

Original Research Article

Statistical Analysis of Factors Affecting the Production of Sugarcane Yield

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Article History

Received: 27.12.2024

Accepted: 01.02.2025

Published: Yes

Abstract: Sugarcane is regarded as essential crop worldwide due to its extensive use in day today lives of people and its industrial intended for dietary and economic sustenance. Study was conducted to analyze the effectiveness of various factors that are responsible for sugarcane production. Study discovers that cost invested for production of yield i.e. Urea, Land Preparation, Pesticides, Herbicides and cost of irrigate on were important aspects which influenced on their turns of sugarcane growers.

Keywords: Sugarcane production, method of irrigation, Kolmogorov Smirnov Test.

1. INTRODUCTION

Sugarcane is oldest crop known to man and it is most important cash crop of India. Sugarcane provides raw material for second largest agro based industries after textile. It is full of antioxidants that are essential to building and maintaining a healthy immune system. Antioxidant help combat free radicals (molecules that caused damage to cells) that can worsen several medical problems like diabetes, malaria, myocardial infarction, and skin cancer. Sugarcane is long duration crop and faces various biotic stresses like shortage of water, high temperature during summer, low temperature during winter, flooding during rainy season, nutritional stress, salinity, alkalinity and biotic stresses like fungal diseases as red dots, smut, wilt, locary mawa etc. Nkosingiphile Samuel Zulu *et al.*, (2019) studied factors affecting sugarcane production by small-scale growers in Ndwedwe Local Municipality, South Africa.

Approximately 80% of the world's sugar is produced from sugar cane in tropical and subtropical climates. The remaining 20% comes from sugar beets, which are grown mostly in the temperate zones of the Northern Hemisphere. A total of over 120 countries produce sugar. India is second largest country in sugar cane production in the world. Improving sugarcane production will greatly help in economic prosperity of the farmer's and stakeholder's associated with sugarcane cultivation. In India sugarcane cultivated over an area of 5.228 million hectare, with an annual production of 355 million tons and productivity 85.98 ton per hectare. In Tropical zone Maharashtra is the major sugarcane growing state covering about 9.4 lakh ha area with production of 61.32 Million ton.

2. METHODS AND MATERIALS

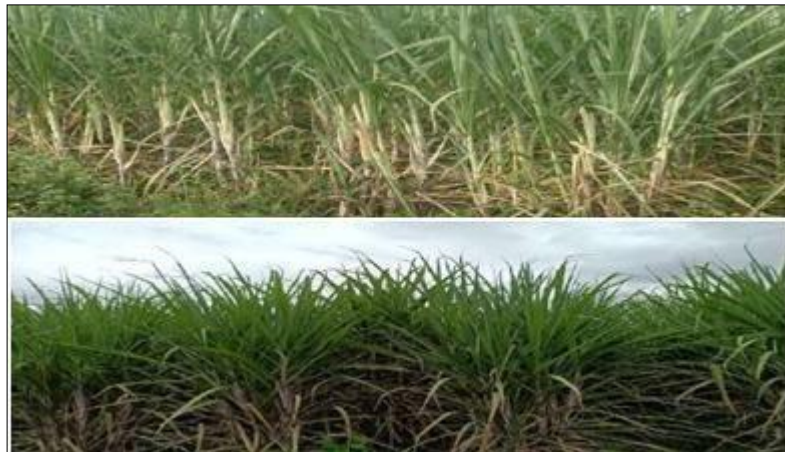
This study is done on primary data. The data is taken from farmers in Miraj Tehsil area. There are 1443 total families in Miraj Tehsil region. The total data collected from farmers is 303 by using sampling method. There are two cultivation methods: Nursery Plant and Cane sugar seed's. There are different types of cane sugar as Co-8371 (Bhima), Co-85004 (Prabha), Co-86032 (Nayana), Co-87025 (Kalyani), Co-87263 (Sarayu) etc. Crop type taken for these project are 86032, 10001, 8005, 265. Type cane sugar.

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CITATION: Prakash Rajaram Chavan (2025). Statistical Analysis of Factors Affecting the Production of Sugarcane Yield.

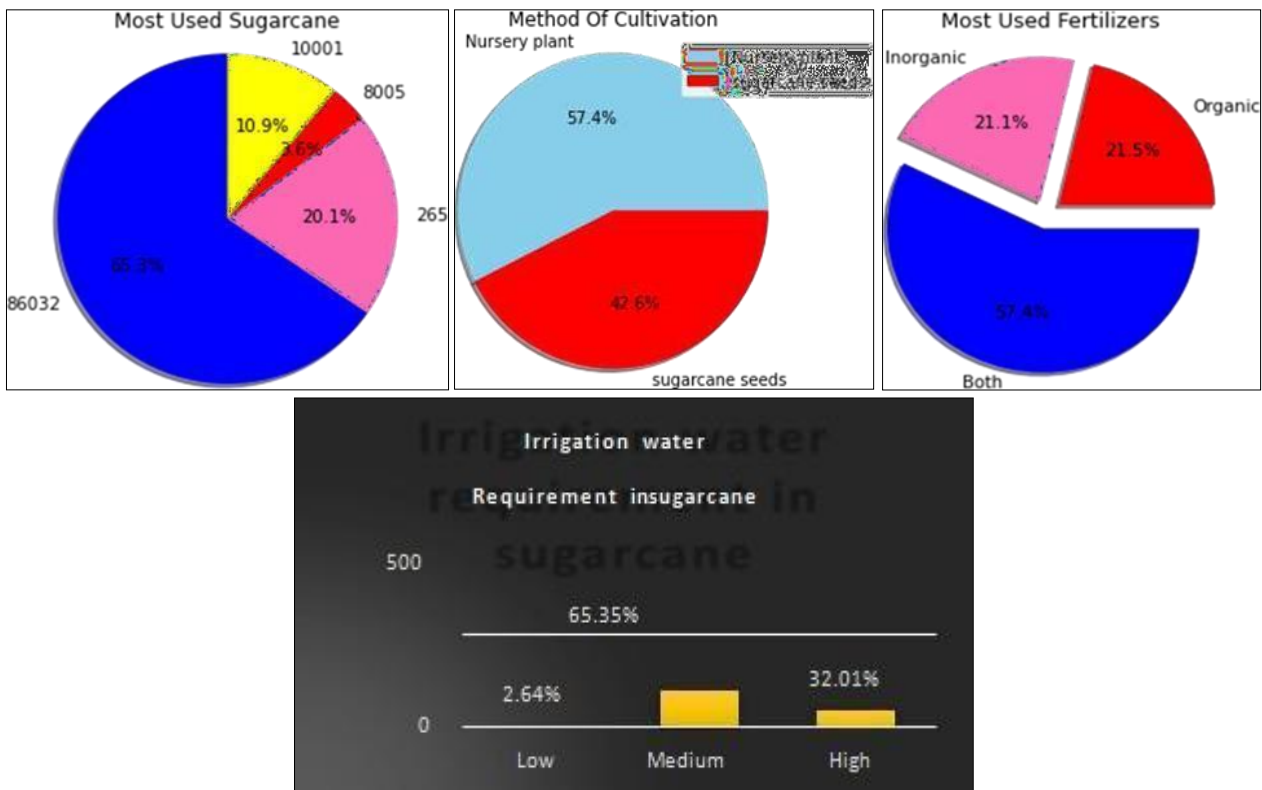
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South Asian Res J Eng Tech, 7(1):11-13.



3. **Statistical Analysis:** The statistical analysis includes graphical representation and statistical tests as follows.

Graphical Representation:



Statistical Tests:

❖ **Kolmogorov-Smirnov Test Hypothesis:**

H₀: There is no significant difference between average yield of rainy and winter season. H₁: There is significant difference between average yield of rainy and winter season.

Formula: $CalD = \max |S_n(x) - S_n(Y)|$ $TabD = 1.36 * \sqrt{\frac{n1+n2}{n1*n2}}$

Observation Table:

X(Rainy)	LCF(X)	S _n (X)	Y(Winter)	LCF(Y)	S _n (Y)	S _n (X)-S _n (Y)
21	21	0.1826	57	57	0.3031	0.1205
53	74	0.6434	83	140	0.7446	0.1012
29	103	0.8956	33	173	0.9202	0.0245
12	115	1	15	188	1	0

Calculation: $CalD = \max|Sn(x) - Sn(Y)|$ $CalD = 0.1205$ $TabD = 1.36 * 0.1184$ $TabD = 0.1610$

❖ **Mean Test for Two Sample Hypothesis:**

H_0 : There is no significant difference between average yield of 86032 and 265 type of sugarcane. i.e. $H_0: \mu_1 = \mu_2$. H_1 : There is significant difference between average yield of 86032 and 265 type of sugarcane.

i.e. $H_1: \mu_1 \neq \mu_2$ Here,

$n_1 = \text{size}(86032) = 198$ $n_2 = \text{size}(265) = 61$ $\mu_1 = \text{average yield of } 86032 \text{ type} = 1.7075$

$\mu_2 = \text{average yield of } 265 \text{ type} = 1.2950$ $v_1 = \text{variance of } 86032 \text{ type} = 0.49$

$v_2 = \text{variance of } 265 \text{ type} = 0.2731$

Calculation: Then calculated $Z_{Cal}|z| = 4.9427$, $Tabz = 1.96$ $Cal|z| > Tab|z|$

4. RESULT: Here, $Cal|z|$ is greater than the $Tab|z|$ hence we reject H_0 at 5% level of significance.

5. CONCLUSIONS

1. Out of 303 farmers 65.3% farmer used 86032 type of sugarcane, 20.1% farmers used 265 type of sugarcane, 10.9% used 10001 Type and 3.6% farmers used 8005 Type of sugarcane in Bhilawadi village.
2. Almost 57.4% farmers used Both (Organic & Inorganic) Fertilizers and it also increases Average yield.
3. There are mainly two methods of cultivation used in village, in which Nursery plant is used by 57.4% of farmer & Sugarcane seed is used by 42.6% of farmer which is useful for increasing yield but Seed germination is only 70% then the seed have to be sown again in non-germinated areas and that is costly so Nursery plant is more used than Sugarcane seeds.
4. Almost 65.35% farmers are of the opinion that sugarcane crop needs medium (moderate) Amount of water.
5. There is no significant difference between Average yield of Rainy and winter season. The two attributes type of sugarcane and Average yield are not independent i.e. dependent.
6. There is significant difference between average yield of 86032 and 265 type of sugarcane.

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