-products play a pivotal role in agriculture and agro-industrial economy and contributed to nearly two per cent of GDP (Verma, 2004). The evapotranspiration (transpiration that occurs in the leaves, corresponding to the water losses, higher evapotranspiration means higher losses) of sugarcane is estimated at 8–12 mm/tons of cane and the total rainfall required by sugarcane is estimated to be 1500–2500 mm/yr, which should be uniformly spread across the growing cycle (Macedo, 2005).

In India more than 61 per cent of the cane is used for white sugar extraction and 26.5 per

cent is diverted for manufacture of Gur and *kandsari* sugar. Resource use on sugarcane farms varies with the size of a farm business (Swaibu and Nieuwoudt, 1998)

Tamil Nadu is one of the major cane growing states in India, contributing 6.41 per cent of national cane and producing 7.64 per cent national cane production in 2003-04. There are 37 sugar mills of which three (Bannari Amman Sugars Ltd., Sathyamangalam; Sakthi Sugars Ltd, Bhavani and the Amaravathi Co-operative Sugar Mills Ltd., Udumelpet) are in the Western zone of Tamil Nadu comprising Erode and Coimbatore districts. Western zone is an intensive irrigated agriculture area covering 52.86 per cent and 43.59 per cent of the net sown area by irrigation in Coimbatore and Erode districts, respectively. The sugarcane production of western zone contributes 9.81 per cent of the state production from 10.24 per cent of the state area.

METHODOLOGY

The study was conducted in 2007 and the study area was western zone of Tamil Nadu *i.e.*, Coimbatore and Erode districts. The areas of cane expansion with greater future potential are those that combine the three conditions *i.e.* more fertile soils, financial resources for irrigation purposes, cost of the energy used in irrigation with perspectives of a positive evolution in terms of logistics (Goldemberg *et al.*, 2007). So, this area has been classified into

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three groups based on the soil type and ground water availability: (i) area suitable and where sugarcane is cultivated and (ii) area suitable but sugarcane is not cultivated and (iii) area not suitable but sugarcane is cultivated. In each group, eight villages were selected randomly from the village list, representing two villages for each of the above four ground water categories namely safe, semi-critical, critical, and over exploited. In each village five farmers were selected randomly from 24 villages, covering the entire study area.

The information on land holding, irrigation structures, cropping pattern and cost of cultivation for major crops were collected through personal interview.

RESULTS AND DISCUSSION

The results obtained from the present investigation are presented below:

Cultivation of sugarcane in suitable area:

Considering area under sugarcane alone, it could be noted from the Table 1 that more than 93 per cent of cane in Erode district was cultivated in safe and semi-critical blocks while in Coimbatore district, only 32 per cent of its cane was raised in the safe and semi-critical blocks. For the western zone as a whole, 72.32 per cent cane area was in safe and semi critical blocks as where: it was 27.68 per cent in critical and over exploited blocks. The distribution of sugarcane cultivation in different ground water category blocks is presented in Table 2. In the western zone there were 23 blocks categorized as safe and semi-critical and 16 blocks categorized as critical and over exploited. Sugarcane was cultivated in more than 500 ha in 20 blocks including both groups covering an area of 32243 ha. Out of this, 13 blocks (23610 ha) were

categorized as safe and semi-critical with an average area of 1816 ha and seven blocks (8630 ha) were under critical and over exploited category having an average area of 1233 ha. In the rest of the 10 blocks categorized as safe and semi-critical, sugarcane was cultivated only in 1906 ha at an average of around 190 ha, whereas in nine critical and over exploited blocks also, sugarcane was cultivated in 1178 ha an average of around 131 hectares.

This would again indicate the intensive cultivation of sugarcane in seven of the critical and over exploited blocks and in less than potential area in 10 blocks of safe and semi critical blocks.

Productivity variation in the different ground water regimes:

The farm level enquiries revealed that the sugarcane productivity did not vary much (Table 3) among the different ground water categories. Sugarcane productivity was 126.66 t/ha in safe and semi-critical areas while it was 123.72 t/ha in critical and over exploited blocks in the western zone.

Cost of cultivation and cost of production of sugarcane in different ground water regimes:

Cost of cultivation for sugarcane was worked out from the farm level survey data. The results are presented in Table 4. On average sugarcane was cultivated in 1.42 ha per farm in safe and semi-critical blocks and in 2.24 ha per farm in critical and over exploited blocks in the sample farms. In general, sugarcane farmers' in critical and over exploited blocks incurred comparatively more expenditure on inputs like fertilizer, irrigation and plant protection chemicals (Table 4). The wage and paid for irrigation labour was Rs.3221 in critical and over exploited

Table 1 : Distribution of sugarcane production of area under sugarcane in different ground water regimes in western zones

Details	Safe and semi critical area		Critical and over exploited area		Total sugarcane area	
Coimbatore	3857	31.76	8287	68.24	12144	100
Erode	21690	93.56	1493	6.44	23183	100
Western zone	25547	72.32	9780	27.68	35327	100

Table 2 : Sugarcane cultivation under different stages of ground water level * as of 2003

Particulars	Coimbatore		Erode		Western zone	
	SS	C&O	SS	C&O	SS	C&O
Total block (No.)	4	15	19	1	23	16
Total area	3809	8334	21710	1473	25520	9807
Blocks with sugarcane of >500 ha (No.)	2	6	11	1	13	7
Area is > 500 ha blocks	3801	7156	19813	1473	23614	8629
Blocks with sugarcane of <500 ha (No.)	2	9	8	0	10	9
Area is <500 ha blocks (ha)	8	1178	1897	0	1906	1178

*Estimates from the primary data SS=Safe semi-critical, C&O= Critical & over exploited

Table 3 : Average yield* in different sugarcane production area

Details	Safe & SC	C&O	All
Coimbatore	121.03	125.35	124.49
Erode	128.07	122.41	124.93
Western	126.66	123.72	124.77

*Estimates from the primary data SC-Semi-critical

Table 4 : Input use level and cost of production of sugarcane (planted in sample farms in the suitable and non-suitable areas (per ha))

Crop	Unit	Safe & SC	C&O
Average area	Hact.	1,42	2.24
Sugarcane setts value	Rs.	12103	11636
Total fertilizer value	Rs.	7711	8252
Irrigation value	Rs.	1351	3221
Chemical value	Rs.	924	1173
Total variable cost	Rs.	75802	79272
Cane yield	Tons	126.66	123.72
Yield of production per ton	Rs.	598	641
Gross return/ha	Rs.	126660	123720
Net return/ha	Rs.	50858	44448

blocks due to more number of irrigation that too from the deeper water table. The total number of irrigation in different ground water categories are presented in Table 5. The total number of irrigation was comparatively high (63 irrigations) in over exploited blocks while it was only 46 and 44 irrigations in safe and semi-critical ground water category areas indicating, more use of water in over exploited blocks which would further deplete the water table in these areas. Adopting drip improved agronomic efficiency, physiological efficiency and apparent recovery considerably more than furrow irrigation (Singandhupe *et al.*, 2006).

Table 5 : Variation in number of irrigations between different groundwater category (Nos.)

Ground water category	Coimbatore	Erode	Western zone
Safe	-	46	46
Semi-critical	43	44	44
critical	47	48	47
Over exploited	63	-	63
All	53	46	48

The total cost of cultivation (variable cost) was Rs.79272 per ha in critical and over exploited blocks whereas it was only Rs.75802 per ha in safe and semi-critical blocks. This resulted in higher cost of production at Rs.641 per ton in critical and over exploited blocks

compared to Rs.598 per ton of sugarcane in safe and semi-critical blocks. Sugarcane cultivating farmers' in critical and over exploited blocks would lose Rs. 2103 per ha by way of additional expenditure on different inputs particularly fertilizers, plant protection chemicals, irrigation and others and a loss of Rs.2940 per ha by way of reduction in yield, all put-together amounting to a total loss of Rs.6410 per ha., beside increased use of irrigation water.

Conclusion:

In nutshell, the proposed sugarcane cultivation strategy should explore the possibility to maintain or increase the current western zone cane production (4.3 million tons) by following the strategies given below.

- Continuation of sugarcane production only in the safe and semi-critical blocks (13) which constituted only 72.31 per cent of the total sugarcane area (35300 ha) of the western zone.

- Expansion of the sugarcane area in safe and semi-critical blocks, which presently has minimum area under sugarcane cultivation. This could be implemented in two ways:

- By adopting drip irrigation and extend the sugarcane area with water save; in presently cultivated suitable blocks

- Introducing sugarcane in new area in the safe and semi-critical blocks with the support of the ground water through additional tube/dug wells.

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