

## EXECUTIVE SUMMARY

The survey of S & T personnel drawing higher emoluments in the States of Goa, Gujarat and Maharashtra was initiated by Department of Science and Technology, Government of India in 1987 and the responsibility of conducting the survey, making the analysis of the data and preparation of the report was entrusted to Indian Institute of Management, Bangalore. The objective of the project is to analyse the various activities carried out by the S & T personnel, the remuneration they received for carrying out such jobs, the qualifications possessed by them and the relationship of these aspects with each other.

The survey covered totally 35,502 higher salaried (with salary more than Rs.36,000 per annum) S & T personnel in the above mentioned States. The summary of the findings and recommendations of the survey are presented below.

### OVERALL ANALYSIS (GOA, GUJARAT AND MAHARASHTRA)

1. Science and Technology (S & T) personnel drawing higher emoluments exceeding Rs. 36,000 per annum in the three States works out to be 0.036% of the total population as against 0.09% in the States of Andhra Pradesh, Tamil Nadu, Kerala and Karnataka, a study done earlier by the Institute.
2. The percentage of S & T personnel in the overall total of 35,502 works out to be 3.0, 21.1 and 75.9 for the states of Goa, Gujarat and Maharashtra respectively.
3. The percentage of S & T personnel in the total work force surveyed for the States of Goa, Gujarat and Maharashtra works out to be 51.5, 52.1 and 31.7 respectively.
4. The percentage of S & T personnel in all the three States (35,502) against the total work force (1,01,419) works out to be 35.0.
5. The percentage of Master's and Doctoral Degree holders works out to 10.4 and 1.5 respectively in the total of 35,502 S & T personnel surveyed.
6. The distribution of S & T personnel in State Public Enterprises, Central Public Enterprises and Public Limited Companies works out to 4.3, 5.3 and 90.4 percent respectively out of the total S & T personnel studied (35,502).
7. The distribution of S & T personnel with Science background in State Public Enterprises, Central Public Enterprises and Public Limited Companies works out to 4.2, 5.4 and 90.4 percent respectively out of the total S & T personnel.

Similarly for those with the Engineering background, the figures for the above Enterprises/Companies works out to 4.4, 5.2 and 90.4 percent respectively.

8. Largest number of S & T personnel work in General and Heavy Engineering Industries (6223 out of 35,502).
9. Next to General and Heavy Engineering Industries, the others that follow are Textiles (5132), Chemicals and Fertilizers (4490) and Electrical and Electronics (4144).
10. It has been found that the largest number of S & T personnel in all the States are working at the plant level.
11. It is also interesting to note that a very small number of Engineers are engaged in R & D in all the three States.
12. With regard to remuneration of S & T personnel working in State Public Enterprises, Central Public Enterprises and Public Limited Companies, the data reveal that the largest number of S&T personnel are in the low income group (Rs.36,000 - Rs.59,000 per annum) in the three types of companies and the percentages are 84.1, 72.8 and 64.5 respectively. Further it is also revealed that only a small percentage of S & T personnel (1.2%) working in State Public Enterprises belong to higher income group (Rs.90,000 and above per annum).
13. In all the three States, those having Master's degree draw relatively higher emoluments than those having Doctoral degree. It is also observed that relatively larger percentage of the S&T personnel with Master's and Doctoral degrees in all the three States are in the middle and higher emolument category.
14. In the higher income group (drawing in excess of Rs.90,000 per annum), S & T personnel working in Administration account for 39.3% as against others in other activities. Only 3.8% of the higher income group are engaged in the Research and Development activity. Even in the Low Income (Rs.36,000 - Rs.59,000 per annum) and Middle Income groups (Rs.60,000 - Rs.89,000 per annum), the percentages of S & T personnel engaged in R & D are only 6.8 and 5.9 respectively. It is also observed that considering plant level and administrative activities together, the percentages of S & T personnel belonging to low, middle and higher income groups work out to 72.5, 77.2 and 78.1 respectively.
15. In the case of low, middle and high investment categories of companies, the percentages of S & T personnel engaged in R & D activities works out to 6.2, 5.0 and 6.9 respectively. A high percentage of S & T personnel works

in plant level and administrative activities in all the above categories of companies.

16. Analysis show that low investment companies pay S & T personnel as much as middle and high investment companies. The percentages of S & T personnel working in higher income group in low, middle and high investment companies work out to be 8.8, 8.9 and 7.5% respectively.
17. In all the three States, Goa , Gujarat and Maharashtra, there are only a total of 77 women S & T personnel drawing higher emoluments of over Rs 36,000 per annum. Among them plant level and administrative activities dominate. Proportionately more women S&T personnel (9.1%) are in R & D.

### ANALYSIS OF INDIVIDUAL STATES

#### GOA

18. The percentage of S & T personnel in the population (8,57,771) works out to 0.12.
19. The percentage distribution of S&T personnel by nature of duties indicate that in R&D percentages of Science qualification with Bachelor, Master, Doctoral and Diploma levels work out to 7.4, 28.6, 25.0 and 0 respectively. The percentages of such personnel working in plant and administrative activities together works out to be 63.5, 37.5, 50 and 100 respectively.
20. The percentage distribution of S & T personnel working in R&D with Engineering qualifications at Bachelor, Master, Doctoral and Diploma levels works out to 0.3, 2.8, 9.1 and 0.3 respectively. The percentage of these personnel working in plant level and administrative activities together works out to 96.9, 94.4 , 81.8 and 95.2 respectively.
21. There is a high percentage of S & T personnel with Bachelor degree in Science belonging to low (Rs.36,000 to 59,000 per annum = 83.5%) income groups Ph.Ds account for 0.4, 3.8 and 1.0 percent to low, middle and high income groups respectively.
22. With regard to the three income groups (Low, Middle and High) the percentage distribution of S & T personnel with Bachelor Degree (Engineering) and Diploma (Engineering) together works out to 96.2, 97.3 and 65.8 respectively. The percentage distribution of S & T personnel with Ph.D(Engineering) and Master (Engineering) together works out to 3.8, 2.8 and 34.2 respectively.
23. Relatively high percentage of S & T personnel are working in Mining industries. This is applicable across low, middle and high income groups. Chemicals and fertilizers comes next to Mining.

## GUJARAT

24. The percentage of S & T personnel in the population (3,40,00,000) works out to 0.02.
25. The percentage distribution of S & T personnel working in R & D with Science qualification at Bachelor, Master, Doctoral and Diploma levels works out to 6.4, 16.4, 39.0 and 0 respectively. Similarly the percentage of S & T personnel working in plant and administrative activities together works out to 54.5, 52.8, 49.4 and 50.0 respectively.
26. The percentage distribution of S & T personnel working in R&D with Engineering Qualifications at Bachelor, Master, Doctoral and Diploma levels works out to 1.0, 9.4, 12.8 and 1.8 respectively. Similarly the percentage of S & T personnel working in plant and administrative activities together works out to 84.9, 73.1, 51.3 and 87.8 respectively.
27. There is a high degree of S & T personnel with Bachelor degree in Science belonging to low (81.8%), middle (73.4%) and high (72.3%) income groups. Ph.D accounts for only 1.3, 3.5 and 6.3 percentage with regard to low, middle and high income groups respectively.
28. With regard to the three income group (Low, Middle and High) the percentage distribution of S & T personnel with Bachelor Degree in Engineering and Engineering Diploma holders together works out to 96.3, 93.4 and 91.9 respectively. The percentage distribution of S & T personnel with Ph.D and Master (Engg) together works out to 3.7, 6.6 and 8.1 respectively.
29. Relatively a high percentage of S & T personnel are working in Textile industries. This is applicable across the low, middle and high income groups. This is followed by Chemicals, fertilizers & pesticides, industries Electrical and Electronics industries.

## MAHARASHTRA

30. The percentage of S & T personnel in the population (6,27,00,000) works out to 0.04.
31. The percentage distribution of S & T personnel working in R&D with Science qualification at Bachelor, Master, Doctoral and Diploma level work out to 10.4, 20.8, 49.0 and 27.5 respectively. The percentage of personnel working in plant and administrative activities together works out to 62.9, 56.0, 46.6 and 45.0 respectively.

32. The percentage distribution of S & T personnel working in R & D with Engineering qualification at Bachelor, Master, Doctoral and Diploma levels works out to 1.5, 4.5, 26.3 and 1.0 respectively. The percentage of these personnel working in plant and administrative activities together works out to 83.9, 86.2, 69.5 and 87.2 respectively.
33. A high proportion of S & T personnel with Bachelor degree in Science belongs to low (83.6%), middle (82.3%) and high (74.4%) income groups. Ph.Ds account for only 1.9, 2.9 and 8.7 percent for the same income group.
34. S & T personnel with Bachelor Degree in Engineering and Diploma holders in Engineering together account for 94.1, 90.9 and 89.0 percent with respect to low, middle and high income groups respectively. The percentage distribution of S & T personnel with Ph.D and Master(Engg) together works out to 6.0, 9.1 and 11.0 respectively.
35. Relatively a high percentage of S & T personnel work in General and Heavy Engineering Industries. Next in the order are Electrical and Electronics, followed by Textiles.

#### COMPARATIVE PICTURE OF WESTERN REGION AND SOUTHERN REGION

36. The percentage of highly paid S & T personnel with reference to total population in the states of Goa, Gujarat and Maharashtra are 0.12, 0.02 and 0.04 respectively. The overall position is that S & T personnel drawing relatively higher emoluments are 0.036% in the three Western states compared to 0.09% in the Southern states as indicated by the survey done earlier in those states.
37. There are more S & T personnel in Kerala in the overall work force surveyed (67.6%) compared to only 31.7% for Maharashtra. The figures for other states range around 52 to 55%.
38. In the Southern region 26.1% of S & T personnel have Science degrees and 73.9 have Engineering degrees. As against this, in the Western region 43.1% have Science degrees and 56.9% hold Engineering degrees.
39. Among S & T personnel, relatively there are more Engineers in the higher income group in Southern region as compared to Western region.
40. Proportion of S & T personnel getting more than Rs.90,000 and above per annum is much higher in Maharashtra (10.4%) as compared to 2.3% in the Southern region.

41. A high percentage of S & T personnel are engaged in plant level and administrative activities in all the States in the South and West. For both the activities put together it works out to 73% in the case of Science degree holders, 86% in the case of Engineering degree holders with respect to the Southern region. The figures for Western region are 60% Science degree holders and 86% Engineering degree holders.
42. It is interesting to note that a high percentage of S & T personnel are engaged in plant level and administrative activities in all the States irrespective of their qualifications.
43. The percentage of S & T personnel engaged in R & D is very low and it is 1.7% of Science degree holders, 1.2% of Engineering degree holders in the Southern region and 1.6% of Engineers in the Western region. However in the case of Science degree holders, it is 11.9% in Western region.
44. It is also observed that in terms of nature of duties performed, the S & T personnel in the Western region are engaged in more diverse activities than those in the Southern region.
45. Most of the women S & T personnel are engaged in the plant level and administrative activities.
46. It was observed in this survey that S & T personnel in public limited companies in the private sector get higher emoluments than those working in the public sector industries.

### **RECOMMENDATIONS**

1. The survey reveals that large percentage of S & T personnel drawing high remuneration are essentially engaged in plant level and administrative activities. It may be concluded that R & D is not yet an important activity for them. This deserves serious attention of the Government of India in terms of their declared policies and programmes for promoting technological self-reliance in the country.
2. The data collected in this study is quite exhaustive and should be made use of by the planners and decision makers in the Government of India to develop comprehensive Human Resources Development programmes for the S & T personnel.