PROBLEMS FACED BY SUGAR AND SUGARCANE SECTOR:- A CASE STUDY ON MAWANA SUGAR MILL UP

Neha Goswami
Research Scholar, K.R. Mangalam University
Email ID: goswaminineha13@gmail.com

Dr. Kshama Sharma
Assistant Professor, K.R. Mangalam University
Email ID: kshama.s@krmangalam.edu.in

ABSTRACT

Sugarcane is an essential crop in India because; it ranks second in the world for the production of sugarcane. There are around 35 million farmers engaged in the production of sugarcane that is around 7 percent of the rural population. This crop is the major cash crop in the rural sector. This industry provides the raw material to the sugar industry which is the world's second-largest industry after the cotton textiles industry. This paper attempts to focus on the different environmental problems faced by the farmers in sugarcane cultivation. The objective of this study is to examine the problems faced by sugar industry with special reference to Mawana Sugar Works and to know the environmental problems faced by the farmers in the cultivation of sugarcane. The present study is mainly dependent on the literature that is available for sugarcane farming. The information for this study is further collected from the report of the Indian sugar mill association, and the various websites and the books related to sugarcane production and sugar production. The data of Mawana Sugar Mill is collected from the mill itself. The sugar sector is India is facing many problems but amongst them sugarcane pricing and environment plays a big role in them. The process of sugarcane diseases is shown with the help of chart. The loss in sugarcane farming is ultimately be the loss of the nation and this loss has adversely affected the mills in the form of less bagasse, bad quality juice, and deccrease in molasse. So, it is necessary to study the problems faced in sugar sector and sugarcane farming in India. The study has also provided some remedial measures to avoid the environmental problems in sugarcane farming as well as the various measures to be adopted by the government for the sugar industry regarding the sugarcane prices.
KEYWORDS: Environment, Sugarcane Cultivation, Indian Economy, Sugar Industry

INTRODUCTION

In India, sugarcane production plays an important role in the growth of the rural sector as well as the development of the Indian economy. Sugarcane is the major input that is used for the production of sugar in all across the world. India is the second-biggest producer of sugarcane after Brazil. There are around 35 million farmers who are engaged in the production of sugar and this is almost 7% of the rural population. The sugar sector is India is facing many problems but amongst them sugarcane pricing and environment plays a big role in them. Sugarcane is the crop that is also used for the production of bio-energy in India. In India sugarcane is also a major commercial crop. The production of sugarcane affects the production of sugar and its by-product like ethanol. Both of them play a big role in the socio-economic development of the country. There is a continuous increase in the production of sugarcane in India. There are various problems faced by the farmers to produce the sugarcane that includes timely payment of their cane value by the sugar mills, uneven weather conditions, improper water supply, bad forecasting system, etc. But the main challenge which is faced by the sugarcane growers is the

degradation of the environment. The sugarcane production also gets affected by the change in climate, fluctuation in rainfall, decline in the fertility of the soil, inappropriate supply of water, excess use of pesticides, water pollution created by the industries, and stress of drought, etc. Water plays a major role in the production of sugarcane. The production of sugarcane requires a very long time and it covers almost all the seasons i.e. summer, rainy, and winter in their life cycle. The production of sugarcane is done in tropical areas which are very hot. In India, there are various regions where sugarcane cultivation is high like Tamil Nadu, Maharashtra, Madhya Pradesh, Andhra Pradesh, Gujarat, Goa, Karnataka, Kerala, and Pondicherry. For sugarcane farming water also plays a big role as it requires 250 tonnes of water for the production of 1ton of sugarcane only. The production of sugarcane is adversely affected by the changes in the weather condition. Nowadays it becomes important to study the increase in temperature which is affecting the sugarcane yield most. The sugar sector also gets affected by the different policies started by the government for the sugarcane. But they do not consider the environmental degradation impact on sugarcane farming.

The loss in sugarcane farming will ultimately be the loss of the nation because the farmer's loss is due to different factors like poor quality seeds, low variety of yield, that will adversely affect the mills in the form of less begasse, bad quality juice, and increase in molasse. As we can see in the chart that the disease in sugarcane yield will result in the loss of nation.

Graph-1
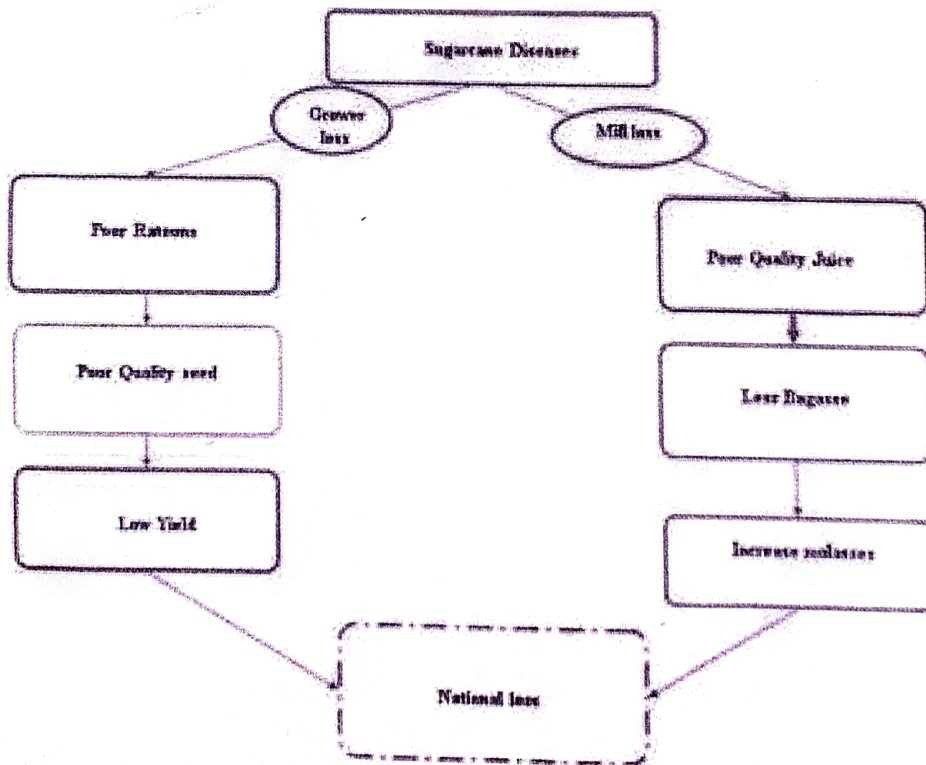
So for this, it becomes necessary to focus on the role of environment on sugarcane farming because sugarcane is the major raw material for other finished products like sugar, alcohol, and generation of electricity. Another big problem in sugar sector is sugarcane prices. Because, in India sugarcane prices are announced by both state and central government every year and in which UP has the highest SAP (State Advised Price) announced by the state government. Mostly, government announces high SAP for the vote bank mainly at the time of elections and all the mills are bound to pay these prices to the farmers irrespective of their financial conditions.

REVIEW OF LITERATURE

- Duli Zhao and Yang-Rui Li: in his study, he examines the process of sugarcane farming and explains that production of sugarcane gets affected by the change in climate conditions and due to this the production of other goods like sugar and alcohol also gets affected as sugarcane is the major input to produce them. In this paper, he gave the idea of how sugarcane production will respond with the changing weather conditions. According to him, the production of sugarcane in the world's best ten countries, the difficulties faced by the sugarcane sector, and how to tackle these problems.

- Sagar D.S.I., Mr. Mishra A.K. (2016) The results showed that manual harvesting (98.47 Rs./ton) is more costly than mechanical harvesting (54.28 Rs./ton). It would suggest that the Bhima Sugar Factory and other sugar factories in Pune are able to increase mechanical efficiency. Mechanical sugarcane harvesting has an additional competence to cut the sugarcane faster in relation to the manual. Therefore, in India, it is necessary to use harvester of sugarcane to produce sugarcane products just because less time is taken by the harvester to cut sugarcane and this can cut sugarcane into mini size to facilitate greater transport in bulk.

- Ashok Kr. Srivastava and Mahendra Kr. Rai: in his paper, he focused on sugarcane production and how it gets affected by the change in climate and also provides the solution to tackle this problem. He also suggested different measures to increase the soil fertility and the component which are affecting the most in sugarcane farming. He also recommended that sugarcane farming we need to prepare the land for cultivation.

- D.Venktesh & M Menkaswashu (2015) in his paper the author gave an overall idea of the sugar sector of India. He stated that the Indian sugar sector is the second-biggest producer of sugar in the agriculture sector which is very important for the socio-economic development of India. This sector is also very important because it provides direct employment to around 7.5 percent of the workforce in India. This sector is also very crucial because India's sugar production comes in the second position after Brazil in the world. Indian sugarcane and sugar production also has a major impact on the world market as it provides 25 percent of sugarcane and 15 percent of sugar in the world market.

- Saleem Hussain and et.Al: in this study, he focused on the effect on sugarcane farming with the changing environmental situation and because of this how much sugarcane quality gets affected. In this, he also focused on the problems faced by sugarcane farming due to the decline in soil fertility, different diseases of soil, insects and weed problem, etc. He also concentrated on the problem of increasing temperature and how it is affecting the production of sugarcane and how to tackle the sugarcane farming with this increasing temperature.

STATEMENT OF THE PROBLEM

The sugarcane sector plays an important role in the overall development of the rural sector and the Indian economy. This sector provides the raw material to the major sector of the Indian economy i.e. sugar. This sector faces many problems in which the role environment in sugarcane farming and sugarcane prices announced by the government is the major concern in the present scenario and there is an urgent need to focus on the consequences of the environment on the farming of sugarcane. It is also required to focus on the problems faced by sugar mills due to high sugarcane prices.

OBJECTIVES

- ☐ To examine the problems faced by sugar industry with special reference to Mawana Sugar Works.
- ☐ To analyze the environmental problems faced by the farmers during sugarcane farming.
- ☐ To suggest some remedial measures to avoid the environmental problems in sugarcane farming as well as the various measures to be adopted by the government for the sugar industry regarding the sugarcane prices.

RESEARCH METHODOLOGY

The present study is based on the secondary data collected from the available literature like the reports of ISMA (Indian Sugar Mill Association) for state sugarcane prices and the reports of Mawana Sugar Mill itself. Besides this internet has also been a good source to collect data required for the study. To understand the process of sugarcane diseases, different charts have been used by the researcher. To measure problem faced, certain indicators have been chosen like, wages of workers, cost of production of sugarcane and sugar, SAP. Statistical tool like Pearson's Correlation Test and Regression analysis have been calculated to analyze the collected data on statistical software SPSS.

DISCUSSION AND ANALYSIS

Problems faced by Indian Sugar Industry

- India is the biggest producer of sugarcane but it's per hectare yield is less in comparison to other major sugar-producing countries.
- Sugar crushing season is very short which lasts only 4-5 months only.
- Indian average recovery rate of sugarcane is lower than the 10 percent, in accordance with the other big sugar-producing countries.
- The cost of production of sugar is very high in India because of costly sugarcane, obsolete technology, non-viable production process, and the imposition of high excise duty.
- Maximum Indian sugar mills are in small dimension with the capability of 1000-1500 tonnes per day by which production of large scale becomes uneconomic.
- Maximum sugar mills of UP, Bihar are using the old and obsolete technology almost 50-60 years old and they need maintenance.
- Sugar industry has competition with Khandsari and Gur.
- Unequal regional distribution of sugar mills leads to regional imbalance.
- Per capita consumption of sugar is very low in India.
- There is dual price policy for sugarcane.
- Increase in farmer's sugarcane arrears due to high sugarcane prices.

Sugar sector in India is highly regulated by the both central and state governments. The production of sugar and sugarcane has been continuously fluctuating over the years because of the changes in the prices of sugarcane by the state and central government. In the sugar sector, the main problem is the dual price mechanism for the sugarcane i.e. SAP and FRP. The increasing sugarcane prices put upward pressure on the cost of production of sugar. The ex-mill sugar prices in India are continuously decreasing due to the excess supply of sugar. Therefore with an increasing production cost of sugar, the mills are unable to generate enough profit so that they can recover the cost of production. Because of this situation mills are unable to repay the cane due of farmers. Thus, the Indian sugar sector is trapped in a web of problems that lead to a decline in the profitability of the mill as well as farmers. In this study, the researcher has collected the data of Mawana Sugar Mill and analyzes these data by using the statistical

tool Pearson's Correlation Test and also use the Regression analysis if required. The analysis is done by using the statistical software SPSS.

Table:-1 Mawana Sugar Works (A Unit of Mawana Sugar Ltd.)

Year	Period of Financial	Cost of production of sugar (in s./Qtls.)	Annual Profit/loss (PBT) (in Rs. Lakhs)	Sugar Sale Domestic/ Export) (in Qtls.)	Wages of workers (CTC / Employee) (In Rs.)	Levy sugar impact of	Cane Arrears (In Rs.)	Area under cultivation	Production of sugar (Sugar Season) (in Qtls.)	Ethanol production	Sugar recovery (Sugar Season) (%)
								Sugar Season (October to September)			
2007	6 Months ended 31.03.2007	1,282.00	- 2,706.91	573,557	115,455			40776	1,742,659	N A	9.63
2008	18 Months ended 30.09.2008	1,474.00	- 4,350.71	1,961,160	214,923			40802	1,451,868	N A	9.89
2009	12 Months ended 30.09.2009	2,052.00	1,235.29	1,182,335	163,350			34135	996,819	N A	9.12
201	18 Months ended							28556	1,236,142	N A	9.41
2011	31.03.2011	2,748.00	- 5,462.57	1,258,522	45,054			31075	1,213,302	N A	9.36
2012	18 Months ended 30.09.2012	3,670.00	- 11,850.08	1,928,548	313,371			31087	1,207,215	N A	8.64

Year	Period									
2013	12 Months ended 30.09.2013	3,223.95	- 9,912.45	1,330,872	252,579		3134	1,305,828	NA	8.84
2014	15 Months ended 31.12.2014	3,332.00	- 9,720.50	1,179,672	328,052		2959 6	931,113	NA	9.17
2015	15 Months ended 31.03.2016						2444 2	1,054,363	NA	9.58
2016		2,998.58	- 1,535.65	1,728,385	381,552		2401 0	1,111,854	NA	11.01
2017	12 Months ended 31.03.2017	3,103.79	5,649.31	1,467,612	369,128		2389 0	1,644,901	NA	11.06
2018	12 Months ended 31.03.2018	3,393.30	- 2,235.92	1,736,843	369,280		2777 1	2,299,987	NA	11.11
2019	12 Months ended 31.03.2019	3,344.34	- 1,943.86	1,494,028	425,386		3012 6	2,056,522	NA	11.44
2020	12 Months ended 31.03.2020	3,209.20	-908.55	2,119,039	447,368		3630 6	2,388,345	NA	11.58

Source- MSW(A Unit of Mawana Sugar Ltd.)

Sugarcane price trend in recent years:-

The price of sugarcane is decided by both state and central government. The data for both state and central price of sugarcane is collected from the annual report of ISMA (Indian Sugar Mill Association) for the year of 2007-08 to 2020-21. But, the study will analyze the data using SAP (State Advised Price) only because in UP the mill is required to pay cane prices only according to the SAP announced by the state government.

Table-2

association between SAP and Annual P/L because their coefficient of correlation is -0.009 and their p value is 0.975 which is greater than 0.05 at 5% level of significance. So, we do not reject the Null Hypothesis that shows there is no significant relationship between SAP and Annual P/L of Mawana Sugar Works.

According to Table-1 there is strong positive correlation between SAP and workers wages because their correlation coefficient is 0.777 and their p-value is 0.003 which is less than 0.05 at 5% level of significance. Therefore the regression analysis for this will be:-

Table 3a: Simple linear regression analysis between SAP and wages of workers of Mawana Sugar Works

Model		B	Std. Error
1	(Constant)	-67128.138	93499.186
	SAP	1375.946	352.310
Dependent Variable: Wages of workers (CTC / Employee /PA)			

Table3a: There is significant association of SAP with wages of workers. Here the independent variable is SAP and dependent variable is Wages of Workers. The regression equation is:

Wages of workers= -67128.138 + 1375.946 SAP

Graph 3a:-Correlation of SAP with workers wages of Mawana Sugar Works.
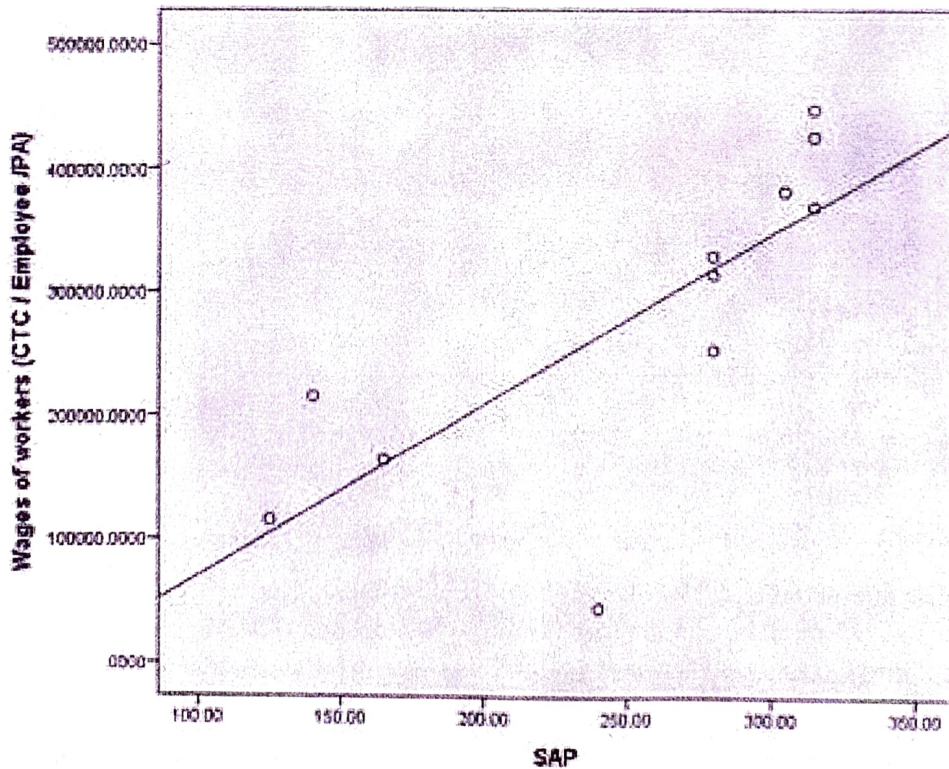
Same has happened with SAP and Domestic and International Trade because their correlation coefficient is 0.465 and their p-value is 0.128 which is again greater than 0.05 at 5% level of significance. So, we do not reject the Null Hypothesis and there is no association between SAP and Domestic and International Trade.

Table-3 shows that there is strong positive correlation between SAP and cost of production because correlation coefficient is 0.938 and p value is 0.000 which is less than 0.05 at 5% level of significance. Therefore the regression analysis for this will be:-

Table 3b: Simple linear regression analysis between SAP and cost of production of Mawana Sugar mills

Model		B	Std. Error
1	(Constant)	202.142	317.812
	SAP	10.213	1.198
b. Dependent Variable: Cost of production of sugar			

Table 3b: There is significant association of SAP with cost of production.

The regression equation is:
Cost of Production = 202.142+ 10.213SAP

Graph-3b: Correlation of SAP with Cost of Production of Mawana Sugar mill.
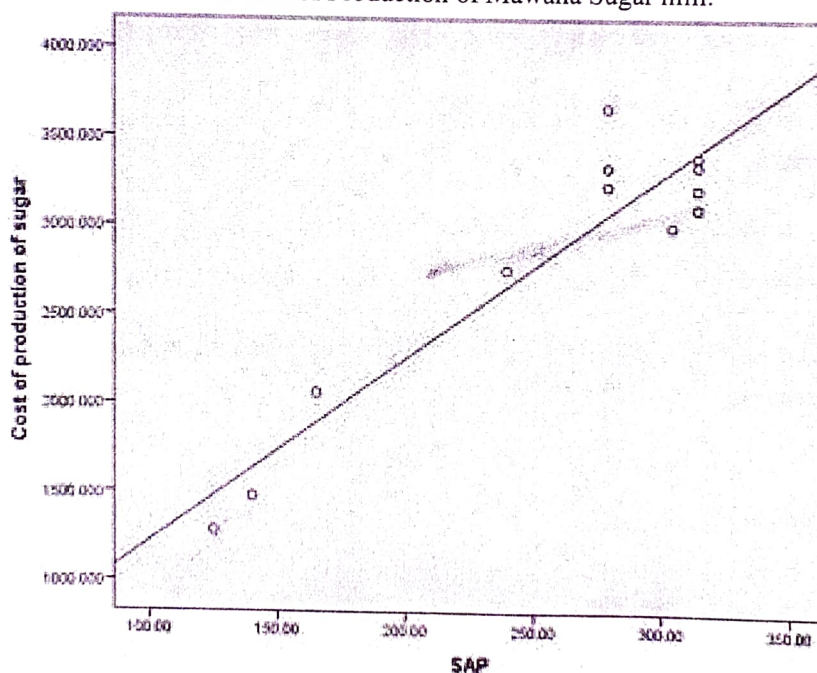
There is also significantly negative correlation between SAP and area under cultivation according to table-3 because the coefficient of correlation is -0.71 and its p value is 0.004 that is less than 0.05 at 5% level of significance. So, there regression analysis for this will be:

Table 3c:-Simple linear regression analysis between SAP and area under cultivation of Mawana Sugar mill.

Model		B	Std. Error
1	(Constant)	45538.790	4297.181
	SAP	-57.201	16.362
Dependent Variable: Area under cultivation			

Table 3c: There is significant association of SAP with area under cultivation.
The regression equation is:
Area under cultivation = 45538.790-57.201SAP
Graph-3c: Correlation of SAP Area under cultivation of Mawana Sugar mills
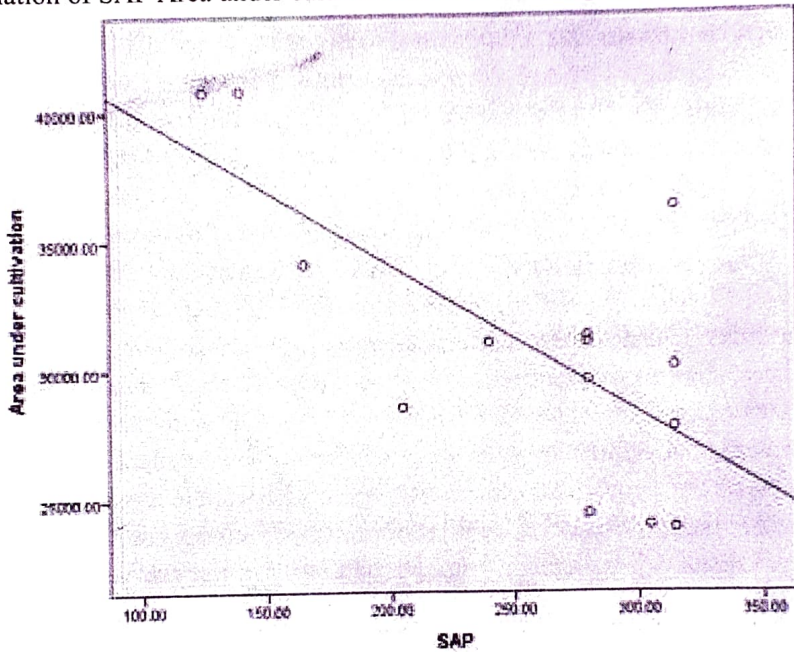

Table-3 shows that SAP has no relation with sugar production and sugar recovery because their p value is greater than 0.05 at 5% level of significance.

Problems faced by Sugarcane sector:-
The main problem faced by sugarcane sector is environment. Role of environment plays a very significant role in the sugarcane production. The production of sugarcane is majorly dependent on the environmental condition which includes proper rainfall, proper sunlight, and temperature etc. For the production of good quality sugarcane, it is necessary to have good variety of yield. There are various components that affect the productivity of yield and these components are as follows:-

- ☐ AVAILABILITY OF HIGH YIELD VARIETY: the availability of high variety of seeds is also a major challenge for increasing the productivity of sugarcane. There is a problem of availability of high variety yield that is suitable to handle in every situation whether it is in the draught, control the pest diseases, and that handle the salinity. These varieties are used maximum in foreign countries. The most promising sugarcane variety is fuzz, by the use of this variety the productivity of sugarcane has shown very high growth. It has been seen that the productivity of sugarcane and recovery of sugar is high where the different variety of yield is being used by the farmers.

- ☐ IRREGULAR RAINFALL: the next major problem for the production of sugarcane is the irregular rainfall which is the main input for the production of sugarcane. For the good variety of sugarcane, it is necessary to have enough amount of water. This also a reason for the improper length and development of sugarcane sticks. Apart from the improper rainfall, there is a lack of management in utilizing the rainwater for the sugarcane harvesting.

- ☐ PROPER SUNLIGHT: proper sunlight availability is the main component for the development of sugarcane. Growth of sugarcane and development of sugarcane sticks depends highly on the photosynthesis for which sunlight is mostly required. The radiant energy of the sun increases the growth of sugarcane production.

- ☐ POLICY OF THE GOVERNMENT: government policy for the sugarcane also affects the production of sugarcane. The farmer demands, the high minimum prices for the sugarcane and fast recovery of sugarcane arrears from the mills that has led the farmers to take more loan and inefficient to produce more sugarcane.

- ☐ AVAILABILITY OF WATER: water plays a very significant role in the production of sugarcane. There is a need for a large amount of water for the cultivation of sugarcane than the other agricultural crop. The major stress in sugarcane farming that affects in the agriculture sector most is the problem of drought. In the drought time, it becomes very difficult to supply enough water for sugarcane production. Improper Rainfall is also one of the problems in the sugarcane sector and the rainfall is also not regular and sufficient to make water available for the farming. From July to September, it is the peak time in which around 70 percent of the yearly rainfall happens. The lengthening and development of sugarcane depend on the availability of sugarcane. The lengthening and development of sugarcane also get negatively affected when there is inadequate water supply. In dry season, the harvest encounters the moderate development that brings low stick yield.

- ☐ PROPER TEMPERATURE: the role of proper temperature is also very important for the production of sugarcane. Throughout the planting season of sugarcane, the yield goes through the different temperature. If the temperature is between 21-27 degrees celsius then there will be good growth of sugarcane. But if the temperature goes beyond this, then there will be a negative impact on the growth of sugarcane production.

Remedial Measures to be adopted by sugar sector:-

Sugar sector in India is facing many problems and among all the problems sugarcane pricing is a big problem for sugar industry. To solve this problem the government should set the sugarcane price by using the Revenue Sharing formula.

- • For announcing the FRP, the government should consider the demand, supply, and global price of sugar.
- • The government should also stop states to announce the SAP higher than FRP unless they are

willing to face the extra expenditure on themselves and not force sugar mills to face the increased price.

- Follow the recommendations of the Rangarajan Committee on setting the sugarcane price by the prescribed formula.
- The mill should complete the 60% of the payment to farmers for their produce within the 14 days period and the rest of 20% be paid in another two weeks and the remaining 20% to be paid in another month.
- Because of the continuous decrease in sugar prices and financial position of the mills has remained a major concern and for this government should come up with different measures from time to time to solve this problem. And for this, the government should create a Sugar and Sugarcane Development Fund.
- There is a need to increase the ethanol blending capacity to around 20% in the upcoming years by enhancing the technology.
- For increasing foreign trade, there is a need to redesign the export policy and in this, the government should provide incentive to sugar exporting mills.

Measures to be adopted by farmers to protect sugarcane farming from environmental degradation:-
All these are the difficulties faced by sugarcane farmers in the production of sugarcane. All the problems have inversely affected the sugarcane farming and there are different measures adopted by the agriculture sector to handle all these problems. These remedial measures are as follows:-

- PREPARATION OF FIELD FOR PLANTATION: this is the main step for the production of a good variety of sugarcane. In this, the cleaning of the field is done, which includes removing the left-outs of the previous sugarcane crop. In this the tillage is being done by the use of ploughing , sub-soiling, harrowing, etc. This step also includes levelling of the land for the uniformity in sugarcane farming and this step is also necessary for the equal water supply in the whole area.
- MANAGEMENT OF WEED: weed is one of the major factors which is responsible for the damage of yield and can destroy the maximum production of sugarcane. The sugarcane production is a long process and because of this, it has to face the different kinds of weeds in almost all the seasons. Weed reduces the potential of sugarcane and its other nutrients by almost 25 to 90 percent of the whole crop. So it is important to manage the weed for the better productivity of sugarcane.
- MANAGEMENT OF SOIL AND ITS NUTRIENTS: managing the soil and its nutrient plays a crucial role in the development of good sugarcane sticks. Because of the poor management of the soil, it results in degradation of land which further decreases the nutrients of the soil. So it is mandatory to apply all the practices for increasing the nutrients in the soil like the texture of the soil, composition of the soil, and knowing the variety of the soil.
- PATTERN OF PLANTING SUGARCANE CROP: this is also one of the important measures to improve the productivity of sugarcane. In this planting pattern of sugarcane different methods are being used to increase the productivity of the sugarcane. The various methods which are adopted by the farmers are Rayungun method, Trunch method, field method and practice of using flatbeds etc. In all these methods field method is the cheapest method and mainly used for the areas where the rainfall is very less. In India, central and northern area this method is majorly used.
- MANAGEMENT OF IRRIGATION: this also a major step to increase the productivity of sugarcane and with the proper management of the irrigation of sugarcane the productivity can

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