

Reservation Status in Higher Education Enrolment – AISHE Data Analysis

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ABSTRACT : Originally reservation was only given to SCs and STs but was later extended to OBCs in 1987 after the implementation of the Mandal Commission report. There are creamy layer income caps on EWS (Economically weaker sections) and OBCs (Other backward classes) and no income limits exist for members of the Scheduled Castes and Scheduled Tribes. The category-wise enrolment and its percentage with respect to total enrolment have been calculated. It has been calculated for all 3 category SC, ST and OBC and for all the states and union territories. Enrolment models for SC and comparison of the states with respect to ST and OBC enrolment have been made. Cluster analysis shows that north east states including Lakshadweep are dominating in SC, ST & OBC enrolment.

Keywords: SC, ST, OBC, Enrolment proportion, Regression, Slope, Cluster analysis

1. INTRODUCTION

The Constitution of India states in article 15(4): "Nothing in [article 15] or in clause (2) of article 29 shall prevent the State from making any special provision for the advancement of any socially, and educationally backward classes of citizens of or for the Scheduled Castes and the Scheduled Tribes." Article 46 of the Constitution states that "The State shall promote with special care the educational and economic interests of the weaker sections of the people, and, in particular, of the Scheduled Castes and the Scheduled Tribes, and shall protect them from social injustice and all forms of exploitation." Reservation in India is a system of affirmative action that provides representation for historically and currently disadvantaged groups in Indian society in education, employment and politics. Reservation is primarily given to 3 groups: Scheduled Castes, Scheduled Tribes, and Other Backward Classes, abbreviated as SC, ST, and OBC respectively. These are groups that have faced social and economic discrimination in the past and/or the present and were severely under-represented in public life.

Originally reservation was only given to SCs and STs but was later extended to OBCs in 1987 after the implementation of the Mandal Commission report. There are creamy layer income caps on EWS (Economically weaker sections) and OBCs (Other backward classes) and no income limits exist for members of the Scheduled Castes and Scheduled Tribes.

Table - 1 showing the percentage of reservation in different states in India

| State/UT | SC | ST | OBC | Other reserved | Total |
|-------------------|----|-----|-----|----------------|-------|
| Andhra Pradesh | 15 | 6 | 29 | | 50 |
| A&N Islands | | | 38 | | |
| Arunachal Pradesh | | 80 | | | |
| Assam | 7 | 15 | 27 | | 50 |
| Bihar | 15 | 1 | 34 | | 50 |
| Chandigarh | | | 27 | | |
| Chhattisgarh | 13 | 32 | 27 | | |
| D&D&D&NH | 3 | 9 | 27 | | |
| Delhi | 15 | 7 | 27 | | 50 |
| Goa | 2 | 12 | 27 | | |
| Gujarat | 7 | 14 | 27 | 10 | 59 |
| Haryana | 20 | | 30 | | 50 |
| Himachal Pradesh | 25 | 4 | 20 | 10 | |
| Jharkhand | 11 | 27 | 22 | | |
| Karnataka | 15 | 3 | 32 | | 50 |
| Kerala | 8 | 2 | 40 | | |
| Lakshadweep | | 100 | | | |
| Madhya Pradesh | 16 | 20 | 14 | | 50 |
| Maharashtra | 13 | 7 | 19 | 36 | 75 |

As the reservation policy is different in different states in India, the enrolment should vary widely from states to states in different categories. An attempt is being made in this communication to how the differences in enrolment in different states over all states and union territories in India. Also, enrolment models for the category SC have been established. A comparative idea has been tried out with ST & OBC enrolments (Ghara 2020).

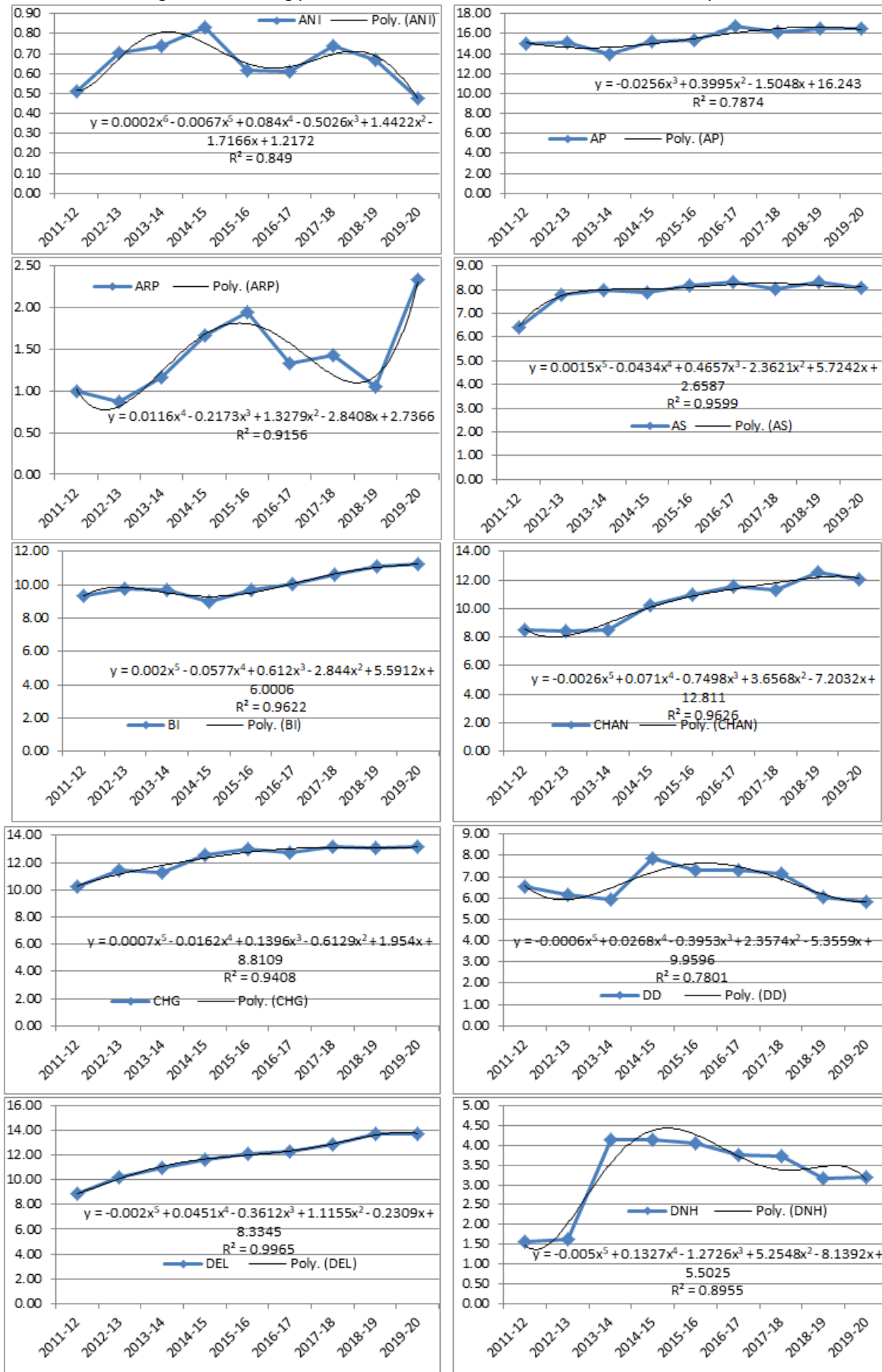
2. DATA

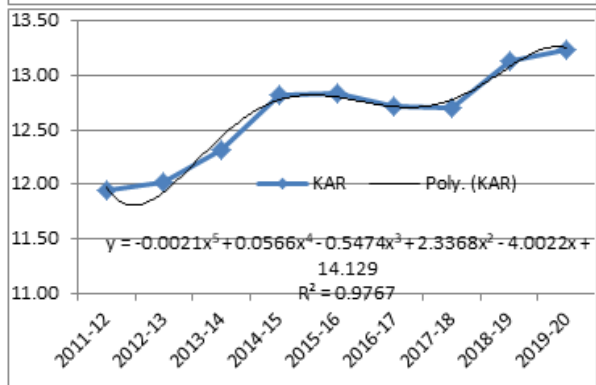
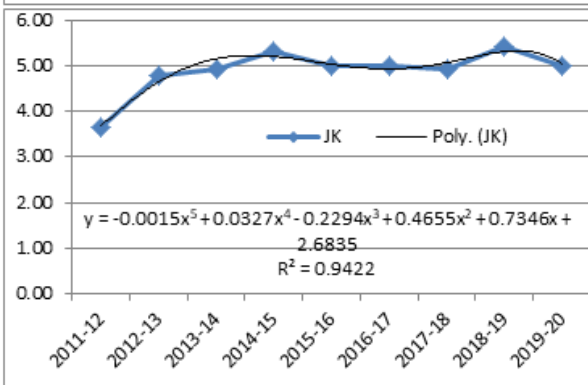
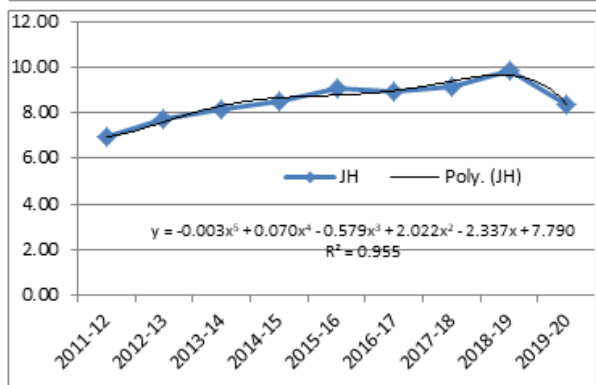
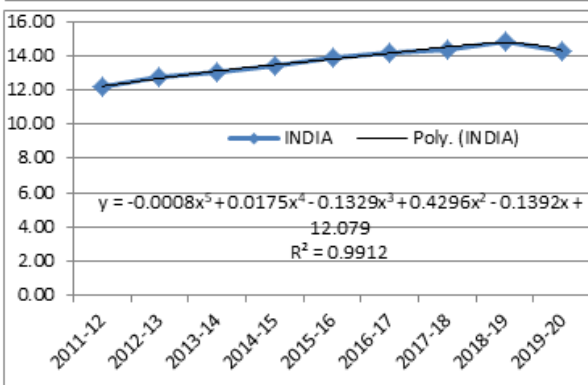
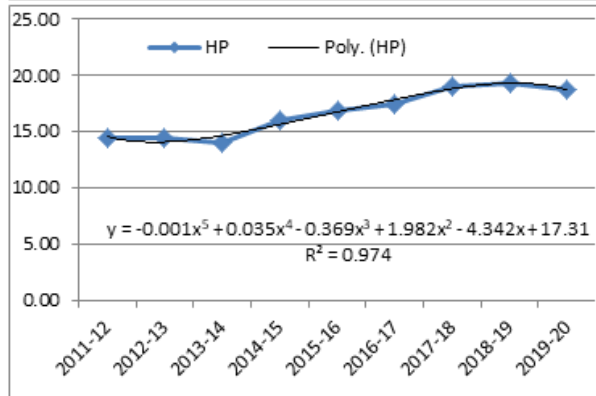
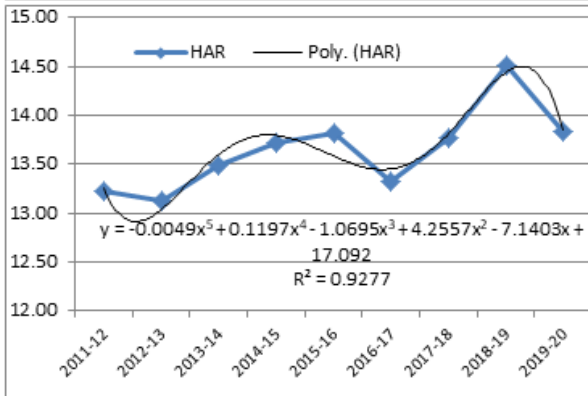
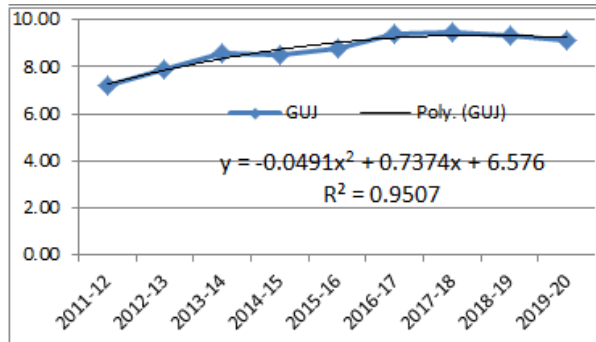
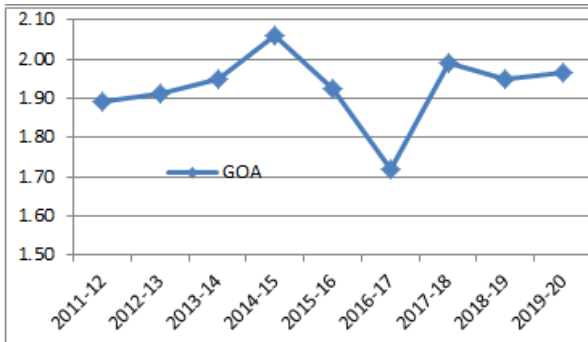
Ministry of Human Resource Development has endeavoured to conduct an annual web-based effort called All India Survey on Higher Education (AISHE) since 2010-11. The survey covers all the institutions in the country engaged in imparting of higher education. Data is being collected on several parameters such as teachers, student enrolment, programmes, examination results, finance, scholarship & stipend, infrastructure, etc.. Indicators of educational development such as Institution Density, Gross Enrolment Ratio, Pupil-teacher ratio, Gender Parity Index, Per Student Expenditure will also be calculated from the data collected through AISHE. These are useful in making informed policy decisions and research for development of education sector. It is intended to have idea about the status of enrolment in the category SC, ST & OBC for all the states & union territories using data from 2011-12 to 2019-20. Data for 2019-2020 is provisional (as on 01.09.2020 and linearly estimated for the non-response HEIs). For the analysis the states have been considered like – Andaman & Nicobar Island(ANI), Andhra Pradesh(AP), Arunachal Pradesh(ARP), Assam(AS), Bihar(BI), Chandigarh(CHAN), Chhattisgarh(CHG), Daman & Diu(DD), Delhi(DEL), Dadar & Nagar Haveli(DNH), Goa(GOA), Gujarat(GUJ), Haryana(HAR), Himachal Pradesh(HP), Jharkhand(JH), Jammu & Kashmir(JK), Karnataka(KAR), Kerala(KE), Madhya Pradesh(MP), Maharashtra(MA), Manipur(MAN), Meghalaya(MEG), Mizoram(MIZ), Nagaland(NAG), Odisha(OD), Puducherry(PDC), Punjab(PN), Rajasthan(RAJ), Sikkim(SIK), Tamil Nadu(TN), Telangana(TEL), Uttar Pradesh(UP), Uttarakhand(UTK) and West Bengal(WB).

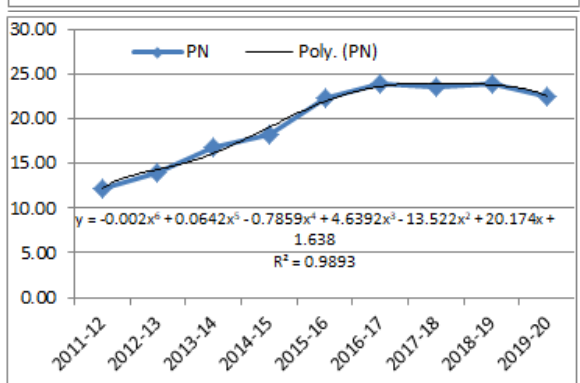
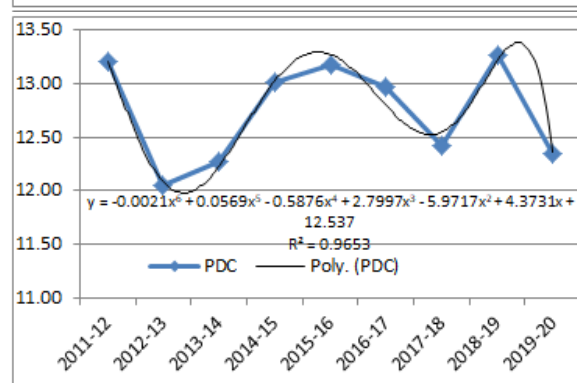
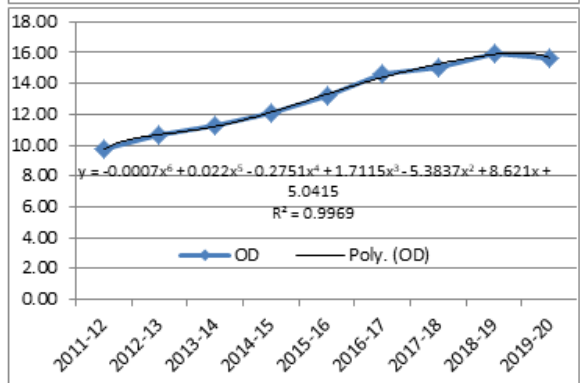
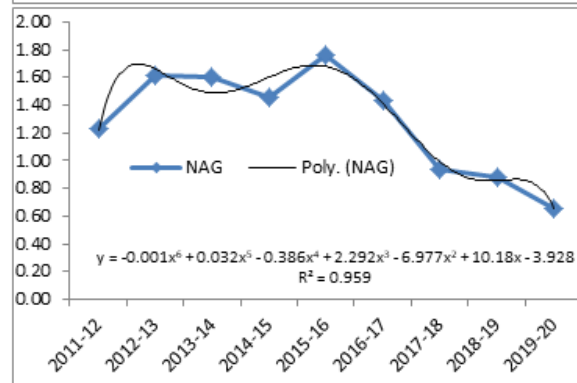
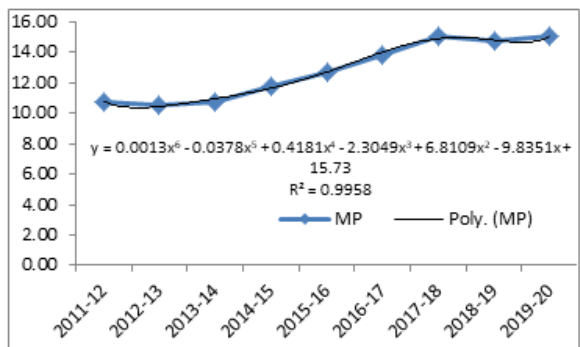
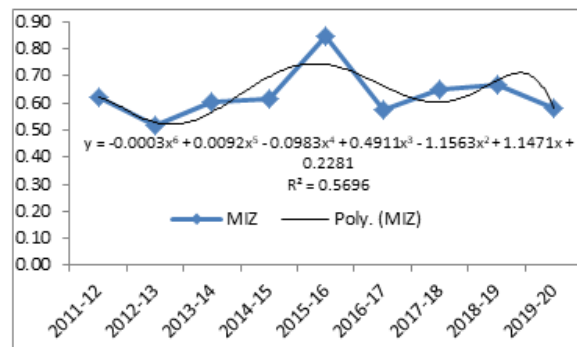
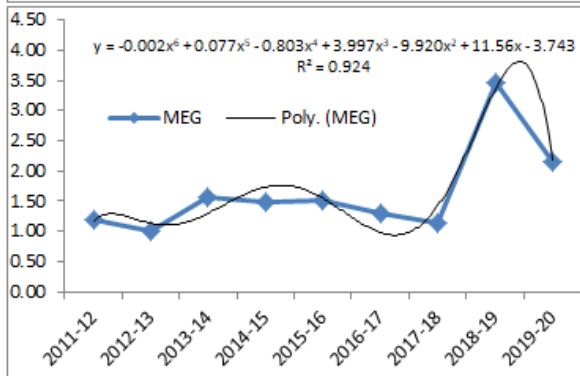
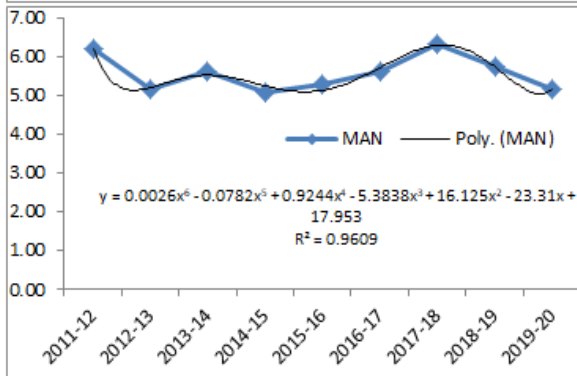
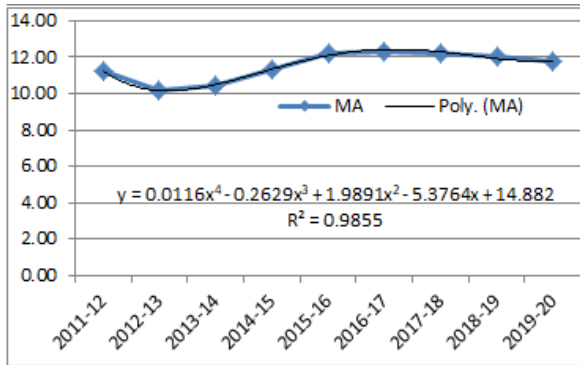
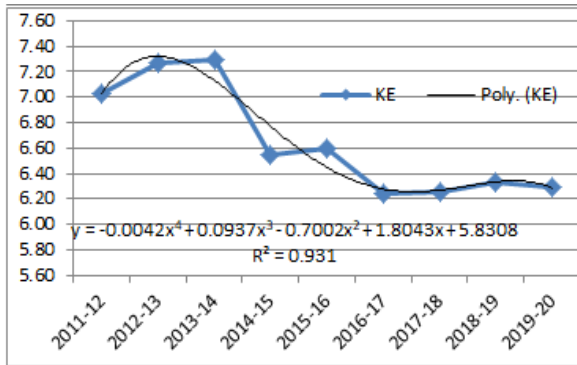
3. RESULTS

The data are very large and wide. Only enrolment data have been considered. The category-wise enrolment and its percentage with respect to total enrolment have been calculated. It has been calculated for all 3 category SC, ST & OBC and for all the states & union territories.

Figure - 1 showing pattern of SC enrolment for the states over last 9 years







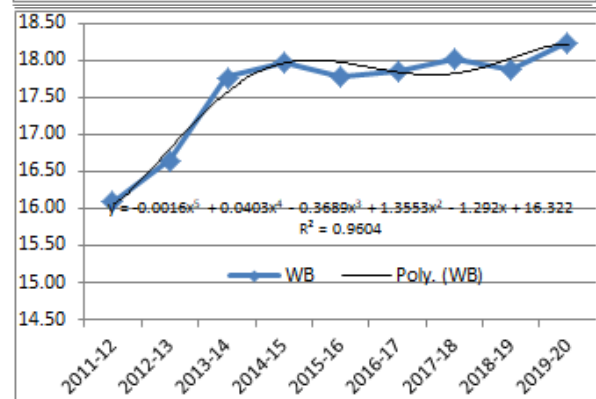
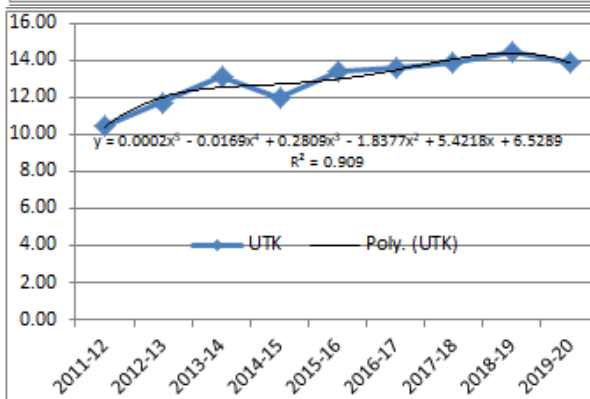
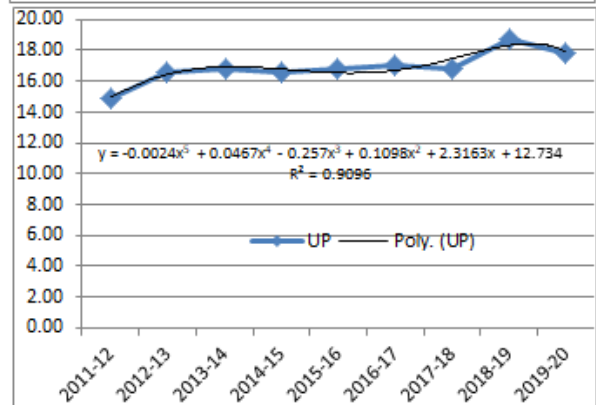
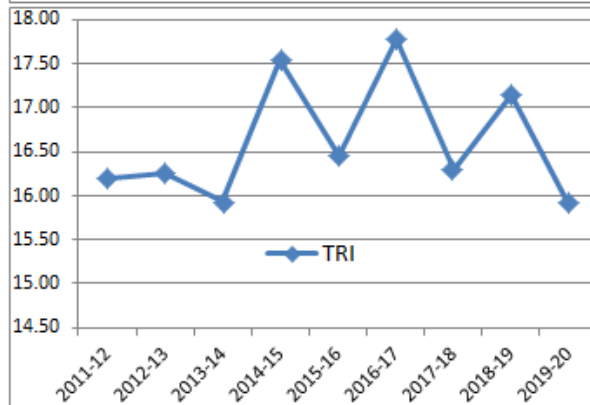
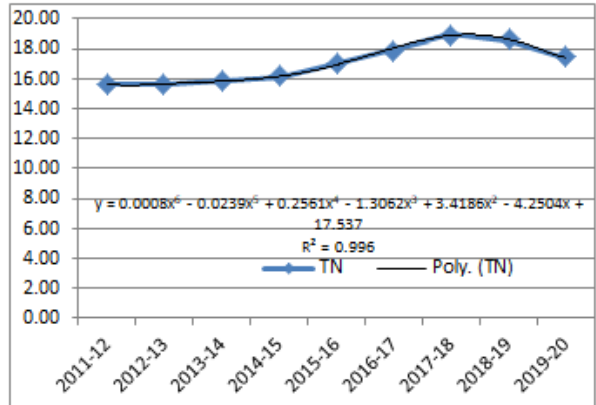
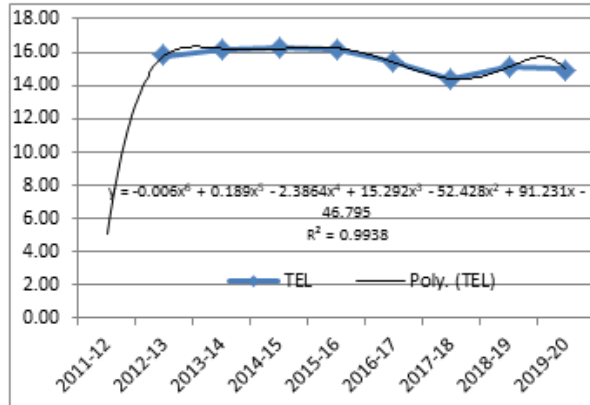
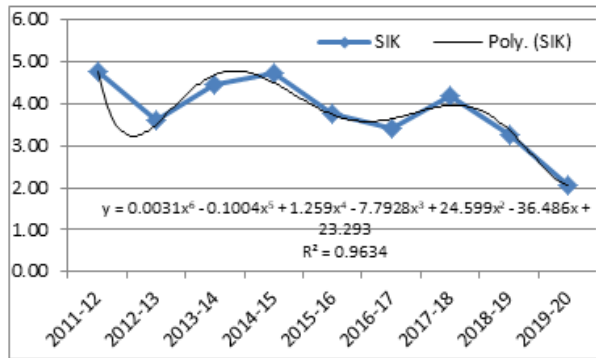
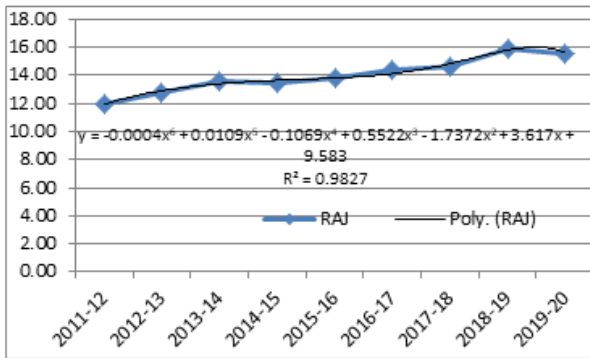


Table – 2 showing regression of SC enrolment proportion for all the states over last 9 years

| STATE | REGRESSION | R ² | SLOPE |
|-------|--|----------------|-------|
| ANI | $0.000x^6 - 0.006x^5 + 0.084x^4 - 0.502x^3 + 1.442x^2 - 1.716x + 1.217$ | 0.849 | -ve |
| AP | $-0.025x^3 + 0.399x^2 - 1.504x + 16.24$ | 0.787 | +ve |
| ARP | $0.011x^4 - 0.217x^3 + 1.327x^2 - 2.840x + 2.736$ | 0.915 | -ve |
| AS | $0.001x^5 - 0.043x^4 + 0.465x^3 - 2.362x^2 + 5.724x + 2.658$ | 0.959 | +ve |
| BI | $0.002x^5 - 0.057x^4 + 0.612x^3 - 2.844x^2 + 5.591x + 6.000$ | 0.962 | +ve |
| CHAN | $-0.002x^5 + 0.071x^4 - 0.749x^3 + 3.656x^2 - 7.203x + 12.81$ | 0.962 | -ve |
| CHG | $0.000x^5 - 0.016x^4 + 0.139x^3 - 0.612x^2 + 1.954x + 8.810$ | 0.940 | +ve |
| DD | $-0.000x^5 + 0.026x^4 - 0.395x^3 + 2.357x^2 - 5.355x + 9.959$ | 0.780 | -ve |
| DEL | $-0.002x^5 + 0.045x^4 - 0.361x^3 + 1.115x^2 - 0.230x + 8.334$ | 0.996 | -ve |
| DNH | $-0.005x^5 + 0.132x^4 - 1.272x^3 + 5.254x^2 - 8.139x + 5.502$ | 0.895 | -ve |
| GOA | No suitable regression | -- | |
| GUJ | $-0.049x^2 + 0.737x + 6.576$ | 0.950 | +ve |
| HAR | $-0.004x^5 + 0.119x^4 - 1.069x^3 + 4.255x^2 - 7.140x + 17.09$ | 0.927 | -ve |
| HP | $-0.001x^5 + 0.035x^4 - 0.369x^3 + 1.982x^2 - 4.342x + 17.31$ | 0.974 | -ve |
| IND | $-0.000x^5 + 0.017x^4 - 0.132x^3 + 0.429x^2 - 0.139x + 12.07$ | 0.991 | -ve |
| JH | $-0.003x^5 + 0.070x^4 - 0.579x^3 + 2.022x^2 - 2.337x + 7.790$ | 0.955 | -ve |
| JK | $-0.001x^5 + 0.032x^4 - 0.229x^3 + 0.465x^2 + 0.734x + 2.683$ | 0.942 | +ve |
| KAR | $-0.002x^5 + 0.056x^4 - 0.547x^3 + 2.336x^2 - 4.002x + 14.12$ | 0.976 | -ve |
| KE | $-0.004x^4 + 0.093x^3 - 0.700x^2 + 1.804x + 5.830$ | 0.931 | +ve |
| MA | $0.011x^4 - 0.262x^3 + 1.989x^2 - 5.376x + 14.88$ | 0.985 | -ve |
| MAN | $0.002x^6 - 0.078x^5 + 0.924x^4 - 5.383x^3 + 16.12x^2 - 23.31x + 17.95$ | 0.960 | -ve |
| MEG | $-0.002x^6 + 0.077x^5 - 0.803x^4 + 3.997x^3 - 9.920x^2 + 11.56x - 3.743$ | 0.924 | +ve |
| MIZ | $-0.000x^6 + 0.009x^5 - 0.098x^4 + 0.491x^3 - 1.156x^2 + 1.147x + 0.228$ | 0.569 | +ve |
| MP | $0.001x^6 - 0.037x^5 + 0.418x^4 - 2.304x^3 + 6.810x^2 - 9.835x + 15.73$ | 0.995 | -ve |
| NAG | $-0.001x^6 + 0.032x^5 - 0.386x^4 + 2.292x^3 - 6.977x^2 + 10.18x - 3.928$ | 0.959 | +ve |
| OD | $-0.000x^6 + 0.022x^5 - 0.275x^4 + 1.711x^3 - 5.383x^2 + 8.621x + 5.041$ | 0.996 | +ve |
| PDC | $-0.002x^6 + 0.056x^5 - 0.587x^4 + 2.799x^3 - 5.971x^2 + 4.373x + 12.53$ | 0.965 | +ve |
| PN | $-0.002x^6 + 0.064x^5 - 0.785x^4 + 4.639x^3 - 13.52x^2 + 20.17x + 1.638$ | 0.989 | +ve |
| RAJ | $-0.000x^6 + 0.010x^5 - 0.106x^4 + 0.552x^3 - 1.737x^2 + 3.617x + 9.583$ | 0.982 | +ve |
| SIK | $0.003x^6 - 0.100x^5 + 1.259x^4 - 7.792x^3 + 24.59x^2 - 36.48x + 23.29$ | 0.963 | -ve |
| TEL | $-0.006x^6 + 0.189x^5 - 2.386x^4 + 15.29x^3 - 52.42x^2 + 91.23x - 46.79$ | 0.993 | +ve |
| TN | $0.000x^6 - 0.023x^5 + 0.256x^4 - 1.306x^3 + 3.418x^2 - 4.250x + 17.53$ | 0.996 | -ve |
| TRI | No suitable regression | -- | |
| UP | $-0.002x^5 + 0.046x^4 - 0.257x^3 + 0.109x^2 + 2.316x + 12.73$ | 0.909 | +ve |
| UTK | $0.000x^5 - 0.016x^4 + 0.280x^3 - 1.837x^2 + 5.421x + 6.528$ | 0.909 | +ve |
| WB | $-0.001x^5 + 0.040x^4 - 0.368x^3 + 1.355x^2 - 1.292x + 16.32$ | 0.960 | -ve |

It is to state that regression of SC enrolment proportion are mostly polynomial with high R². The regression can not be done for the states Tripura & Goa due to very low R². The slope are negative (-ve) for the states Andaman & Nicobar Island, Arunachal Pradesh, Chandigarh, Daman & Diu, Delhi, Dadra & Nagar Haveli, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Manipur, Maharastra, Madhya Pradesh, Sikkim, Tamil Nadu and West Bengal. In India, the slope is also negative. The average proportion in India is 13.71%. Average of all states is 9.76 with maximum as 14.89, minimum as 12.14 and sd as 0.823.

Table - 3 showing the descriptive statistics of ST enrolment proportions for all states in India over last 9 years

| STATE | Mean | SD | MAX | MIN |
|-------|-------|------|-------|-------|
| ANI | 3.70 | 0.8 | 4.73 | 2.48 |
| AP | 4.38 | 0.5 | 5.65 | 3.63 |
| ARP | 77.16 | 8 | 86.1 | 57.75 |
| AS | 15.18 | 1.1 | 16.4 | 13.54 |
| BI | 1.35 | 0.2 | 1.75 | 1.06 |
| CHAN | 1.70 | 0.1 | 1.88 | 1.56 |
| CHG | 17.17 | 1.7 | 18.5 | 13.22 |
| DD | 11.14 | 1.7 | 14.4 | 9.29 |
| DEL | 1.66 | 0.1 | 1.89 | 1.50 |
| DNH | 22.98 | 5.4 | 30.5 | 12.46 |
| GOA | 7.13 | 1.1 | 8.44 | 5.22 |
| GUJ | 8.84 | 0.9 | 10.4 | 7.38 |
| HAR | 0.24 | 0.1 | 0.31 | 0.11 |
| HP | 5.31 | 0.6 | 5.93 | 4.51 |
| JH | 17.04 | 1.17 | 18.44 | 14.61 |
| JK | 4.72 | 1.07 | 6.31 | 3.35 |
| KAR | 4.46 | 0.24 | 4.83 | 4.03 |
| KE | 0.92 | 0.07 | 1.01 | 0.82 |
| INDIA | 4.97 | 0.42 | 5.60 | 4.38 |

| STATE | Mean | SD | MAX | MIN |
|-------|-------|-------|--------|-------|
| LKD | 53.15 | 26.86 | 100.00 | 25.96 |
| MA | 4.20 | 0.33 | 4.55 | 3.58 |
| MAN | 32.15 | 2.34 | 35.27 | 27.54 |
| MEG | 70.83 | 4.63 | 78.25 | 60.99 |
| MIZ | 93.25 | 5.64 | 96.58 | 77.57 |
| MP | 8.49 | 1.48 | 10.46 | 6.03 |
| NAG | 79.66 | 6.59 | 88.20 | 67.61 |
| OD | 10.61 | 1.77 | 13.20 | 8.31 |
| PDC | 1.40 | 0.22 | 1.85 | 0.99 |
| PN | 0.50 | 0.14 | 0.65 | 0.27 |
| RAJ | 10.26 | 1.04 | 11.80 | 8.67 |
| SIK | 23.32 | 4.27 | 30.46 | 14.01 |
| TEL | 7.91 | 0.39 | 8.45 | 7.39 |
| TN | 0.85 | 0.07 | 0.95 | 0.75 |
| TRI | 20.31 | 2.20 | 23.73 | 16.87 |
| UP | 0.68 | 0.07 | 0.85 | 0.60 |
| UTK | 3.74 | 0.32 | 4.21 | 3.09 |
| WB | 3.18 | 0.16 | 3.37 | 2.86 |

Average is maximum in Mizoram, Nagaland & Arunachal Pradesh. Standard deviation is less in Bihar, Chandigarh, Haryana and Uttar Pradesh and it is maximum in Lakshadweep. Maximum ST enrolment is maximum in Mizoram and Arunachal Pradesh. Minimum ST enrolment is maximum in Mizoram, Meghalaya, Nagaland and Arunachal Pradesh. ST enrolment is more than 7% in Arunachal Pradesh, Assam, Chhattisgarh, Daman & Diu, Dadar & Nagar Haveli, Goa, Gujarat, Jharkhand, Lakshadweep, Manipur, Meghalaya, Mizoram, Nagaland, Madhya Pradesh, Odisha, Rajasthan, Sikkim, Telangana and Tripura. India average is 4.97 which is below 7% (threshold level).

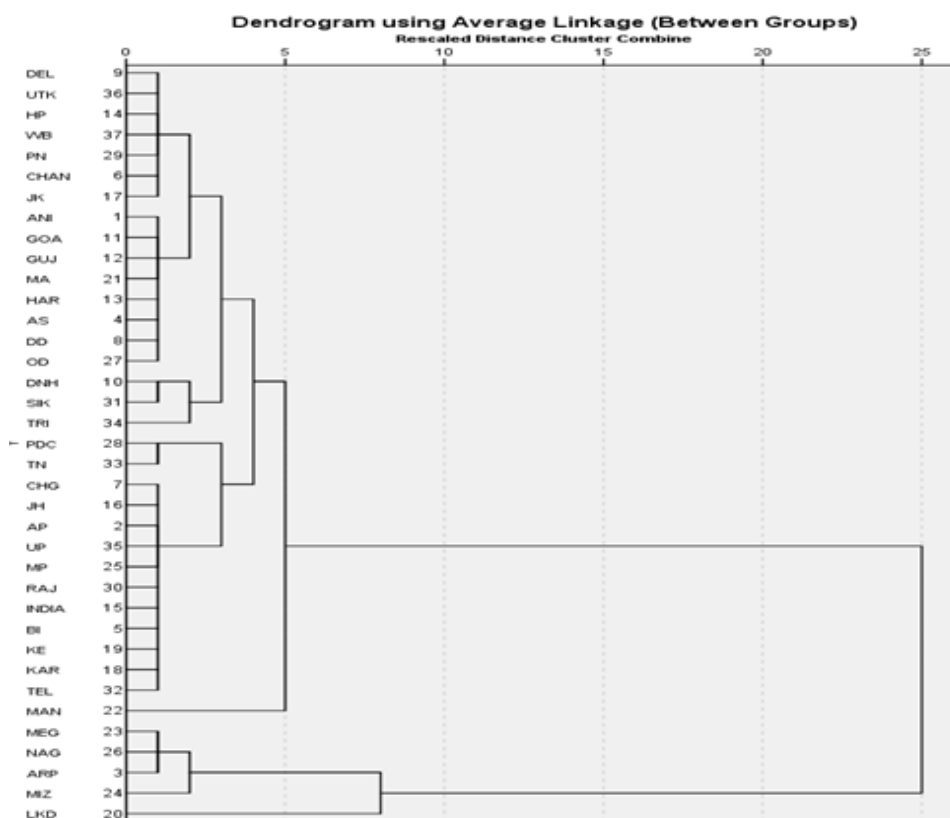
Table - 4 showing the descriptive statistics of OBC enrolments for all states in India over last 9 years

| STATE | Mean | SD | MAX | MIN |
|-------|-------|------|-------|-------|
| ANI | 18.57 | 5.82 | 26.75 | 9.11 |
| AP | 40.23 | 2.51 | 44.26 | 36.01 |
| ARP | 2.82 | 0.41 | 3.41 | 2.36 |
| AS | 26.10 | 1.93 | 28.15 | 21.05 |
| BI | 40.98 | 3.21 | 46.30 | 35.13 |
| CHAN | 4.30 | 0.98 | 5.90 | 3.06 |
| CHG | 39.26 | 3.71 | 43.71 | 32.29 |
| DD | 24.19 | 7.67 | 33.47 | 13.34 |
| DEL | 11.75 | 1.78 | 14.40 | 8.62 |
| DNH | 8.68 | 2.16 | 11.01 | 4.49 |
| GOA | 16.01 | 1.52 | 17.83 | 13.20 |
| GUJ | 28.06 | 2.11 | 31.49 | 24.73 |
| HAR | 22.52 | 1.08 | 24.33 | 20.80 |
| HP | 12.04 | 1.39 | 13.74 | 10.22 |
| JH | 33.26 | 5.58 | 39.66 | 22.23 |
| JK | 6.35 | 0.37 | 6.77 | 5.68 |
| KAR | 45.65 | 3.61 | 50.36 | 38.39 |
| KE | 37.54 | 3.48 | 42.20 | 31.74 |
| INDIA | 33.62 | 2.07 | 36.43 | 30.06 |

| STATE | Mean | SD | MAX | MIN |
|-------|-------|------|-------|-------|
| LKD | 4.29 | 8.04 | 19.76 | 0.00 |
| MA | 27.76 | 2.08 | 29.78 | 23.24 |
| MAN | 32.72 | 1.63 | 35.28 | 30.12 |
| MEG | 2.55 | 1.03 | 4.45 | 1.50 |
| MIZ | 1.24 | 0.27 | 1.65 | 0.88 |
| MP | 34.97 | 4.79 | 40.03 | 26.39 |
| NAG | 1.65 | 0.20 | 1.87 | 1.27 |
| OD | 20.25 | 1.37 | 21.85 | 17.04 |
| PDC | 57.86 | 2.69 | 60.70 | 51.66 |
| PN | 9.59 | 2.18 | 12.91 | 5.60 |
| RAJ | 38.02 | 2.75 | 41.27 | 32.37 |
| SIK | 19.56 | 3.70 | 24.19 | 11.99 |
| TEL | 44.03 | 1.16 | 45.70 | 42.01 |
| TN | 57.87 | 2.41 | 62.12 | 55.62 |
| TRI | 16.00 | 1.08 | 17.39 | 13.85 |
| UP | 37.08 | 1.82 | 40.53 | 34.22 |
| UTK | 14.08 | 2.74 | 17.54 | 9.42 |
| WB | 10.73 | 3.82 | 15.56 | 5.15 |

Average OBC enrolment is maximum in Tamil Nadu, Telangana, Puducherry, Karnataka, Andhra Pradesh, Chhattisgarh & Uttar Pradesh. Standard deviation is less in Nagaland, Arunachal Pradesh and more in Andaman & Nicobar Island, Daman & Diu & Lakshadweep. Maximum OBC enrolment is maximum in Puducherry, Bihar, Kerala, Madhya Pradesh, Telangana, Tamil Nadu & Uttar Pradesh. Minimum OBC enrolment is maximum in Tamil Nadu, Telangana, Karnataka, Bihar & Andhra Pradesh. Average OBC enrolment is more than 17% in Andaman & Nicobar Island, Andhra Pradesh, Assam, Bihar, Chhattisgarh, Daman & Diu, Gujarat, Haryana, Jharkhand, Karnataka. Kerala, Maharashtra, Manipur, Meghalaya, Madhya Pradesh, Odisha, Puducherry, Rajasthan, Sikkim, Telangana, Tamil Nadu and Uttar Pradesh. India average is 33.62% which is far more than 17%.

Figure – 2 showing dendrogram for all the states



The cluster analysis shows that Meghalaya, Nagaland, Arunachal Pradesh, Mizoram & Lakshadweep have more and dominant proportion of SC, ST & OBC enrolment in the country and alike.

4. REMARKS

The category-wise enrolment and its percentage with respect to total enrolment have been calculated. It has been calculated for all 3 category SC, ST and OBC and for all the states and union territories. The regression of SC enrolment proportion are mostly polynomial with high R². The slope are negative (-ve) for the states Andaman & Nicobar Island, Arunachal Pradesh, Chandigarh, Daman & Diu, Delhi, Dadra & Nagar Haveli, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Manipur, Maharashtra, Madhya Pradesh, Sikkim, Tamil Nadu and West Bengal. In India, the slope is also negative. ST enrolment is more than 7% in Arunachal Pradesh, Assam, Chhattisgarh, Daman & Diu, Dadar & Nagar Haveli, Goa, Gujarat, Jharkhand, Lakshadweep, Manipur, Meghalaya, Mizoram, Nagaland, Madhya Pradesh, Odisha, Rajasthan, Sikkim, Telangana and Tripura. Average OBC enrolment is more than 17% in Andaman & Nicobar Island, Andhra Pradesh, Assam, Bihar, Chhattisgarh, Daman & Diu, Gujarat, Haryana, Jharkhand, Karnataka. Kerala, Maharashtra, Manipur, Meghalaya, Madhya Pradesh, Odisha, Puducherry, Rajasthan, Sikkim, Telangana, Tamil Nadu and Uttar Pradesh. India average is 33.62% which is far more than 17%. Meghalaya, Nagaland, Arunachal Pradesh, Mizoram & Lakshadweep have

more and dominant proportion of SC, ST & OBC enrolment in the country. The other characteristics like category-wise staff and teachers may also be analysed further.

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