

Regional variations in sugarcane production and productivity in India- A district level analysis

RAJESH KUMAR¹, O K SINHA² and ADIL ZUBAIR³

Indian Institute of Sugarcane Research, Lucknow Uttar Pradesh 226 002

There are two distinct sugarcane growing regions (tropical and subtropical) in the country which are characterized by marked differences in climatic and agro-ecological conditions. The tropical region comprises Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Gujarat, major parts of Madhya Pradesh, Orissa, Chattisgarh, Puducherry and Kerala. The subtropical region consists of Uttar Pradesh, Haryana, Punjab, Uttarakhand, Bihar, Rajasthan, West Bengal, Assam and northern part of Madhya Pradesh. Sugarcane cultivation in India is known for its diversity which is mainly the result of variations in resource endowments, climate, topography, sugar industry, institutional and socio-economic factors. Policies followed in the country and nature of technology that became available over time reinforced some of the variations resulting from natural factors. As a consequence, production performance of sugarcane sector has followed an uneven path and large gaps have developed in cane productivity between different geographic locations across the country. Although area under this crop is higher in the alluvial soil tract of subtropics, the cane yield is the highest in the humid tropics of peninsular India and the most favourable sugar recovery is generally registered in the arid Deccan plateau. These regional variations have remained a subject of concern for couple of reasons. Large variation in productivity leads to regional disparities leaving some regions behind others in making economic progress. Identification of various levels of productivity helps analyze the reasons for variation in performance and in developing location specific strategies for future growth and development of sugarcane. Variation in cane productivity also indicates scope to raise cane production and attain growth.

The variations in sugarcane performance and productivity in India have been studied most often at the state level, though a few district-level studies have also been done. Recognizing the importance of district level approach for sugarcane development, an analytical study was undertaken. District-wise data of sugarcane for the period of 2006-2007 (when sugarcane production was optimum in the country) are based on the data available with the Directorate of Economics and

Statistics, Ministry of Agriculture, Government of India, New Delhi (Anon. 2012).

Out of 622 districts in the country, sugarcane is grown in around 460 districts, of which 155 districts (Table 1) appeared to be the potential ones with respect to area under sugarcane, whereas 305 districts were not taken into account for analysis because such districts grow sugarcane in less than 0.07% area of the total cane area in the country. The 155 potential districts for sugarcane contribute more than 95.98 % sugarcane area and 96.82% of cane production in the country. To study the intensity of cane area in a district, spread index of sugarcane was derived as the percentage of ratio of sugarcane area in a district and total sugarcane area in the country in the same year. These 155 districts were divided into five class intervals of 0.07 to 6.0% based on spread index of sugarcane viz., 0.07-0.2, 0.2-0.5, 0.5-1.0, 1.0-2.0 and 2.0-6.0. Total sugarcane area, production and yield for each class interval are presented in table 2.

The perusal of table 2 showed that in 29 districts, grouped under high and very high spread index, average sugarcane yield is low (70 and 67 t/ha respectively). These 29 districts contribute nearly 60.31% of cane area and 57.94% of cane production in the country. Out 29 districts, 17 districts are from U.P., 6 from Maharashtra, two from Karnataka and one each from Gujarat, Tamil Nadu, Bihar and Uttarakhand. In 69 districts which are grouped under medium and low spread index, average sugarcane yield is high (77.64 and 74.88t/ha respectively), but they contribute only 32.36% of cane area and 34.68% of cane production in the country. Out 69 districts, 14 are from U.P., 13 from Maharashtra, 9 from Tamil Nadu, 8 from Andhra Pradesh, 6 each from Karnataka and Haryana, 4 from Bihar, 3 each from Gujarat and Punjab and one from Uttarakhand. 57 districts had very low spread index, but their average cane yield was relatively higher (71.17 t/ha) than the districts with higher spread index. These 57 districts contribute about 7.32% of cane area and 7.38% of cane production in the country. Most of these districts were in U.P. (16), Tamil Nadu (13) and Bihar (7).

It was also noted that in districts with relatively higher sugarcane area, cane productivity is lower and *vice-versa*. Better remuneration from sugarcane than other crops and more number of sugar mills in areas with higher spread index, favourable environment and better soil fertility in areas with lower spread index can be the probable reasons for this finding.

¹Principal Scientist; ²Project Coordinator; ³Technical Officer, AICRP(S)

Table 1 Distribution of districts of India in different spread index classes vis-à-vis cane area, production and productivity

Spread Index	State	District
2.0-6.0 (Very High)	Uttar Pradesh	Muzaffarnagar, Kheri, Bijnor, Sitapur, Saharanpur, Meerut
	Maharashtra	Solapur, Kolhapur
	Gujarat	Surat
	Bihar	West Champaran
1.0-2.0 (High)	Karnataka	Belgaum, Bagalkot
	Maharashtra	Ahmednagar, Pune, Satara, Sangli,
	Tamil Nadu	Villupuram,
	Uttar Pradesh	Balrampur, Moradabad, Kushi Nagar, J.B.Phule Ngr, Bareilly, Bagpat, Gonda, Ghaziabad, Pilibhit, Bullandshahr, Shahjahanpur
0.5-1.0 (Medium)	Uttarakhand	Haridwar
	Andhra Pradesh	West Godavari, Visakhapatnam
	Bihar	Gopalganj
	Gujarat	Bharuch, Navsari
	Karnataka	Medak, Bidar, Chittoor
	Maharashtra	Beed, Latur, Osmanabad, Nasik, Nanded
	Tamil Nadu	Thiruvannamalai, Erode
	Uttar Pradesh	Bahraich, Hardoi, Basti
	Uttarakhand	Udham Singh Nagar
	Haryana	Yamuna Nagar
	Punjab	Gurdaspur
	Andhra Pradesh	Krishna, Nizamabad, Srikakulam, Nellore, East Godavari, Vizianagarm
0.2-0.5 (Low)	Gujarat	Valsad, Junagarh
	Bihar	Madhepura, Sitamarhi, East Champaran
	Haryana	Sonepat, Rohtak, Karnal, Kurkshetra, Ambala
	Punjab	Hoshiarpur, Jalandhar
	Karnataka	Bijapur, Mandya, Mysore
	Madhya Pradesh	Narsinhpur
	Maharashtra	Parbhani, Aurangabad, Jalgaon, Hingoli, Jalna, Nandurbar, Yavatmal, Dhule
	Tamil Nadu	Thanjavur, Vellore, Dharmapuri, Namakkal, Perambalur, Salem, Pudukottai
	Uttar Pradesh	Maharajganj, Badaun, Azamgarh, Barabanki, Faizabad, Deoria, Rampur, Aligarh, Jaunpur, Farrukhabad, Sultanpur
0.07-0.2 (Very Low)	Andhra Pradesh	Khammam
	Assam	Karbi-Anglong, Nagaon
	Bihar	Siwan, Samastipur, Bhagalpur, Madhubani, Mujaffarpur, Banka, Begusarai
	Gujarat	Narmada
	Haryana	Panipat, Faridabad, Jind
	Punjab	Amritsar, Kapoorthala, Ropad, Navanshhr
	Karnataka	Hassan, Gulbarga, Davangere
	Madhya Pradesh	Chhindwara, Sehore, Betul
	Orissa	Koraput
	Tamil Nadu	Coimbatore, Theni, Chamarajannagar, Dindigul, Karur, Trichy, Madurai, Nagapattinam, Tirunelveli, Kancheepuram, Thiruvallu Virudhunagar, Sivagangai R
	Uttar Pradesh	Fatehpur, Ambedkar Ngr., Etah, Ballia, Ghazipur, Raebareli, Mathura, Mau, Siddharth Nagar, Varanasi, Unnao, Jalaun, Kanpur City, Sant Kabir Nagar, Hamirpur, Gorakhpur
	Uttarakhand	Dehardun, Nainital
	West Bengal	Murshidabad

Table 2 Sugarcane area, production and yield in different class intervals

Spread index and class interval	Zone	Area ('000 ha)	Production ('000000 t)	Yield (t/ha)	Number of districts
2.0 - 6.0 (Very High)	Zone I	1567 (32.76)	104 (30.84)	67.00	10 (6.37)
1.0 - 2.0 (High)	Zone II	1317 (27.55)	92 (27.10)	70.00	19 (12.10)
0.5 - 1.0 (Medium)	Zone III	764 (15.98)	59 (17.44)	77.64	21 (14.01)
0.2 - 0.5 (Low)	Zone IV	783 (16.38)	58 (17.24)	74.88	48 (30.57)
0.07 - 0.2 (Very Low)	Zone V	350 (7.32)	25 (7.38)	71.78	57 (36.94)
Total		4783 (95.60)	340 (96.38)	71.17	155
India		5003	353	70.60	460

Sugarcane Spread - Percentage of sugarcane area in a district to total cane area of the country

However, there is a need to analyze the factors that actually influence cane productivity especially in areas with higher spread index so that enhanced thrust can be applied on technology development and extension in such areas. It would be more logical to concentrate our research and development programme for increasing cane productivity in 29 sugarcane districts with high and very high spread index of sugarcane as

such districts contribute more to acreage and cane production in the country.

REFERENCES

Anonymous 2012. Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, New Delhi.