# C H A P T E R VI.

# IRRIGATION, RAINFALL & CAPACITY UTILISATION

## 6.1 Introduction:

In this Chapter, we explain the correlation between (a) Rainfall and the rate of capacity utilisation; and (b) Irrigation and the rate of capacity utilisation, on the basis of the available data.

## 6.2 Theoretical Background:

In trying to find out the correlation coefficients between the rainfall and capacity utilisation, our thinking is that adequate rainfall in the $t^{th}$ year will be followed by greater cane production in the t + 1th year, resulting into a higher rate of capacity utilisation.

Similarly, it is but natural to expect a larger rate of capacity utilisation of a factory with a larger irrisgation ratio than the rate of capacity utilisation of a factory with a lower irrigation ratio. Similarly, it can also be said that increasing irrigation ratio overtime will be accompanied by a higher rate of capacity utilisation.

Let us now see what the actual co-efficients of correlation are. Data regarding irrigation ratio and annual rainfall are given in Appendices 6-A and 6-B respectively.

## 6.3 Rainfall & the Rate of Capacity Utilisation:

TABLE NO.6.1

RAINFALL & CAPACITY UTILISATION

| S.No | Factory | 'r' Values |
|---|---|---|
| 1. | Daulat | -0.21 |
| 2. | Gadhinglaj | +0.56 |
| 3. | Shahu | +0.27 |
| 4. | Datta | +0.82 |
| 5. | Bhogawati | +0.51 |
| 6. | Dudhaganga | +0.19 |
| 7. | Panchaganga | +0.99 |
| 8. | Kumbhi-Kasari | +0.35 |
| 9. | Warana | +0.76 |

We could get annual rainfall data only for the years 1981 to 1985, but we could not get the rainfall data for the year 1980. As per our contention, rainfall of this season will influence the capacity utilisation of the next season. We, therefore, could calculate overtime factorywise 'r' values only for four years. If we look to the data in Table no.6.1, it is seen that except in the case of Daulat factory, the 'r' values for the remaining factories are positive and very strong in the case of Panchaganga, Datta, Warna; fairly strong in the case of Bhogawati and Gadhinglaj and not very strong in the case of Shahu, Dudhaganga and Kumbhi-Kasari factories. It is noted here that in the case of Daulat factory, the cane imports from outside Maharashtra are mostly considerably larger than in the case of other factories. This mays be mainly due to the fact that the Daulat factory is located almost on the boundary between Maharashtra and

Karnataka. As a result, the factory has always been in a position to import the needed quantity of sugarcane from the adjoining areas of Karnataka. In other words, even if there is deficient rainfall in the area of Daulat factory, the rate of capacity utilisation could not have been adversely affected.

If we carry out an exercise to find out the 'r' value in an aggregate way, we get the 'r' value which is +0.25. Considering the factorywise overtime and aggregate overtime 'r' values are positive and in certain cases quite strong coupled with the fact that the aggregate 'r' value is also positive, we can certainly say that the rainfall of the $t^{th}$ year, does affect the rate of capacity utilisation of a factory in the t + 1th year in a positive manner.

However, if we carry out exercise to find out cross sectional 'r' values for the relationship between rainfall and the rate of capacity utilisation for each year for all the factories, we get 'r' values given in Table no.6.2.

**TABLE NO.6.2**

**CROSS SECTIONAL 'r' VALUES**

| S.no | Years | 'r' Values |
|---|---|---|
| 1. | 1981 | -0.11 |
| 2. | 1982 | -0.26 |
| 3. | 1983 | -0.005 |
| 4. | 1984 | -0.05 |

Except for the year 1984, the 'r' values are negative, but very weak. The positive 'r' value in the year 1984 is also very weak. The fact that both negative and positive 'r' values are very weak, perhaps, indicates that the variations in the rainfall really do not have a significant bearing on the rate of capacity utilisation; atleast cross sectionally. In fact, irrigation ratio must be considered as a more important factor.

## 6.4 Irrigation & the Rate of Capacity Utilisation:

We could not get data for annual changes in the irrigation ratios for the different factories under study. The latest irrigation data that we could get was for the year 1981 from Kolhapur District Census Abstract. Consequently,s we had to carry out the exercise for finding out 'r' value between irrigation and the rate of capacity utilisasation in the following manner. We assumed irrigation ratio as constant for the period under study. The irrigation ratio was the average of the different areas of the different factories for the year 1981. Here irrigation ratio was calculated by deducting from the total area of the talukas concerned, the area not available for cultivation, the area described as culturable waste and the forest area. The remaining area is the total cultivable area. The irrigation ratio is given by:-

$$\frac{\text{Irrigated Area}}{\text{Total Cultivable Area}} \times 100$$

The 'r' value that we got is +0.47. We, therefore, can say that the differences between irrigation ratio have some bearing on the variations in the rate of capacity utilisation, though not very strong.

On the whole, it can be said that the rainfall of the previous year and the irrigation of the current year positively but not strongly affect the rate of capacity utili=-sation of the sugar factories.

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## APPENDIX NO.6-A-1

## ACTUAL RAINFALL

| Sr. no. | Tahsil | 1981 | 1982 | 1983 | 1984 |
|---|---|---|---|---|---|
| 1. | Kolhapur | 1,074 | 778 | 952 | 747 |
| 2. | Panhala | 1,203 | 1,176 | 1,359 | 1,034 |
| 3. | Hatkanangale | 804 | 411 | 560 | 502 |
| 4. | Shirol | 758 | 504 | 602 | 331 |
| 5. | Kagal | 746 | 864 | 1,070 | 853 |
| 6. | Gadhinglaj | 939 | 679 | 1,153 | 795 |
| 7. | Chandgad | 2,889 | 2,993 | 3,178 | 2,537 |
| 8. | Ajara | 1,882 | 1,955 | 2,380 | 1,789 |
| 9. | Bhudargad | 1,610 | 1,974 | 1,923 | 1,351 |
| 10. | Radhanagari | 3,922 | 3,649 | 4,012 | 3,323 |
| 11. | Gagan Bavda | 6,264 | 5,589 | 7,336 | 4,965 |
| 12 | Shahuwadi | 1,408 | 1,427 | 1,803 | 1,485 |
| | Average | 1,643 | 2,194 | 1,833 | 1,958 |

## APPENDIX NO.6-A-2

## AVERAGE RAINFALL

(in millimetres)

| Sr No | Factory | Major Area of Operations | Average Rainfall | | | |
|---|---|---|---|---|---|---|
| | | | 1981 | 1982 | 1983 | 1984 |
| 1. | Daulat | Chandgad & Ajra | 2,386 | 2,474 | 2,789 | 2,163 |
| 2. | Gadhinglaj | Gadhinglaj | 939 | 679 | 1,153 | 795 |
| 3. | Shahu | Kagal & Karveer | 910 | 821 | 1,011 | 800 |
| 4. | Datta | Shirol & Hatkanangale | 781 | 458 | 581 | 417 |
| 5. | Bhogawati | Radhanagari & Karveer | 2,498 | 2,214 | 2,484 | 2,035 |
| 6. | Dudhaganga | Kagal, Bhudargad & Radhanagari | 2,093 | 2,162 | 2,335 | 1,842 |
| 7. | Panchaganga | Shirol & Hatkanangale | 781 | 458 | 581 | 417 |
| 8. | Kumbhi | Panhala & Karveer | 1,139 | 977 | 1,156 | 891 |
| 9. | Warana | Panhala & Hatkanangale | 1,004 | 794 | 960 | 769 |

## APPENDIX TABLE 6-B-1

## ACTUAL IRRIGATION

(Area in Hectares)

| Sr. No. | Tehsil | Total Net | Irrigated Area | % of irrigated Area to total net area |
|---|---|---|---|---|
| 1. | Karveer | 41338 | 13022 | 31.5 |
| 2. | Panhala | 29951 | 4063 | 13.5 |
| 3. | Hatkanangale | 40904 | 9697 | 23.7 |
| 4. | Shirol | 33909 | 12675 | 37.4 |
| 5. | Kagal | 40817 | 3146 | 7.7 |
| 6. | Gadhinglaj | 6685 | 3103 | 46.4 |
| 7. | Chandgad | 33180 | 3011 | 9.0 |
| 8. | Ajara | 23385 | 830 | 3.0 |
| 9. | Bhudargad | 26340 | 2399 | 9.1 |
| 10. | Radhanagari | 26442 | 4227 | 16.0 |
| 11. | Bawada | 24777 | 1166 | 3.0 |
| 12. | Shahuwadi | 34887 | 1612 | 5.0 |

## APPENDIX TABLE 6-B-2

## AVERAGE IRRIGATION

| Sr. No. | Factory | Main areas of operation | % of Irrigated area to total net area |
|---|---|---|---|
| 1. | Daulat | Chandgad and Ajara | 6.24 |
| 2. | Gadhinglaj | Gadhinglaj | 46.4 |
| 3. | Shahu | Kagal and Karveer | 19.68 |
| 4. | Datta | Shirol and Hatkanangle | 29.09 |
| 5. | Bhogawati | Radhanagari and Karveer | 25.44 |
| 6. | Dudganga | Kagal, Bhudargad and Radhanagari | 10.44 |
| 7. | Panchganga | Shirol and Hatkanangale | 29.9 |
| 8. | Kumbhi | Panhala and Karveer | 23.96 |
| 9. | Warana | Panhala and Hatkanangale | 19.41 |