Review of Literature
CHAPTER II

REVIEW OF LITERATURE

2.1. INTRODUCTION

Planning is the first and the most crucial function of management that explains where to begin and how things would be well-organised in a system. Human beings are the most privileged animals of the creation because they need not start every new thing from the beginning. The acquired experience is always helpful to them. They learn from the past and make the plan for the future. In this context, a review was made on the existing relevant literature available on the topic.

Viswanath and Lalitha (1979)\(^1\) carried out a Study on “Performance of Sugar Factories in India-An Inter State Comparison”. They assessed the efficiency of the sugar factories in terms of first quantity of sugarcane crushed and sugar produced, second installed capacity, third area, production and productivity of sugarcane and fourth profit and loss in sugar factories. The study also ranks the factories on the basis of performance. The authors observed that there was a positive correlation between sugar cane crushed and sugar production, production of sugar and profit of the factories.

Mahalingham (1980)\(^2\) conducted a study “Financial Performance of Indian Sugar Industries” and highlighted the theoretical as well as practical advantages of operation of sugar mills. In his study he had shown the actual benefits derived from the co-operative sugar mills. He had pointed out that the benefits included rise in remuneration and the consequent change in the cropping pattern, additional employment opportunities and the development of the industrial and business activities in and around cooperative sugar mill.
Khan (1988) conducted a study on “Physical Performance of Sugar Industry in India since 1950-1951” and showed a striking feature of the sugar Industry had been the instability in its output. The author had also disclosed that the industry faced regional imbalances in capacity expansion and capacity requirements.

Naimat Ullah Abid (1989) conducted “A Case Study - Performance Evaluation of a Sugar Mill”. The paper attempts to highlight peculiar methodology and findings of an evaluation of a sugar project. The objectives of the performance evaluation were to identify and analyse strengths and weaknesses of the project and a well-considered opinion on the soundness of the organisation, to make recommendations for improvements, in case it was possible to redeem the project. The evaluation suggested that it would be more beneficial for the mill to rehabilitate its image with growers as an alternative to official pressure for "Banning" paddy cultivation. Such a ban would indeed not even be desirable in the local political environments. The report suggested that the mill needed to reorganise internally towards the following ends: Implementing more efficient schedules for lifting and transportation of sugar cane from the fields; Improving services to growers, especially in the matter of indenting and paying for sugar cane; Improving the system of disbursement of development loans to sugar cane growers so that it was not only channelised appropriately but also appeared to have been done so.

Bharani (1992) in her research work on “Performance of Sugar Co -Operative in Tamil Nadu” had examined the physical performance, growth and capacity utilisation of sugar co-operative in Tamil Nadu using ratio analysis, regression analysis and compound growth rate. It was observed that the sugar production and said variables were positively correlated and sugar recovery was
not significantly correlated with sugar production, sugarcane acreage, sugarcane production, number of factories and sugarcane crushed. The author also examined the physical performance of sugar factories in Tamilnadu in terms of sugarcane crushed, duration of crushing, sugar recovery and sugar production. The author observed that most of the cooperative sugar mills in Tamil Nadu were underutilised in some periods. The outcome of the study reached that the efficiency of the selected nine co-operative sugar mills assessed in terms of four indicators were not uniform.

**Jagdish Lal (1992)** in his article “Sugar and Sugarcane Production, Trends and Policies” studied the production of sugar and its consumption trend and examined the impact of sugar cane and sugar pricing and distribution policies. The study showed that there was a trend in the case of production and consumption of sugar during the period 1950-51 to 1990-1991.

**Venkaiah (1993)** in his study entitled “Management of Co-operative Sugar Factories – A Case Study of the Anakapalle Cooperative Sugar Ltd., Thummapala” analysed the operational efficiency and the capacity utilisation of the factory. He observed that the financial performance of this company had been unsatisfactory.

**HereKar (1995)** undertook a study entitled “Correlation Analysis of Financial and Operational Factories of Sugar Industry”. This study evaluated the managerial performance of the sugar industry in co-operative sector on the basis of correlation between the operational factors such as age, crushing capacity, sucrose recovery, etc., and financial aspects. He concluded that age and capacity utilisation etc., had fairly good impact on financial performance of the sugar industry. It was also observed that the operational factors also had impact in the financial performance. The author also concluded that the crushing capacity and sucrose recovery were not directly correlated with the finical performance.
Vijayakumar and Venkatachalam (1995)\(^9\) carried out a study on “Working Capital and Profitability – An Empirical Analysis” taking thirteen firms from sugar industry covering a period from 1982-83 to 1991-92. The impact of working capital ratios on profitability was determined by using correlation and regression analysis. Major ratio’s like liquid ratio, receivables turn over, inventory turnover, and cash turn over were computed to measure their impact on profitability. The study showed that inventory turn over and receivable turn over had positive correlation with the profitability and liquid ratio where as cash turn over had negative correlation with the profitability.

Sanjeev Kumar Malik (1997)\(^10\) in his article “Growth Analysis of Sugarcane in Hardwar District of Utter Pradesh” investigated the growth rate of sugarcane Utter Pradesh in Hardwar district and visualised the effects of change in areas of cultivation as well as yield potentials. To study the growth rate the exponential function was fitted by the least square method. Hardwar district made significant and positive compound growth rate of sugarcane production per unit per year. They concluded that the growth rate of sugarcane production was found higher than the area and yield growth. Moreover, the increase in production of sugarcane was mainly caused by the area effect along with the yield effect.

Awal Raj Daroar (1998)\(^11\) in his study on “Determinants of Profitability in the Sugar Industry in Punjab and Haryana - A Sector wise Analysis” measured the profitability of the individual mills on the year wise basis. The researcher had employed time series and cross section data to calculate multiple regressions. The author arrived at the conclusion that improvement in sugarcane recovery and avoidance of abnormal expansion can go a long way in improving profitability ratio in the sugar industry.


O'Reilly (1998)\textsuperscript{12} viewed on “The South African Sugar industry”. The South African sugar industry grows sugarcane in the south than anywhere else. There is a strong emphasis on variety selection to counter local problems of pests and disease, and factories experience particularly processing problems to which the industry has adapted. Features of the processing side of the industry include extensive use of diffusers and very high levels of process control. Of the 2.5 Mt sugar to be produced in 1998, 1.5 Mt will be refined sugar; in addition to a large (0.5 Mt/year) central refinery in Durban. Five out of fifteen factories have refinery sections, whose operating costs are the lowest in the world. The structure of the industry has changed recently to allow easier access to new growers and there is a rapid growth in the emergence of new small growers. South Africa is set to play an important role in the rehabilitation and development of the sugar cane industries of neighbouring countries that belong to the Southern African Development Community.

Chandrasekaran (1999)\textsuperscript{13} carried out a study on “Financial Performance of Indian Sugar Industry” for the period covering from 1990-1991 to 1995-96 in which various ratios like profitability ratios, liquidity ratios, leverage ratios and turn over ratios were calculated. It was found that financial performance of the sugar industry had been moderate to poor except during 1993-94. The study disclosed that the financial performance of sugar industry was affected mainly by high stocks of finished goods, average to low coverage ratios due to high variability in earnings, high leveraging and difficulty of controlling cost structure. The author concluded that tough cycle of low production, high price realisation followed by higher production and low price realisation leading to delay in payments would affect the company’s performance.
Daxa Gohil (2000)\textsuperscript{14} conducted a study on “Analysis of profitability in sugar industry - a case study of Bardoli Co-operative Sugar Mill”. In his study he analyses the profitability position of the Bardoli Co-operative Sugar Mill in Gujarat, India, for the period 1988-89 to 1997-98. Information is provided on net profit ratio, operating ratio, return on total capital employed and net capital employed, return on owner's funds, earning per share, return on equity capital and sugarcane recovery. The analysis indicates that profitability is low but could be improved through prudent management measures.

Mohan (2001)\textsuperscript{15} in his study on “Working capital management of the sugar mills” examines the working capital management of the sugar mills in Thanjavur district, Tamilnadu. The two crucial determinants of corporate health (liquidity and profitability) are partly influenced by the way working capital is managed. Industry sources said that today sugar cane arrears are set to mount. Though the law requires the mill owners to pay within fifteen days of sugar cane purchased, barring a few mills, none are able to do so because of serious cash flow problem. Industry experts also pointed out that the performance of the existing government and co-operative sugar mills has been unsatisfactory and they continue to be defaulters by huge amounts to financial institutions. These are largely because of an illiquidity of funds. Finally the author concludes the Co-operative sugar mills were not able to maintain properly the working capital due to high cane price and low sugar price.

Christine Bolling and Nydia Suarez (2001)\textsuperscript{16} analysed the “The Brazilian Sugar Industry: Recent Developments”. They find that the Brazil is among the world leaders in the production of sugarcane, sugar, and ethanol (fuel alcohol). In addition, it is among the most efficient of all major sugar producers. Since Brazil can produce either sugar or ethanol from sugarcane, it is one of the few
countries that can adjust sugar production rapidly to potential world sugar shortfalls and high international prices. In 2000, less than half of its cane production was ground for sugar. Brazilian Government policies supporting economic liberalisation are likely to stimulate greater sugar production and result in increased Brazil sugar export availability. Brazilian sugar can be expected to remain competitive in the world market because of increased internal efficiencies as Brazil deregulates its industry, modernises its ports, and reduces its transportation costs from the mill to the port. However, the main determinant of growth in sugar output and exports is likely to be government policies affecting production and use of ethanol. These policies may be affected by trends in international prices of crude oil, as well as by Brazil’s approach to environment issues such as air quality.

Pratapsinh Chauhan & et al. (2002)\textsuperscript{17} carried out a study on “Analysis of Performance Appraisal by Collective Action in Indian Sugar Industry”. The broad objective of the study is to explain the variations in the performance of sugar co-operatives in terms of procurement of sugar cane, processing and marketing through collective action. In the study they tried to explain involvement of the stakeholders in the three basic functions namely, procurement of sugar cane, processing and marketing through collective action process. And it concentrates only on the role of members and employees in these three functions and tries to explain the variation by using regression analysis. An increase in the proportion of non-managerial employees to the managerial employees contributed to the reduction in the net income of the sugar mills. One per cent increase in the capacity utilisation results in an increase in net income of the sugar mill marginally. It is expected that an increase in the price of statutory minimum price would result in the reduction in the net income of the sugar mills.
Beate Zimmermann and Jurgen Zeddies (2002)\textsuperscript{18} presented an article on “International Competitiveness of Sugar Production”. In this article the competitiveness of sugar production in the most important sugar producing countries is analysed, including the whole production process from beet or sugar cane production in the field to sugar processing in the factory. Special emphasis is focused on the different location factors and their influence on competitiveness, so that finally, conclusions can be drawn on future development of the world sugar market and the single production locations. From the countries included in this study, at present only Brazil, Australia, Thailand and partly South Africa would be able to produce sugar under world market conditions. They concluded that Brazil and Australia derived profit from favourable natural, economical and political location factors, in Germany high opportunity costs as well as high environmental and social standards predominate to the advantages of high efficiency in the sugar industry. In the United States partly disadvantageous climatic conditions together with high opportunity costs are responsible for the insufficient international competitiveness of sugar production. Low productivity in Thailand and South Africa is overbalanced by low wages as well as comparatively low environmental and social standards.

Dangat Nilesh (2003)\textsuperscript{19} in his article on “Co-operative Sugar factories in Maharashtra” analysed functioning of sugar industry in the state during 2000-01. Among the 436 sugar factories operating in India, 137 sugar factories were operating in Maharashtra alone. The article was identified the soil and climatic conditions of Maharashtra are favourable to the cultivation of sugar cane. The co-operative sugar factories in Maharashtra were the farmers” organisations and they served as the primary force to the development of the rural areas.
These factories provided employment to a large number of workers in the villages and a sugar factory with a daily crushing capacity of 2500 tonnes provided permanent employment to 461 persons and seasonal employment to 653 persons.

Pratapsinh Chhauhan (2003)\textsuperscript{20} in his article “Role of transaction cost on financial performance of sugar industry of India” has evaluated the financial performance of sugar industry in India. The analysis concluded that the financial variable related to transformation cost and transaction cost and it also includes the operation variable for i.e. return on net sales based on cane quantity crushed and sugar produced in quintals influencing financial performance of sugar industry. Transaction cost on cane crushed, percentage of transaction cost in advertising, marketing and bad debts and transaction cost based on sugar produced were highly statistically significant and whereas operational variable capacity was also statistically significant. Remaining variables are not statistically significant on return on net worth between two groups. The overall conclusion of the regression model was the transaction cost influencing the financial performance at greater extent where as transformation cost led to increase profitability up to optimum level of production but after that it negatively influenced the financial performance.

Windle, Jill & et al. (2003)\textsuperscript{21} presented a paper “Diversification in the Sugar Industry: The Grower's Perspective in Central Queensland, Australia”. The future viability of the sugar industry has been questioned in several major reports. It is generally agreed that the industry will have to undergo some changes. One of the key issues in the most comprehensive of these reports, the Hildebrand report (Hildebrand 2002), is the need to improve economic efficiency in the industry. At the grower level, the report considers many farms to be economically unavailable and advocates the need to increase farm size to achieve better economies.
of scale. Some growers will not be able to expand and a more viable economic option might be to diversify farm enterprise income. Generally, the main advice farmers receive about alternative crops is based on gross margins, but there are other components of crop diversification which may influence growers' decisions, e.g., changes in management effort required or changes in the level of risk associated with a new crop. This paper outlines a study that used the Choice Modeling Technique to explore the trade-offs growers make between different components of diversification, when deciding on possible diversification options. The influence of socio-economic characteristics on choice is also explored.

Mohan (2004)\textsuperscript{22} in his study “Profitability of Sugar Industry” has made an evaluation of the profitability of the sugar mills in the Thanjavur district. The study analysed the operational of the sugar mills, through operating ratios there by judging the effectiveness in using the „pool“ of funds. The study identified the long term funds entrusted to a concern by companies and owners through return on capital employed. On concluding the study indicated that the private mill was moderate where as the public and co-operative mills did not achieve the expected performance. It also concluded that all the mills under study showed an unsatisfactory operational performance and identified that low recovery, under remunerative sugar prices in the free market due to the import policy of the Govt., increase cost of production, decline in the „molasses“ and alcohol prices are the main causes for such overall poor performance of all the sample mills under study. Further, under utilisation of capacity, increased interest burden, poor recovery, losses on the fertilizer and diesel business are identified as the main determinants for the losses of the co-operative mills under study.

Pittie (2004)\textsuperscript{23} published an article entitled “Problems and prospects of the sugar industry”. This article expresses concern over problems hounding the sugar
industry in India with emphasis on the lack of long term policies covering the important aspects of the sugar sector. The delay in formulating a policy related to the creation of a buffer stock of sugar and facilitation of sugar exports has negatively affected sugar mills and sugarcane farmers. Similarly, the creation of support measures encouraging the export of Indian sugar at low international sugar prices is delayed. In addition, shortcomings in the payment procedure lead to unduly delayed payments. After several years of high sugar production, the sugar output has dropped considerably. Sugar prices also declined precipitously. It is proposed that reforms should be made in the sugarcane pricing policy and that specific areas should be reserved for sugar factories. Other recommendations include the mandatory oxygenation of gasoline, subsidising ethanol production, and purchase of at least ten per cent additional power from renewable resources, particularly from co-generated power supplied by sugar mills.

Nieuwoudt & et al. (2004)\textsuperscript{24} in their work, “The rate of return on R&D in the South African Sugar Industry, 1925-2001” The rate of return (ROR) on R&D in the South African Sugar Industry is estimated from a Ridge Regression of a production function of time series data for the period 1925 to 2001. The Industry has kept records on R&D expenditure, yields, rainfall and related factors over a 75-year period. Sugar cane yield was measured in tonnes sucrose to account for quality improvement. In this function, R&D expenditure lagged three years was significant (t = 6.5) in explaining increased sucrose production per ha. Other highly significant variables in this model were rainfall (t = 5.2) and real cost of production (t = 8.4). A dummy interaction with R&D was significant (t = 2.9) implying a greater impact for R&D technology during the period 1959 to 1975 than either before or after this period. The standardised regression model indicated that the R&D variable was one of the most important variables in explaining yield.
Using the elasticity of production estimate for the R&D variable of the un-standardised model, a Benefit/Cost ratio for this variable of 1.41 was estimated, if benefit of millers is excluded and 1.59, if the gain to millers is included. In the latter estimates, the exports realisation price of sugar was used as the appropriate shadow price. A real internal rate of return was estimated at seventeen per cent. A unique feature of the South African Sugar Industry is that the research is privately funded by the industry, which implies that the distortionary impact of taxes need not be accounted for, as is the case with public funded research.

**Sanghamitra Das and Dilip Mookherjee (2004)** in their paper, “Ownership Form and Contractual Inefficiency: Comparing Performance of Co-operative and Private Factories in the Indian Sugar Industry” explore the role of differing contractual relationships between sugarcane farmers and sugar factories in India resulting from differing ownership structures. In Maharashtra most sugar factories are cooperatively owned by sugar cane farmers, while in Uttar Pradesh most factories are privately owned and purchase cane from independent farmers. The key incentive problem is that residual claimants to factory profits are inclined to exploit their monopoly power and under price cane supplied by farmers. This results in undersupply of sugar cane to factories, the extent of which depends on, who owns the factory, besides the distribution of land between small and big sugar cane growers. It is clear that the respective cane price distortions overwhelm the effect of changes in cane quality, technological change, prices or irrigation in accounting for differences in growth of the industry between different ownership forms and regions over this period.

**Scott McDonald & et al. (2004)** presented a paper entitled “Trade Liberalisation, Efficiency and South Africa"s Sugar Industry”. This paper reports the results of a Computable General Equilibrium (CGE) analysis of the South
African sugar industry. The study was inspired by analyses of the EU South Africa Free Trade Agreement that indicated the importance of sugar exports to the welfare gains from agricultural trade liberalisation and by the increasing pressure upon OECD countries to reform their sugar (trade) policies. In addition to the effects of trade liberalisation this study also considers the implications of increases in the efficiency with which sugarcane is converted into raw sugar, which is an important determinant of the competitiveness of sugar production and exports. The results indicate that there would be substantial welfare gains across all household groups and that overall agricultural producers in South Africa should benefit; however there are substantial variations in the impact upon agricultural producers in different provinces, with farmers in some provinces facing reductions in the profitability of farming.

**Prakash Rao and Venkateswara Rao (2005)**\(^{27}\) examined the “Problems and Prospects of Sugar Industry in India”. An attempt has been made to examine the problems and prospects of sugar industry in India. Though the industry contributes a lot to the socioeconomic development of the nation, it is plagued with a number of problems such as cyclical fluctuations, high support prices payable to farmers, lack of adequate working capital, partial decontrol and the uncertain export outlook. Despite the problems, the industry has good growth potential due to steady increase in sugar consumption, retail boom and diversification into areas such as power generation and production of ethanol.

**Narayan and Prasad (2005)**\(^{28}\) analysed the “Economic importance of the sugar industry for Fiji”. In their analysis they found, the sugar industry has been perceived as the backbone of the Fijian economy, given its contributions to Gross Domestic Product (GDP) and employment generation. However, because of the non-renewal of land leases and the gradual withdrawal of preferential prices by the
European Union, the industry is on the verge of collapse. They use the Fiji computable general equilibrium model to simulate the economy-wide impact of a thirty per cent reduction in sugar production. Among the key results, it is clear that in the long run a thirty per cent reduction in sugar production leads to a 2.1 per cent fall in exports, and government expenditure and real consumption falls by 1.9 per cent and 1.6 per cent, respectively. These declines in the aggregate demand components are reflected in a fall of approximately 1.8 per cent in Fiji’s GDP. The negative repercussion of declining economic growth is reflected in a 1.5 per cent decline in real national welfare.

**Kwong (2005)** assessed the “Status of sugar industry in Mauritius: constraints and future research strategies”. In this study he finds that the success of the sugar industry in Mauritius has to a significant extent been due to the preferential trade agreements that the country benefited successively from the UK and from the European Union. At present, the cost of sugar cane production in Mauritius is among the highest due to a low milling capacity, a short milling season, a high ratio of labour to total production costs with field labour making up eighty per cent of the total labour costs. To enable the sugar cane industry of Mauritius to survive, research strategies must be aimed at both decreasing production costs of sugar while at the same time increasing productivity per unit of resources. Those research strategies encompass all the scientific disciplines of agronomy, namely irrigation, nitrogen nutrition, cultural operations and also includes research and development on mechanisation of cultural practices, breeding of high yielding varieties with high sucrose and fibre content with good rationing potential for sustainable production levels.

**Singh (2006)** in his article entitled on “Performance of Sugar Mills in Uttar Pradesh by Ownership, Size and Location” measures the performance assessment of
the sugar industry and setting targets for the relatively inefficient mills to improve their efficiency and productivity is crucial, as the interests of various stakeholders are largely dependent on its performance. This paper, therefore, attempts to assess the performance of the sugar mills of Uttar Pradesh, the largest sugarcane producing state of India. The paper finds that during the period, the average Overall Technical Efficiency (OTE) in the sugar mills of the state has been ninety three per cent. This implies that an average mill can make radial reduction in all its inputs by seven per cent without detriment to its output levels. The OTE shows a cyclical pattern mainly due to fluctuations in the scale efficiency. The performance of the mills is found to vary significantly across sector, plant size, and region. The private sector mills achieve the highest efficiency scores, followed by the co-operative sector. It has also been observed that the mills with bigger plant size attain relatively higher efficiency scores. Moreover, the mills located in the Western Region (WR) are found better performer as compared to their counterparts of other regions. Labour and energy inputs are found highly underutilised in almost all the inefficient mills.

**Andy Duff and Venkatraman (2006)** in their article “Fortune Smiles on India''s Sugar Sector” explored how the sector''s fortunes had changed and examined some key factors that would influence its development and profitability in the years to come. Production in 2005-2006 had rebounded powerfully following two seasons of low output. Attractive margins for sugar producers, robust growth in domestic sugar consumption and promising market developments for ethanol and cogeneration had combined to generate a wave of investment in the sector. India''s sugar sector is clearly on a roll – yet if was not so long ago that the industry was in crisis. Among other issues, consideration was given to the impact of some fairly radical ideas regarding sugar prices and marketing management that had been recently proposed by the Government.
Singh (2006) made an attempted to study the “Efficiency Measurement of Sugar Mills in Uttar Pradesh”. This paper measures the relative efficiencies of individual sugar mills of Uttar Pradesh, India, and sets targets for relatively inefficient mills to improve their performance. The study is based on the cross-sectional data collected for the year 2002-03 from a sample of thirty six sugar mills. The Data Envelopment Analysis (DEA) is applied for assessing efficiencies of individual sugar mills. The regression analysis is conducted to examine the impact of various background variables on the efficiencies. The paper finds that about fourteen per cent of sugar mills operate at the maximum degree of efficiency under Constant Returns to Scale (CRS) technology assumption. It also evinces that an average sugar mill has the scope of producing the same level of output with the inputs that are nine per cent lesser than the existing level. The study shows that several sugar mills have been able to make efficient use of their inputs but they suffer from disadvantageous plant sizes. The regression analysis reveals that the net sugar recovery and plant size have a significant positive impact on the overall technical efficiency and scale efficiency. The paper suggests that efficiency in the sugar industry may be increased by expanding its capacity as sugar mills in the state are mostly found to operate at increasing returns to scale.

Snehal Mistry (2007) in his thesis “A Study on use of Information Technology in Sugar Factories of South Gujarat Region” addresses the objectives like level of usage of information technology in sugar factories. To fulfil these objectives, researcher had taken exploratory research design. Some exceptions from results of study are, sugar factories under the survey are making moderate to minimum use of information technology and its various formats. Factories are not prepared for meeting globalisation and national challenges like introduction of
commodities trading at commodity exchanges, researcher has recommended model on integrating information technology with functions like procurement of sugarcane to marketing of sugar and improving the customer relations with farmers cultivating sugarcane.

**Bedi (2007)**[^34] made a study on “Sugar Industry in India: Today and Tomorrow”. In his article he revived the Indian sugar industry as today and tomorrow. Owing to the growing sugar production and the structural changes witnessed in Indian sugar industry, India is all set continue its domination at the global level. Indian sugar industry is highly fragmented with organised and unorganised players. The unorganised players mainly produce Gur and Khandasari, the less refined forms of sugar. And he finds in his study that following factors like dual pricing policy, low capacity utilisation, shift from Gur and Khandasari to sugar, absence of well knit policy in the past for purchasing and blending ethanol etc., are influencing the industry.

**Bhagat and Dilip Jain (2007)**[^35] in their Study “Indian sugar Industry – An overview” discussed the structure, size and influence of Indian sugar industry on world sugar market and presented on overall view of the sugar industry and its socio – economic impact. The paper highlighted the Indian sugar industry scenario, technology issues, efficiency improvement, by product usage and environmental safeguards addressed by the Indian sugar mills. The authors also presented the engineering and institutional support available for its sustainable growth.

**Benni Basavaraj (2007)**[^36] conducted a study on “Inter state sugar factory efficiency: A comparative analysis”. This study was carried out to compare the average efficiency ranks of the various sugar producing states on the basis of their respective average technical efficiency scores with a view to identifying the
inefficient sugar producing states. Using the data envelopment analysis model, the study identified the inefficient sugar producing states and revealed that Bihar can increase 12.28 per cent (3936 Tonnes) of sugar output with given inputs, Tamil Nadu 10.22 per cent (3709 Tonnes), Punjab 8.52 per cent (1467 Tonnes), Karnataka 6.12 per cent (1832 Tonnes), Uttarakhand 5.89 per cent (2386 Tonnes), Haryana 5.54 per cent (1803 Tonnes), Chhattisgarh 3.15 per cent (364 Tonnes), Madhya Pradesh 3.27 per cent (348 Tonnes), Orissa 1.95 per cent (146 Tonnes) and Goa 1.27 per cent (103 Tonnes).

Singh & et al. (2007)\(^{37}\) in their study “Sugar Industry in Uttar Pradesh: Efficiency Still Holds the Key”. The sugar industry is a major agro-based industry of Uttar Pradesh where cropping pattern is largely subsistence-oriented and sugarcane is one of the important cash crops. It has shown considerable instability in the level of production as a result of inter-dependence and inter-relationship between sugarcane, Gur, Khandsari and white sugar, leading to fluctuations in the production of sugarcane as well as sugar. These fluctuations emanate from the presence of various processing sectors and the differential governmental policies. In view of this scenario, it was felt necessary to carry out an investigation, which can reveal the present status of sugar industry in terms of its efficiency in operations. The study has revealed that most of the mills were in the efficiency range of sixty to eighty per cent. Efficiency was higher in the private sector (eighty one per cent), followed by the public (seventy three per cent) and co-operative (sixty six per cent) sectors. Though this study has advocated the continuation of partial decontrol policy, it has urged the policymakers to streamline strategies that promote stabilisation of sugarcane economy and make the state a credible supplier of sugar in the international market, benefiting growers, processors and, in turn, consumers.
Devaraja (2007)\textsuperscript{38} conducted a study on “An analysis of functioning of sugar industry in Karnataka - SWOP (T) Management technique approach”. This paper analyses the development and financial performance of the sugar industry in Karnataka, India, using data for the years 1990-91 to 2004-05. It identifies influencing factors that are internal and external to this industry with a view to improving its performance and contributions to rural-led economic development. The administrative efficiency of sugar factories is evaluated using the SWOP (T) [Strength, Weaknesses, Opportunities, Problems/ Threats] management technique. The paper concludes by outlining appropriate policies/strategies for improving the performance of the sugar industry in the state.

Sunil Chaudahry (2008)\textsuperscript{39} prepares a report on “Sugar Industry in India” He concluded his study by the sugar industry will not be lacking in meeting the requirement of ethanol. In a market economy, there would be a considerable shift from the Gur and Khandsari sectors which are inefficient producers with poor quality. In the current scenario of glut in sugar production, it may be advisable to divert such additional cane for the production of alcohol after meeting the sweetener requirement. The additional availability of alcohol on the assumption that the entire sugar cane is utilised for the production of sweeteners will be about 200 million litres over and above. Alternatively, if additional sugar cane available is utilised for the production of alcohol to bring in a balance in the demand and supply of sugar, the alcohol production at the end of the 10\textsuperscript{th} plan would be around 1,485 million litres. Such flexibility has become very relevant in the current scenario of economy liberalisation and more particularly as a means to correct the aberrations in sugar production.

Dyah Ismoyowati (2008)\textsuperscript{40} in his research entitled that “Profitability and Comparative Advantage of Sugarcane Farming to Supply Sugar Industry in Java,
Indonesia” aimed to determine the sugarcane farming system’s profitability, comparative advantage of the system, incentive or protection available to the farmers, and sensitivity analysis on relevant sugar dynamics. The study sites were five sugar industry samples spread over Java. The primary data for profitability analysis covered 300 units originated from 185 farmers and 115 industry plantation units spread over a proportional area. The study applied a non-distorted efficiency measure approached by the average production cost of competitive and efficient countries of US$ 280 per tonne to identify comparative advantage in the long run. The findings showed three alternatives of sugarcane procurement. They are partnership with farmers based on minimum return on land, partnership with farmers as the industry provides assistance and purchasing sugar cane from free farmers.

**Mala Lalvani (2008)** evaluated the “Sugar Co-operatives in Maharashtra: A Political Economy Perspective”. In his study he examined that the origin of the powerful sugar lobby in Maharashtra dates back to the 1950s. Post Independence, cooperatives formed an integral part of the congress vision of „rural development with local initiative”. A „special” status was accorded to the sugar co-operatives and the government assumed the role of a mentor by acting as a stakeholder, guarantor and regulator. Persistence of the maze of regulations instituted five decades ago, despite its stated original rationale being thwarted, suggests that it is by active design of entrenched vested interests. The clarion call of the times is a fresh start with minimal regulations. Teething problems and initial market failures that may occur cannot be worse than continuing the saga of government failure.

**Amit Kumar Dwivedi & et al. (2009)** conducted a study on “A Study on Gur (Jaggery) Industry in India”. They observed from the study the Gur industry is not only a traditional industry but it also has medicinal values. This industry
covering a wide range of population which depends on it, but no any good
research organised for further development. After consulting the report of National
Federation of Co-operative Sugar Factories Ltd., the researcher found Uttar
Pradesh and Tamil Nadu are producing huge quantity of Gur, so they thought to
conduct research in these states only. They concluded that the research will help to
develop the Gur industry of India, its value added production, market potentiality
as well as increase the demand in international markets. This will help and guide
the manufacturers for diversifying of the Gur products range, and also helpful in
planning of its marketing strategy. Cost benefit analysis of this industry will focus
its financial and revenue aspects which will give a direction to the manufacturers.
Still there is no research for the development of this Industry, so this research will
find the actual need of any research and development for this industry and training
support for the entrepreneurs.

Goncharuk and Anatoliy (2009)\textsuperscript{43} in his article entitled that “How to
make sugar production more effective: A case of Ukraine” is devoted to the
analysis of efficiency of sugar companies of Ukraine and the ways of its
improving. The main factors of sugar plants inefficiency are defined and he finds
that these problems have two sides: external and internal. The solving of external
problems is not connected with actions of companies and depends on the
government and its further policy in the field of regulation of agriculture and sugar
production. The solving of internal problems of sugar companies depends on
desire and abilities of their proprietors and management to manage a business
performance. Recommendations for the improvement of efficiency of sugar
companies and industry based on the study are the following; attraction of large
foreign investors having high-efficiency technologies, own raw-material base
(beet, raw sugar) and distribution channels abroad, and directed to increasing of
labour productivity, reduction of wastage, improving of energy efficiency and decreasing of materials-output ratio.

Anuradha Rajendran (2009)\textsuperscript{44} under took a study on “Performance Appraisal of Private Sector Sugar Companies in Tamil Nadu” for the period from 1997-98 to 2006-07. The main objectives of the study are to access the production and sales performance, to analyse the financial performance and profitability analysis of select sugar mills. Financial analysis techniques like ratio analysis and trend analysis are used to analyse the financial data. The correlation analysis revealed a positive correlation between return on total assets and inventory turnover ratio during the study period. The analysis of the operational efficiency using Altman"s model reveals the financial health of the selected sugar industry falls in the healthy zone.

Sunil Kumar and Nitin Arora (2009)\textsuperscript{45} carried out a study entitled “Analysing Regional Variations in Capacity Utilisation of Indian sugar industry using Non-parametric Frontier Technique”. By using time series data spanning over the period 1974-75 to 2004-05, this paper provides the trends of Capacity Utilisation (CU) levels in Indian sugar industry from regional respective. The results reveal that, on an average the sugar industry in India is operating with the excess capacity in tune to thirteen per cent in each sampled year; substantial variations in CU levels appear in the sugar industry of twelve major sugar producing states under consideration, a precipitous decline in CU levels is noted in the post-reforms years relative to what has been observed in the pre reforms period, except the state of Rajasthan, the sugar industry in the remaining eleven states observed a significant decline in CU levels during the post reforms period relative to the pre-reforms period and availability of raw material is most significant variable explaining the CU in Indian sugar industry.
Renuka Mahadevan (2009) in her study on “The viability of Fiji’s sugar industry” examines the impact of various socio-economic factors on the viability of sugar production by focusing on the technical efficiency of farm performance. The analysis is undertaken by empirically estimating the random coefficient production frontier using farm level data. The paper uses Fiji as a case study. The Findings of the paper, in general, shows that farmers produced twenty five per cent less than their potential output. Among the farm inputs, land (labour) was the most (least) efficiently used input. Empirical evidence also suggests that large-scale farming should be seriously considered by amalgamating land leases. Lastly, sugar reform can be successful with the use of appropriate best farming techniques to improve sugar cane yield, if there is successful expansion of sugar-related products.

Uma Maheswari and Ramachanadra Reddy (2012) presented a paper on “Working Capital Management in Sugar Mills in Chittoor District of Andhra Pradesh”. The study focused on Sri Venkateswaru Co-operative Sugar Factory Limited and Sagar Sugars & Allied Products Limited in Chittoor district of Andhra Pradesh. Sugar industry faces many problems such as fluctuations in the production due to inadequate availability of sugarcane and power failure. The profitability of the sugar industry is comparatively very low because of high cost of production. In fact, some units are incurring losses continuously. The study found the industry has failed to retain more profits, consequently been forced to define more on external sources.

Malik & et al. (2012) in their article on “Affect of Working Capital Management on Firms Profitability in Sugar Industry of Pakistan” test the impact of working capital management on firm's profitability in sugar industry of Pakistan. Pearson Correlation and Multiple Linear Regression are used in this
research to study the relationship between variables. The result shows that the sales growth, current ratio, No. of days inventory and No. of days accounts payables are significantly affecting the profitability of the firms while Sales, gearing ratio and No. of days account receivables are insignificant in the research.

**Yashwant and Neeraj Kumar (2012)**49 undertook a study on “Financial Wealth Health of Mawana Sugar Mill - A Case Study”. In this paper an attempt has been made to study the degree of financial health of the selected units with the help of Edward Altman's Z-score model and the comparison of wealth and health among the selected units with the help of statistical tools i.e. Mean, Standard Deviation and Coefficient of Variation. The objective of the study is to ascertain the degree of financial health condition of the selected units and the success thereof. Financial health reflects the success of the sugar mills. The scenario circles around diagnosing the wealth health of sugar mill by peeping deep into the annual reports of the concerns. The study depicts the issues relating to the financial performance only. Non-Financial aspects like marketing, personnel, etc. are not taken into consideration.

**Balasubramanian (2012)**50 in his study on the “Financial Performance of Sugar Industries in India” is an attempt as to review progress of sugar industry in India, understand its problems and challenges in context of ongoing liberalisation process. He concludes in the era of globalisation, sugar industry needs more competitive edge which can be given by way of modernisation, enhancing productivity, and manufacturing excellent quality sugar at competitive prices. It needs quality management at every level of activity to enhance its performance. Most of the sugar units do not have byproduct utilisation plants. Projects based on bagasses and molasses should be initiated, Ethanol, alcohol, and paper projects have tremendous scope for development in India. In future, ten to fifteen per cent
ethanol may be allowed to be blended with petrol. Bagasses based power generation projects installed adjacent to each sugar factory would fulfil need of power. New sugar units should be set up taking into consideration sugarcane availability. Research programme should be undertaken in area of sugarcane cultivation, enhancing sugarcane productivity, and sugar recovery. Sugarcane prices should be fixed on basis of sugar recovery.
REFERENCES


