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Resource use efficiency of sugarcane production in Belagavi district of Karnataka

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Abstract
The study was undertaken to assess the resource-use efficiency of sugarcane producers in Belagavi district, Karnataka. The primary data were collected from sugarcane farmers' personal interview. Cobb-Douglas production function is used to estimate the resource use efficiency. The value of Coefficient of Multiple Determination (R^2) was found to be 0.98 indicating 98% of variation in sugarcane yield. The coefficient elasticities for human labour, machine labour, planting material, manures & fertilizers and plant protection chemicals were found to be positive, but only human labour, machine labour and planting material were found to be significant. The comparison of marginal value productivity of resources with heir acquisition cost shows that increase in expenditure on human labour, machine labour and planting material would increase the gross income from sugarcane indicating these resources are underutilized and statistically only planting material was significant.

Keywords: Sugarcane, variables, resource use efficiency, marginal value product (MVP), marginal input cost (MIC)

Introduction
Sugarcane is one of the major commercial crops grown in the world because of its strategic positioning and vast used in routine life of any country as well as industrial uses aimed at nutritional and economic sustains. It is most important source of sugar or sucrose. Sugarcane is the main source of sugar, Gur and Khandsari. It also serves as a source of raw materials for the production of alcohol. As cash crop, it ranks third in most cultivated crops after paddy and wheat. The performance of this crop has important bearing not only for the growth and development of agriculture and also the capacity utilization for growth of the industrial sector.

Sugarcane is grown more than 100 countries in the world, it is grown on around 26 million hectares of land with a worldwide production of about 1.87 billion tonnes and productivity of 71 tonnes per hectare in 2020. Brazil is the largest sugarcane producer in the world followed by India, China, Thailand, Pakistan, Mexico and Columbia.

India is world's biggest sugar consumer with a consumer base of more than billions of people. Sugar is the second largest processed product in India after cotton and textiles. Sugarcane plays crucial role in the Agro-Industrial economy of India. It mobilises rural resources in generating higher income and employment opportunities

Uttar Pradesh (2.18 million hectares) is the largest producer in India, and contributes more than 44.9% of the total production, Maharashtra (1.14 million hectares) is the 2nd most important states in terms of Sugarcane production and contributes 23.5% of total production of the nation, Karnataka (0.44 million hectares) is in 3rd position with the share of 9.12% of total production. These three states taken together account for around three-fourth of the total Sugarcane production in the country. In India Karnataka stands third in cane production next to Uttar Pradesh and Maharashtra states and second with respect to sugar recovery after Maharashtra.

Materials and Methods
The study deals with the Resource use efficiency of Sugarcane cultivation in Belagavi district of Karnataka. Primary data are collected randomly from 100 sugarcane farmers.

The Cobb-Douglas production function was used to determine the regression co-efficient. It is specified as

$$Y = a\, X_1^{\,b1}\, X_2^{\,b2}\, X_3^{\,b3}\, X_4^{\,b4} X_5^{\,b5}\, e^u$$

When stated in logarithmic terms this function transformed into linear function of the following type,

$$\ln Y = \ln a + b1 \ln X_1 + b2 \ln X_2 + b3 \ln X_3 + b4 \ln X_4 + b5 \ln X_5 + u$$

Where

Y = Gross returns (in Rs/ha)
X_1 = Expenditure on Human labour (in Rs/ha)
X_2 = Expenditure on Machine labour (in Rs/ha)
X_3 = Expenditure on Planting material (in Rs/ha)
X_4 = Expenditure on Manures and Fertilisers (in Rs/ha)
X_5 = Expenditure on Plant protection chemicals (in Rs/ha)
a = Intercept or Constant term
bi = Elasticities of co-efficient of respective inputs
u = Error term

Marginal Value Productivity

The marginal value productivity (MVP) of input X_1, X_2......X_5 for Cobb-Douglas production function was computed as follows

$$MVP_i = bi.\ \bar{Y} / \bar{X}$$

Where,
bi= Estimated regression coefficient of input Xi,
$\bar{Y}$= Geometric mean value of output,
$\bar{X}$ = Geometric mean value of input being considered

Resource Use Efficiency

If inputs are used to the extent so that its MVP is equal to its price, there exists efficient use of resources. Mathematically,

If, MVP = MIC

Where

MIC = Marginal input cost of X_i

Any deviation of MVP of variable input Xi from its unit price, may be called as the resource use inefficiency. The higher the difference between these two, the higher is the inefficient use of resource and vice-versa.

The criterion for determining optimality of resource use will be
MVP = MFC, Efficient utilization
MVP < MFC, Over utilization
MVP > MFC, under utilization

Results and Discussion

The regression co-efficient were estimated to identify the significant variables. From the table 1 it is noted that the value of coefficient of Multiple Determination (R^2) was found 0.98 which means that 98 per cent of variation in output would be explained by five independent variables i.e., human labour (X_1), machine labour (X_2), planting material/seed (X_3), manures and fertilizers (X_4) and plant protection chemicals (X_5). It is observed from the table that the regression coefficient for all the inputs is positive and coefficient elasticity for human labour, machine labour and planting material/seed were estimated to be 0.447, 0.224 and 0.244 respectively and statistically significant at 1 per cent level of probability. This indicates that sugarcane production can be increased with the use of additional unit of these inputs *viz* human labour, machine labour and planting material/seed. For example, the production function indicated that by increasing one percent use of human labour, production of sugarcane would increase by 0.48 percent. The coefficient of elasticity for manures & fertilizers and plant protection chemicals were 0.083 and 0.053 respectively but statistically insignificant.

Table 1: Regression coefficients and standard error of production function for Sugarcane

Variables	Coefficients	Standard Error	P value
Constant/Intercept	1.772	0.188	3.12E-15
Human labour (X_1)	0.477***	0.087	0.00000039
Machine labour (X_2)	0.224***	0.063	0.00061
Planting material (X_3)	0.244***	0.093	0.0100
Manures & Fertilizers (X_4)	0.083	0.075	0.268
Plant protection Chemicals (X_5)	0.053	0.062	0.397
R^2	0.98		

Note: *** Indicates significant at 1 per cent level

Table 2: Marginal value productivity of inputs used in sugarcane production

Variables	MVP	MIC	Difference
Human labour (X_1)	4.978	1.00	3.978
Machine labour (X_2)	4.358	1.00	3.358
Planting material (X_3)	4.116	1.00	3.11
Manures & Fertilizers (X_4)	0.692	1.00	-0.308
Plant protection chemicals (X_5)	2.032	1.00	1.032

From the table 2 it is shown that Marginal Value Product was calculated to find out the Resource use efficiency of sugarcane cultivation. The findings shows that the value of MVPs of human labour (X_1), machine labour (X_2), planting material (X_3) and Plant protection chemicals (X_5)) are 4.978, 4.358, 4.116 and 2.032 respectively, which are positive and higher than the MIC of respective inputs. This indicates that these inputs are underutilized and production can be increased by increasing the units of inputs. Whereas the MVP of Manures and Fertilizers (X_4) is 0.692 which is less than MIC indicating overutilized.

Conclusion

The functional analyses were carried out to know the contribution of independent variables in yield of sugarcane. From the estimated Cobb-Douglas production function, the resource-use efficiency of the producers depicted that none of the resources were used efficiently it is noted that the most of the resources are underutilized. The study recommends that the farmer should increase the quality of inputs supplied and suggest using improved varieties and adopting new technologies in order to get efficient yield.

References

1. Koshta AK, Choudhary V. Assessment of precision farming in sugarcane growing areas of Chhattisgarh. Project Report, Chhattisgarh State Planning Commission; c2017.
2. Mali BK, Pawar PP, Shete SM, Yadav DB. Impact of input use gap and technology adoption on productivity of Sugarcane in Western Maharashtra. Cooperative Sugar. 2007;38(9):45-53.
3. Nagpure SC, Jhakare AB, Khandare AP, Patil RK. Economics of sugarcane production in Vidarbha region of Maharashtra state. Rural India. 2004;67(6-7):123-125.
4. Anitha P, Senthil Kumar R, Rajendran T, Muralidharan C. Resource use efficiency in sugarcane production in

Tirunelveli district of Tamil Nadu. Journal of Pharmacognosy and Phytochemistry. 2019;8(3):3529-3531.
5. Sandeep Bogage. An economic analysis of cropping systems in Bidar district of Karnataka. M.Sc. (Agri.) Thesis, University of Agricultural Sciences, Dharwad.
6. Sitole RS, Agrawal GP, Nahatkar SB. Profitability and resource use efficiency in cultivation of sugarcane in Nimar zone of Madhya Pradesh. Indian Sugar. 2005;55(2):95 100.
7. Jaiswal U, Nishad J, Choudhary V. An economic analysis of production of sugarcane under different method of irrigation in Durg division of Chhattisgarh. International Journal of Chemical Studies; c2018.
8. Umesh, *et al*. Resource use efficiency in sugarcane production in Kawardha and Balod district of Chhattisgarh. IJCS. 2017-18;6(1):1223-1226.
9. Veeresh S Wali, Kiran L Kadam, Upasana Mohapatra, RK Mishra. Economics of sugarcane cultivation in Bagalkot district of Karnataka. The Pharma Innovation Journal. 2019;8(2):261-265.