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RESOURCE PRODUCTIVITY AND EFFICIENCY OF SUGARCANE CULTIVATION: AN ECONOMIC ANALYSIS IN THENI DISTRICT, TAMIL NADU

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ABSTRACT

Sugarcane is grown in more than a hundred countries, by independent farmers and agro industrial firms. While the sugar and rum markets have always been the prime outlets for the crop, it is increasingly the object of interest from pharmaceutical, chemical and energy firms. Farmers will have to satisfy growing, ever more diverse demand. The study conducted in Theni District and 255 farmers are approached to find the details regarding the relationship of resources usage predicting the economic usage.

KEYWORDS: Sugarcane, Economic, Resources, Land, Material, Manpower, Technology

INTRODUCTION

Sugarcane is a tropical and subtropical crop that requires a hot and humid climate to grow. A tall, perennial grass species known as sugarcane or sugar cane is utilised in the production of sugar. The 2–6 m tall plants have thick, jointed, fibrous stalks that are rich in sucrose and accumulate in the internodes of the stalks. Several other states grow sugarcane in addition to Uttar Pradesh, which is the largest producer of sugarcane in India. The largest sugarcane producing state in India is Maharashtra. The annual production of sugarcane in 2022-23 in Maharashtra was 138 lakh tonnes Uttar Pradesh, Karnataka, and Maharashtra together contribute to 80% of the total sugarcane production in India. Maharashtra produces 61.32 million tonnes of sugarcane on average per year.

Significance of the Study

Sugarcane is able to grow over a prolonged season. Under warm humid conditions, it can continue its growth, unless terminated by flowering. For ripening, it needs a cool, dry season; but where rainfall is too heavy and prolonged, the quality of the juice tends to be low, and where the weather remains comparatively. In many places, dark rich clay loams, 120-150cm deep, and lying on a previous

substratum of murum (disintegrated traprock) used for this crop. Water requirement of sugarcane varies from 2000 to 2500 mm depending upon its duration, soil type and climatologically factors. The main purpose of the present study is to understanding the relationship of resources usage in sugarcane predicting economic usage

Objectives of the Study

1. To find the relationship of sugarcane production resources usage and economic usage.
2. To analysis the sugarcane production resources like Land, Man power, Material, Financial, Electricity, Water, Technology

Methodology of the Study

The study is based on primary date. Primary data has been collected through the personal interview, with the help of preplanned interview schedules. Data regarding resources of production in sugarcane in Theni District under small (1 to 5 acres) medium (6 to 10 acres) and large (11 to 15 acres) farmers.

Tools of Analysis

Following statistical analysis have been used for analyzing the data linear relationship of resources economic usage significantly predicts the overall economic resource usage in sugarcane cultivation. Simple percentage analysis used in the present study.

REVIEW OF LITERATURE

G. Kshirsagar (2008) study was based on primary data collected from OS (organic sugarcane) and IS (inorganic sugarcane) farmers through personal interviews with the help of a specially designed questionnaire. This study analysed that cultivators practicing OS farming are moderately earlier and more educated having larger land holding and better resources. The OS cultivating was found to be prevalent than is cultivating on account of expended human labour employment, lower fetching, higher benefits, better input efficiency, improved self – reliance and job security of the agriculturists. In addition, OS cultivating had positive affect on productivity, demonstrating considerable potential for preservation of water assets in a water rare state like Maharashtra. Thus, OS farming has greater potential in achieving the goal of sustainable cultivation of sugarcane crop and ensuring economic well being of the farmers. Finally, he concluded from this study that, it was crucial to formulate policies and strategies to promote OS farming in order to realise its full potential in selected regions of Maharashtra.

K. S. Sujitha et. al., (2020) study on ground water irrigation has been important role in Indian

agriculture sector and develops productivity of crops, farm income and also decreases rural scarcity. Given the fast degeneration of ground water resources due to several reasons, there is a need to increase the water use efficiency in crop cultivation. In this study, to find out the water use efficiency in three different water intensive crops namely curry banana, sugarcane and paddy cultivated using ground water. Among the three crops, highest cost of cultivation is found to be with sugarcane crop as compared to other two crops. The irrigation water productivity and water use efficiency is higher for sugarcane crop. But, in the case of profitability and economic water productivity, curry banana crop cultivation seems to be more efficient. Paddy appears to be more inefficient crop both in terms of irrigation water productivity and economic water productivity, which is plausible. Due to poor water – usage literacy, farmers still continue to cultivate paddy under the conventional inundation method which is no longer sustainable due to looming water scarcity. Paddy is presently cultivated in 43-44 million hectares of land in India. Finally, this paper suggests that, with ever increasing water scarcity, cultivating paddy under straight inundation method will put more pressure on the scarce water resources in the future. Therefore, special programmes with attractive incentives need to be expressed to change the cropping design from paddy to other crops that can give increased water efficiency as well as more income to every drop of water.

METHODOLOGY

Data Collection: For the collection of data, the interview schedule was framed and content validity was tested by the experts and 300 sugarcane cultivators cultivating sugarcane crop in Theni District, Tamil Nadu state, India, were orally interviewed and 255 responses (85% response rate) were taken into account for the data analysis.

Data analysis: Frequency analysis was carried out to capture the opinion of the cultivator respondents on various resources usage in sugarcane crop cultivation. The linear regression analysis was applied to test the relationship of the ways of resources usage explaining the economic efficient usage of resource.

Demographic Frequencies; The age and literacy level of the respondents is significantly related with the usage of resources to increase sugarcane production yields. The 31-40 yrs age group of the 126 respondents (49.4%), 41- 50 yrs age group of 48 respondents (19%), 51-60 yrs age group of 44 respondents (17.2%), 61 – 70 yrs age group of 37 respondents (14%) shared the various resources and the way of using resources economically. 139 respondents (54.5%) had secondary level education, 64 respondents (25%) had higher secondary level education and 52 respondents (20%) had graduation level of education who shared the efficient ways of using the resources for sugarcane production and evidenced the causal and explanatory relationship of resources for economic efficient usage of resources.

Objectives

To find out the various resources used in sugarcane crop cultivation and to find out the linear relationship of identified resources explaining economic efficient usage of the resources. To emphasize the significance of efficient way of using resources to attain the economic usage

Hypothesis

H₁: Efficient use of sugarcane cultivation resources has significant linear relationship with economic usage

H₂: Land resource usage significantly explaining the linear relationship with economic resource usage in sugarcane cultivation.

H₃: Manpower resource usage significantly explaining the linear relationship with economic resource usage in sugarcane cultivation

H₄: Material resource usage significantly explaining the linear relationship with economic resource usage in sugarcane cultivation

H₅: Financial resource usage significantly explaining the linear relationship with economic resource usage in sugarcane cultivation

H₆: Electricity resource usage significantly explaining the linear relationship with economic resource usage in sugarcane cultivation

H₇: Water resource usage significantly explaining the linear relationship with economic resource usage in sugarcane cultivation

H₈: Technology resource usage significantly explaining the linear relationship with economic resource usage in sugarcane cultivation

RESULTS AND DISCUSSION

The study assumed that the efficient use of the identified resources of sugarcane crop cultivation as land, manpower, materials, finance, electricity, water and technology may significantly predict and explaining the linear relationship with the economic resource usage. The linear regression analysis results the significant relationship of efficient use of resources with economic usage resulting yield outcomes.

Efficient usage	Economic Usage of Sources						
	M	SD	R ² Value	SE	F Value	Beta value	P value
Sugarcane Cultivation Resources							
Land	3.76	0.734	.947	.138	6.67	.973	.000 ^a
Manpower	3.78	0.609	.798	.270	1.47	.893	.000 ^a
Materials	3.78	0.623	.540	.407	436.80	.735	.000 ^a
Finance	3.78	0.623	.738	.307	1.04	.859	.000 ^a
Electricity	3.78	0.600	.864	.221	2.36	.930	.000 ^a
Water	3.76	0.684	.788	.277	1.38	.888	.000 ^a
Technology	3.77	0.692	.807	.264	1.55	.898	.000 ^a
Source: Compiled SPSS data							

Land & Water resources relationship - The framed regression equation $F(372) = 6.672$, p value < 0.05 shows the statistical significant evidence to reject the null hypothesis and accept the alternative that land resource usage ($M = 3.76$, $SD = 0.734$) is significantly predicting economic resource usage ($M = 3.75$, $SD = 0.60$) in sugarcane cultivation by $R^2 = 0.947$ (95%). A significant regression equation was framed $F(372) = 1.381$, p value < 0.05 that shows there is a statistical significant evidence to reject the null hypothesis and accept the alternative that water resource usage ($M = 3.76$, $SD = 0.684$) is significantly predicting economic resource usage ($M = 3.75$, $SD = 0.600$) in sugarcane cultivation by $R^2 = 0.788$ (79%)

Manpower, Material & Finance resources relationship - The framed regression equation $F(372) = 1.472$, p value < 0.05 exhibits the statistical significant evidence to reject the null hypothesis and accept the alternative that man power resource usage ($M = 3.78$, $SD = 0.609$) is significantly predicting economic resource usage ($M = 3.75$, $SD = 0.60$) in sugarcane cultivation by $R^2 = 0.798$ (80%). The framed regression equation $F(372) = 436.805$, p value < 0.05 results in the statistical significant evidence to reject the null hypothesis and accept the alternative that materials resource usage ($M = 3.78$, $SD = 0.623$) is significantly predicting economic resource usage ($M = 3.75$, $SD = 0.60$) in sugarcane cultivation by $R^2 = 0.540$ (54%) and the framed regression equation $F(372) = 436.805$, p value < 0.05 evidences the statistical significant evidence to reject the null hypothesis and accept the alternative that finance resource usage ($M = 3.78$, $SD = 0.623$) is significantly predicting economic resource usage ($M = 3.75$, $SD = 0.60$) in sugarcane cultivation by $R^2 = 0.738$ (74%)

Electricity & technology resources relationship - The framed regression equation $F(372) = 2.364$, p value < 0.05 shows the statistical significant evidence to reject the null hypothesis and accept the

alternative that electricity power resource usage ($M = 3.78$, $SD = 0.600$) is significantly predicting economic resource usage ($M = 3.71$, $SD = 0.669$) in sugarcane cultivation by $R^2 = 0.864$ (86%). The framed regression equation $F(3,72) = 39.443$, $p \text{ value} < 0.05$ shows the statistical significant evidence to reject the null hypothesis and accept the alternative that technology resource usage ($M = 3.77$, $SD = 0.692$) is significantly predicting economic resource usage ($M = 3.75$, $SD = 0.600$) in sugarcane cultivation by $R^2 = 0.807$ (81%)

Finally, the regression analysis results the linear relationship of resource economic usage significantly predict and explain the overall economic usage of resources. This shows the linear relationship between the resources predicting economic usage that will result cost minimization, cultivation process improvement and more yields. Among all resources usage, land (95%), manpower (80%), electricity(86%), water (78%), technology (81%) resource significantly predicting the linear relationship with economic resource usage.

DICUSSION

Firstly, Being the land and water sources are the primary sources of agriculture production notably food crops cultivations, without which there is no yield of production and revenue. The way we use these primary sources will enable to the economic state that resulting better outcomes and earnings. The study results the significant relationship of efficient way of using these primay sources will result the economic efficiency usage of the sources resulting optimal yields. By this way, the proper meaurments of land, proper use of land, planning for usage of land, ploughing the land, knowing the required amount of water, accessing water sources, proper usage of water based on the requirements, proper time intervals will be taken into consider in the practice of efficient usage of resources. The sugarcane farmers responded the same for their economic efficiency usage and earnings in sugarcane crop cultivation. .

Secondly, the material, man power and finance are the next level of primary sources for agriculture production, without which no production function will be carried out. Manpower has the capacity how to, what to, when to use the sources. Materials are the basic for planting, ploughing, harvesting the agriculture crops from the fields. Finace is the main source for accessing the man power and materials and other sources. The man power, materials and finance sources are necessary sources, the way of usage has to be studied and registered and the availability of these sources, proper use of these, maintaining the usage for long time, will enable to economic efficiency resultig the expected yields. Conducted study among the farmers revealed the same. The responses were lack of manpower and water sources, lack of accessing finance sources, insufficient subsidies from governemnt, loans, challenges of intermediaries, migration of field workers, water scarcity, high cost to spend for both the sources access are big chllenges of farmers..

Thirdly, the electricity and technology adoption are the major sources for agriculture crop cultivation in modern days, the literacy level in applying the technology is one of factors to think of efficient way of approaching the cultivation. As far as the electricity and technology is concerned, these sources depend on the availability and accessibility that determine the usage frequency for cultivation. The study results the significant relationship of these sources with economic efficiency usage of sources. Technology adoption includes the sharing information through recent advancements like cultivation process videos, messages, farmers bank account transactions, online training programs, cultivation knowledge gaining are the advantages the farmers gaining. Most of the respondents responded that they apply these sources and they struggle to access these sources. They want supportive mechanism for their efficient use of these sources.

Finally, the way of using the resources for cultivating sugarcane crop will result in economic and efficient practice of using the sources resulting cost minimization, more production yields, and sustained growth in production and profits. Further the study emphasizes the need of sugarcane cultivators may be met either by government initiatives like subsidies, schemes for using labours, accessing water supply, supportive technology mechanism, trainings and so on or by non governmental organization may initiate to support the sugarcane crop cultivators in the issues like lack of fertilizers, high cost of fertilizers, improper drainage systems.

CONCLUSION

The presents study aimed the objectives of identifying and bringing out the various resources used in sugarcane crop cultivation, finding and testing the linear relationship of efficient ways of using the identified resources explaining and predicting the economic usage efficiency that resulting more yields and earnings, and emphasizing the significance of effective utilization of resources in sugarcane cultivation. The study fulfilled the objectives and evidenced the same. Further the study discussed the various issues affecting the usage of resources like improper measurements of land, aiming for profit not for quality, lack of subsidies, lack of labour and material sources and access, lack of water and electricity sources, all among the issues, the study emphasizes to sugarcane cultivators the need of the modern approach in cultivation, application of methods, fertilizers, marketing strategies, accessing various sources and so on.

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