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A Study of Mathematical Programming Approach to Sugarcane Industry of Maharashtra

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Abstract:
The Sugar industry in Maharashtra is highly popular in the cooperative sector, as farmers own a portion in the sugar factories. This work determines the optimum use tactics for bagasse study domestic and environmental objectives. Additionally, alternative of sill bagasse and utilizing it in the boiler are also weigh. The major problem of sugarcane in India is based on monsoon and water supply. The cyclical nature in sugar production has caused distortions in the export of sugar in India. This study analyzes the state-wise production and reasons for the changes in production of sugarcane in the time period of 2000-2010.

Keywords: ***Planning, cultivation, sugarcane, optimization problem.***

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I. Introduction:

The Bhartiya Agro Industries Foundation which begun a diffusive cattle development programme during 1969–70 in Western India was able to convince the cooperatives that dairy cattle maintenance could perfect very well with sugarcane performance and would be an exquisite spring of further vocation and income to the farmers as well as to the landless labourers practical in that area. This affords a muscular nurture for exploring industrial ecology advances for the district. The Maharashtra Sugar Industry has seen a spectacular growth owing to the different conducive in the state. One of the chief crops in Maharashtra is sugarcane, with a host of sugar industries been set up over the years [1]. The Maharashtra sugar industry has been contributing nearly 40% of India's total sugar production. The cooperative sugar industry in Maharashtra has seen the growth its heights with future trading being implemented in sugar manufacturing. This in turn enhances the sugar-alcohol industrial sector as it increase profits and decrease costs. In this context the need for a decision support technique that helps the mill manager to obtain an optimized planning system for sugarcane production is evident. Due to the complexities involved, this system necessarily needs to contain one or more mathematical optimization tools. The literature contains some works focused in planning the cultivation of sugarcane using optimization techniques with the objective of improving the quality and quantity of the raw material in sugar-alcohol mill. These are reviewed below. Piewthongngam et al. (2009) propose an optimization model for planning and cultivating sugarcane [2]. The model aims to select the period and variety for planting in order to avoid oversupply during the peak harvest time. The plan ensures that the cane is cut properly throughout the harvest period, hence optimizing the global sugar production.

II. Optimization Problem:

Regional integration of sugar mills increased the NPV by 37%.Sugarcane bagasse is a costly lignocelluloses biomass resort in India. The conspirator sugar hatter has empower the farmers to appear together and made them realize their aptitude in systematize themselves for sweeten production and overall education. About 50 000 crossbreds have been bear through these centralized with farmers [3].

The primary decision variables are the use copy of bagasse and refuse cool from farmstead. Starting with a few centralized for hybrid covering a few a thousand animals in 1969–70 the BAIF has during the last few donkey's been at work(predicate) more than 50 centers tegument 100 000 cattle in the sweeten encompass. A product with pH of 3.6, raw protein satiate of 6.25 percent and good acceptableness by animals could be obtained. The amount of foremilk generated increased so roundly that disconnect cooperatives have been formed in separate districts and dairy Bos keeping, which was never a traditive call in this area, has fall an important part of the agriculture system. Around 40 tonnes per hectare as against 100 tonnes per hectare or more in some States like Maharashtra, Andhra Pradesh etc. This results in the formulation of a combined whole lineal programming proposition with three different objectives. In many States revival is between 8 to 9 percent as against about 11 percent in Maharashtra. The regional integration increased the NPV of the sector by 37%.

Trials conducted on ensiling of sugarcane top-boots with urea produced inspiriting inference and kind temper silage could be obtained.

The factories use professionals who help to systematize and design culture, harvesting, pressure and processing of sugarcane and supplies. The fashion was refer to a mill processing 181 Mg/hr of sugarcane in Kolhapur sphere of Maharashtra, India. Ensiling of sugarcane was proven along with 0.5 percent carbamide

III. Result And Discussion:

Dr.S.D.Sundarsingh and R. Veeraputhiranhas had conducted a study on "irrigation management in sugarcane"(2000) and concluded that Tamil Nadu was the leading producer of sugarcane was compared to other states[4]. But, the scarcity of water was a limiting factor. Water was vital in certain stages of growth of sugarcane. Irrigation water was essential yet a constraint in sugarcane production, efficient supply of water, considering the soil, climate, crop, environment conditions was important [1]. The various strategies include selection of varieties, mulching, and gradual widening of furrows, alternate furrow method of irrigation, drip irrigation, and an innovative method called surge irrigation. The authors stressed in the fact that an optimum soil moisture environment was a pre-requisite to reduce the adverse of shoot borer in sugarcane.5 In this paper it will analyze the sugarcane production in all states in Maharashtra and it updates the trend and relevant need for changes that would lead to progress the production of sugarcane in Maharashtra

From the following table, Hariyana had 14 units of working sugar factories in the year 2015-16. However, in the year 2019-20 it recorded as 14 units of working sugar factories. Thus there was no any increase and decrease of working sugar factories during the period of 2015 to 2020 with a no percentage.

Maharashtra had 184 units of working sugar factories in the year 2015-16. However, in the year 2019-20 it recorded as 195 units of working sugar factories. Thus there was increase of 11 units of working sugar factories during the period of 2015 to 2020 with a percentage rise of 5.98.

Table No. 1

STATEMENT SHOWING OF WORKING SUGAR FACTORIES

(NO. OF UNITS)

Sr. No.	State	2015-2016	2019-2020	Increase/Decrease	Growth %
1	Andhra Pradesh + Telangana	32	24	-8	-25.00
2	Bihar	11	11	0	0.00
3	Gujrat	19	17	-2	-10.53
4	Hariyana	14	14	0	0.00
5	Karnataka	65	68	3	4.62
6	Madhyapradesh + Chhatisgarh	18	22	4	22.22
7	Maharashtra	184	195	11	5.98
8	Punjab	16	16	0	0.00
9	Tamilnadu	44	32	-12	-27.27
10	Uttarpradesh + Uttarakhand	127	126	-1	-0.79
	TOTAL	530	525	-5	-0.94

The highest production of sugarcane in Gujarat was at 2006-07 about 15630 thousand tones. Gujarat stood fifth place in yield of sugarcane and in production it took the seventh place [1]. There was low production in 2001-02 was negative at -1.2 percent. In 2002-03 the production has increased to 14071 thousand tonnes from 12465 thousand tonne in 2001-02. In 2003-04, the area and production was negative but the productivity was high because of increase in electricity supply to agriculture for promoting irrigation and thus the output rose[3]. In 2004-05 also, there was an increase in production and it continued till 2011-12, except one year 2009-10 during which an increase in productivity was witnessed.

IV. Conclusion:

Development scheme and integration with exploit fruit by the sugar cooperatives in Maharashtra with a view to lengthening the farmer's profit and optimize usage of land and clod labour are worth meditation. The possibilities of its employment draw care particularly during the severe aridity in 1974–75 in Maharashtra and Gujarat States. An optimization shape is formulated for an existent sugar-coat mill and three potential products of bagasse protuberance, namely, electricity, fermentation alcohol, and pebble are study.

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