C H A P T E R   II.

PROBLEM & METHODOLOGY

2.1 Introduction:

In this Chapter, we briefly state the problem under study in its various dimensions. This is followed by the elaboration of the methodology of the study adopted and its limitations.

2.2 Statement of the Problem:

The title of the present study is "CAPACITY UTILISA TION OF CO-OPERATIVE SUGAR FACTORIES IN KOLHAPUR DISTRICT". The period of study is the crushing seasons 1981-82to1985-86, i.e. five years. In Kolhapur district, at present, there are eleven co-operative sugar factories of which we have covered nine factories. the remaining two were left out of the scope of the study because it was difficult to get compa- rative statistical data from Rajaram Co-operative Sugar Factory, Kolhapur, and Datta CO-operative Sugar Factory, Asurle-Porle. Of these, two factories, the former was earlier in the private sector upto 1984 and the latter was started much after the first year of study and earlier it was a Khand- sari Unit upto 1984. In fact, almost for a decade, it was non- functioning.

2.2.1 The Focus of the Study:

Sugar industry in general and the co-operative sector of the industry in particular constitutes the vital agent of rural transformation in Maharashtra and more so is Kolhapur district. The growth of this industry in Kolhapur district began by the end of the first five year plan and now it has reached a stage, perhaps of saturation. With the growth of co-operative sugar factories, more and more area was brought under sugar cane cultivation, which of necessity had to be accompanied by gradually increasing irrigation facilities. Of late, adequate supply of sugar cane to each of the factories has become somewhat problematic., Almost all the factories have to crush a certain proportion of sugarcane imported from outside its allotted zone. Sometimes,a factory has to crush a larger quantity of sugarcane necessitating a longer crushing season whereas in certain other cases, a sugar factory has to stop its crushing well ahead of its normal lengths of crushing season. In other words,the problem of capacity utilisation - both under-utilisation and over-utilisation - becomes of great practical significance. The present study focuses its attention on this single but singularly important aspect of co-operative sugar factories in Kolhapur district. Full utilisation of installed capacity of industry is one of the conditions of efficient working of the industry. Under utilisation of capacity leads to wastage of capital, reduction in production,higher production

cost and less than possible employment of labour. Co-operative sugar factories lead the agro-based industrial sector in Maharashtra and more prominently in Kolhapur district. In this industry, apart from in-built feature of under utilisation due to seasonal nature, there are problems of day-to-day under utilisation of capacity arising out of supply channel of raw materials and other technical problems. It is for these reasons that we consider an empirical study of the phenomenon of capacity utilisation in co-operative sugar factories of Kolhapur district justified.

2.3 Objectives of the Study:

The main objectives of this study are as under:-

a) To measure capacity utilisation of the co-operative sugar factories of Kolhapur district for the period under study,

b) To examine various possible causes for changes in capacity utilisation over time and cross sectionally,

c) To suggest measures for optimal utilisation of capacity of the co-operative sugar factories in Kolhapur district.

2.4 The Hypotheses:

A priory, it can be said that the rate of capacity utilisation of the sugar factories depends on the following factors:-

i) Cane production of the year in the zone of the factory,

ii) Cane imports from outside the zone of the factory,

iii) Cane diversion from the zone of the factory for various reasons,

iv) Cane price of the previous season,

v) Sugar price of two seasons earlier,

vi) Incidence of stoppages of the factory,

vii) Rainfall of the year,

viii) Level of irrigation facilities of the year in the zone of the factory,

ix) Area under cane.

x) Cane yield in the zone.

2.4.1 Assumed Correlations:

Given other things, the capacity utilisation of a factory will tend to increase with increase in sugarcane production in the zone of the factory during the year of the crushing season and vice versa. It is also to be noted here that the cane production depends on the per acre yield of the zone which in turn will depend on factors like area under sugarcane appropriateness of the soil for the sugarcane cultivation and the seed variety used. In this study, however, we have decided to concentrate on cane production of the year, area under sugarcane for the year and the yield of sugarcane in the zone.

2.4.2 Similarly, other important factors which can increase or decrease the rate of capacity utilisation of

a sugar factory (given the sugarcane production in its own zone) are (a) Cane Diversion, and (b) Cane Import from outside the factory's zone. It can be hypothetically said that given other things, increasing cane diversion will decrease capacity utilisation and increasing imports of the sugarcane from outside the zone will tend to increase the rate of capacity utilisation of the factory.

2.4.3 It is generally believed that a change in the cane price in the previous year causes a change in the supply of sugarcane in the current year through changes in the area under sugarcane. It can be arrgued that a higher price of sugarcane in the previous season will cause an increase in the area under sugarcane in the current year leading to an increase in the supply of cane to the factory in the zone and vice-a-versa. This will accordingly change the rate of capacity utilisation.

2.4.4 It is at the sametime logical to say that an increase in the sugarcane price will generally follow an increase in the sugar price itself. It is of course very difficult to say that an increase in the sugar price will immediately lead to an increase in the sugarcane price. To allow for the time lag, here also, we take into consideration the sugar prices of the previous year as the factor which influences the sugarcane prices in the current year. We,

therefore, can say that an increase (decrease) in the price of the sugar in the previous year will increase (decrease) the price of sugarcane in the current year which naturally will increase (decrease) the supply of sugarcane in the subsequent year causing a greater capacity utilisation in the same year and vice-a-versa.

2.4.5 There is another reason for changes in capacity utilisation rate of the factory. It is of a mechanical and operational nature. Even during the crushing season, the operation of a sugar factory may be interrupted because of mechanical fault, need for major repairs, problems of labour unrest, etc. Greater the frequency and intensity of such interrupting factors the lower will be the rate of capacity utilisation of a sugar factory.

2.4.6 The annual variations in the rainfall of the zone and in the irrigation facilities of the zone, can also be considered as two other important factors affecting the rate of capacity utilisation of a sugar factory. Given the soil quality, natural drainage facility, etc., greater access to irrigation and/or adequate and timely rainfall will tend to increase the sugarcane production which will naturally cause a higher rate of capacity utilisation.

Thus, there are in all 10 factors which we have taken into consideration as factors influencing the rate of capacity utilisation of the sugar factories.

2.5 Conceptual Framework:

In the present study, by capacity of a sugar factory, we mean the installed capacity of a sugar factory. Normally, in the beginning, a co-operative sugar factory is given a certain licenced capacity which the management may install well from the beginning or start the first crushing season with an installed capacity less than the licenced capacity. Operationally and practically, the concept of installed capacity is, therefore, the more relevant one.

The discussions with the top management including the Chief Engineers and Chief Chemists of the sugar factories under study revealed that co-operative sugar factories have a standard of 100% capacity utilisation. According to this standard, when a sugar factory operates its installed capacity for a crushing season of 160 days, it is considered as optimum or 100% capacity utilisation. These 160 days of crushing are to be exclusive of stoppages. In other words, 100% capacity utilisation is indicated by the product of 160 x installed TCD, where TCD means tonnes crushed per day.

In finding out the relationship between sugar price and capacity utilisation, we have taken into consideration the average per quintal price calculated in the following manner:

Average price of Sugar = Price per quintal of levy sugar +

Price per quintal of open market sugar

divided by two.

It has to be pointed out here that underutilisation
of capacity results in losses to the sugar factory because
of the increased average cost of processing and ultimately
causes some reduction in the employment of seasonal workers
due to smaller number of crushing days. Similarly, over utili-
sation of capacity leads to perceptible decrease in recovery
as also a significant increase in the percentage of sugar
in molasses and bagasse.

2.6 Techniques of Analysis:

In this work, we have used two techniques of analy-
sis. Firstly, we have tried to find out correlation co-effi-
cients between capacity utilisation and various variables
which we have enumerated above. The formal used is given
below:-

$$r = \frac{\epsilon dxdy}{\sqrt{\epsilon dx^2 \times \epsilon dy^2}}$$

where 'x' indicates capacity utilisation, 'y' stands for the
variables concerned affecting the rate of capacity utilisation.
ϵdx is the sum of deviations of 'x' value from the $\bar{x}$ value.
Similarly, ϵdy is the sum of deviations of 'y' value from $\bar{y}$
value and 'r' = co-efficient of correlation.

We have also tried to measure price elasticity of
supply values of:-

a) Cane price of T th year and cane supply of T+1th year.

b) Sugar price of T th year and cane crushed of T+1th year.

c) Sugar price of T th year and sugar production of T+1th year.

The Formula used is:

$$Es = \frac{\% \text{ change in supply}}{\% \text{ change in price}}$$

OR

$$Es = \frac{\Delta g}{\Delta p} \times \frac{p}{q}$$

Where 'p' stands for price and 'q' stands for quantity supplied.

2.7 Sources of Data:

In this work, we collected data from the following sources:-

i) Annual reports of the concerned sugar factories,

ii) Office records of the concerned sugar factories,

iii) Bharatiya Sugar Directory - 1983-84,

iv) Direct unstructured interviews with the Managing Directors and Chief Chemists of the sugar factories.

In a sense, the whole work is based on secondary data.

2.8 Limitations:

In interpreting the results of the statistical analysis, we have to bear in mind the following limitations:-

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1)   The data is only for the period of five years,

2)   The data is only related to nine   out of eleven

     factories in Kolhapur district,

3)   So far as correlation-coefficients are concerned, it is

     to be carefully noted that in every exercise, we assumed

     that all other relevant factors remain constant.

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