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Cover: The crest of St. Xavier's College Mumbai., Designed in 1929 by Fr. T. Molina. Shows an eagle teaching its young ones to fly. Above it, on the left, is the emblem of the Society of Jesus which consists of the Greek initials of the name of Jesus set in a sun; on the right is a chequered moon, taken from the arms of the house of Xavier. The motto in Latin is taken from the bible and refers to the eagle who encourages (its young ones) to soar aloft.

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Vol. 10, Issue 1, (Sciences Section) December 2019

CONTENTS
Research Articles

**A Statistical Study on Higher Education based on
All India Survey on Higher Education (AISHE)**

Annapurna Shankarnarayanan, Raju K. Lohot..... 1

Rotational Dynamics of a Flywheel

Rajesh Singh..... 22

Vol. 10, Issue 1, (Humanities-Social Sciences) December 2019

Cult of Mahesha during the Rashtrakuta Era in Maharashtra

Anita Rane-Kothare..... 26

The Theme of Benevolence in Two Zoroastrian Daily Prayers

Pearl Pastakia..... 39

Forest Policies in Ancient India

Pratibha Naithani..... 44

**Ethics, Myths and Sculptures - A Case study of Śiva Sculptures
of Kambatthadi Mandapa**

Radha Kumar 53

From the Managing Editor's desk.....

'Xplore', the Research Journal of St Xavier's College (Autonomous), Mumbai started in the year 2010 with the aim of promotion and propagation of fundamental research. 'Xplore' has maintained its integrity and quality since its inception and has been acknowledged as UGC Research Journal in the year 2019.

Although the year 2019 was welcomed with new hopes, the world seemed to have reached the saturation point with multiple and overlapping challenges like unending recession, escalating unemployment, political uncertainty and the onset of Covid-19 in China in December which changed all the parameters of the international relations forever in one stroke.

I congratulate the authors of Xplore 2019 who contributed their research work amidst all these challenges. This year, we have selected 6 leading articles for publication. From the Sciences Section, we have selected 2 articles based on the Statistical Study on Higher Education and Rotational Dynamics of a Flywheel. Humanities and Social Sciences section has 4 articles, covering a wide range of areas such as historical importance of monuments, religious studies and forest policies in ancient india.

I also congratulate the team of peer reviewers for making this edition possible and credible. Last but not the least, I congratulate the editors of Xplore 2019, Dr. Prof. Hrishikesh Samant (Sciences Section), Dr. Prof. Aditi Sawant (Humanities and Social Sciences Section) and Dr. Prof. Pearl Pastakia (Assistant Editor) for their painstaking efforts to check all the essential aspects of the research journal.

It can be confidently stated that Xplore 2019 reiterates the notion that continuous engagement with knowledge is sacrosanct.



Dr Rajendra Shinde

Managing Editor (Xplore 2019)

and

Principal

St. Xavier's College, Mumbai

December 2019

A Statistical Study on Higher Education based on All India Survey on Higher Education (AISHE)

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Abstract :

The All India Survey on Higher Education (AISHE) is a survey conducted by the Government of India since 2010-11 with the objective of studying the status of higher education in India. This paper conducts a comparative study on various key parameters to give a better comprehension of the progress of higher education over the past eight years. It also tries to identify areas where improvement is required to boost the quality of education keeping in mind the basic fabric and limitations of our country. Furthermore, wherever possible an in-depth study of the status of higher education situation in different states has been undertaken.

Keywords: AISHE reports, People with disabilities (PWD), College density, Gross enrollment ratio (GER), Gender parity index (GPI), Two-sample t test, Pupil Teacher Ratio (PTR), Trend analysis, Distance Regular Enrollment Ratio, Normal probability plot.

Introduction

India's higher education system is the third largest in the world, next to the United States and China. From ancient times, higher education has always occupied a prominent place in Indian history. Universities such as Nalanda, Takshashila and Vikramashila were renowned seats of higher learning which flourished by attracting students from all over the world. In modern India, the main governing body at the tertiary level is the University Grants Commission, which enforces and maintains the standards of higher education, advises the government, and helps to coordinate between centre and state.

The Ministry of Human Resource Development, Department of Higher Education, Government of India has been conducting annually an online survey 'All India Survey on Higher Education (AISHE)' since 2010-11 with the objective of representing the status of higher education in India. This survey takes into account all institutions engaged in imparting higher education. AISHE collects data on several parameters such as teaching staff, student enrollment, non-teaching staff, programmes infrastructure, etc. The data thus collected, provides extensive information on various indicators of development of higher education such as Institution Density, Gross Enrollment Ratio,

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Pupil-Teacher ratio, Gender Parity Index. The report generated is highly useful in making informed policy decisions and research for development of the education sector at the centre as well as government departments of Higher Education in the various states. Such reports also aid in creating future perspective plans in higher education which are more meaningful and help improve the quality of education.

Methodology

The AISHE survey covers all institutions of higher education in the country, registered with AISHE code. The entire survey is conducted through the electronic mode and a dedicated portal <http://aishe.gov.in> has been developed for this purpose, thus making the exercise completely paperless. The survey is being conducted on an annual basis. It is appropriate to mention here that the results published in the AISHE report are based on the number of institutions who have registered and have uploaded their information in specially designed Data Capture Formats (DCFs).

Educational institutions are classified in three broad categories. The first is University and University Level Institutions i.e. institutions which are empowered to award degrees under some Act of Parliament or State Legislature. The second category is Colleges/Institutions which are not empowered to

provide degrees in their own name and therefore are affiliated / recognised with Universities. The third type is Stand-alone Institutions. These are not affiliated with Universities. They are not empowered to provide degrees and therefore run Diploma Level Programmes.

The data collected through AISHE is extremely extensive. Analysing it in its entirety is beyond the scope of this paper and hence we have restricted our interest to a few key areas.

Analysis

1. Response to AISHE by universities, colleges and stand-alone universities

From Fig.1 it can be observed that in the first year of the AISHE survey i.e. 2010-11, 594 (of 621 i.e. 95.65%) Universities, 20479 (of 32974 i.e. 62.10%) colleges and 6725 (of 11095 i.e. 60.61%) Stand Alone Institutions responded during the survey. In the recent report for the year 2018-19 there is a marked increase. Response from 944 (of 993 i.e. 95.1%) Universities, 36308 (of 39931 i.e. 91%) Colleges and 8354 (of 10725 i.e. 77.9%) Stand Alone Institutions has been received. Another observation is that there has been a 15.6% rise in higher education institutes in the country over the last nine years (i.e. from 44690 to 51649).

2. College Density

College Density is defined as the number of colleges per lakh eligible population i.e. population in the age group of 18-23 years. Only affiliated and constituent institutions of Central and State Universities have been counted as colleges in the AISHE reports. College density can be looked on as an indicator of how much money is invested into higher education by the government. The all India average is currently at 28 which is a 22% rise from 2010-11. The top 4 states in terms of highest college density in India are Telangana, Karnataka, Andhra Pradesh and Maharashtra. The top two states in terms of the highest number of colleges in India are Uttar-Pradesh and Maharashtra in the last 6 years.

Though Uttar Pradesh houses the maximum number of colleges, 4828 in 2010-11 to 7078 in 2018-19, the college density has been low starting at 20 in 2010-11 and reaching 28 in 2018-19. Maharashtra has consistently held second place with respect to number of colleges and also has a better college density ranging between 32 and 35.

The worst faring state is Bihar in spite of having the third largest population among the states of India. Bihar has been at the bottom of the national tally ever since the first survey was published for 2010-11, when it had a college density of five and improved it to seven in the subsequent years. Some of the issues plaguing higher education in Bihar are shortage of teaching staff in colleges, apathy of society towards education to name a few. All these have adversely impacted educational activities and have resulted in migration of talented students to other states for better educational facilities.

India is predominantly a rural country. The rural population (% of total population) in India was reported in 2017 at 66.46 % which has declined from 68.8% obtained from the 2011 census. (Rural Urban Distribution of Population Census Of India 2011). From the data in the Table 1 & Fig. 2, it can be observed that in spite of the decrease in rural population, the percentage of colleges in rural areas has improved over the last decade.

This indicates that educational institutes have increased in rural areas, thus creating a greater reach to more students. The AISHE report (Fig. 3) also states that in 2011 around 9% of the total colleges in India were exclusively for women. The current report of 2019 shows that this percentage has increased to 10.8%.

3. Student Enrollment

The AISHE report looks at student enrollment in various ways. Firstly it classifies total student enrollment at 8 levels as per the programme enrolled in viz – Ph.D., M.Phil., Post Graduate, Under Graduate, PG Diploma, Diploma, Certificate and Integrated. Out of the total enrollment of students it is observed that from

2010 to 2019, a huge majority of 79% students are enrolled in the undergraduate programme followed by about 11% students in postgraduate studies. The rest of the 10% students are enrolled in the remaining six above-mentioned levels. Further among the various undergraduate programmes available it is observed that the Bachelor in Arts has the highest enrollment and is around 25% of the total enrollment.

When enrollments into various programmes are looked at based on gender from 2010-2019, there is more representation of females in humanities at both undergraduate (around 54%) as well as postgraduate (58%-62%) levels. In the stream of sciences, male representation at undergraduate level has decreased from 51% in 2011 to 48% in 2019. The Postgraduate enrollment in sciences of males has reduced from 47% in 2010 to 38% in 2019. Commerce has around 52-55% males enrolled. Engineering and Technology is heavily male-dominated at 71-73% followed by MBA programmes with 60-65% males. Although the gender gap in enrollment has decreased significantly post-independence, there still exists a disparity amongst different departments.

3.1 Total Enrollment and Gross Enrollment

We observe that the total enrollment in higher education has risen from 27.5 million in 2010-11 to 37.3 million in 2018-19, a 36% rise as compared to the 10% growth in population from 123.1 crores in 2011 to 135 crores in 2018. Further the percentage of girls enrolling has increased from 44% to 48.6% in the span of nine years from 2010. The Gross Enrollment Ratio (GER) in Higher education in India is calculated for the 18-23 years age group. It is obtained as the total enrollment regardless of age, expressed as a percentage to the eligible official population (18-23 years) in a given academic year. The GER is widely used to express the general level of participation and capacity of higher education. From the AISHE report for 2010-11, we understand that for every 100 youths in the age group 18-23, only 19.4 are enrolled for higher education. This rate currently stands at 26.3, a 36% rise. If we observe the GER

separately for males and females, both of them are increasing. The corresponding increase for males is about 26% and for females it is 47% over the last 8 years.

The column 4 and 5 of the Table 2 indicates that GER for males has been greater than GER for females except in 2018-19. It can be observed from Fig. 4 that the gap between the GERs has been reducing indicating that the GER for females has been improving and in 2018-19 has surpassed that of males.

We perform two sample t – test on the data of GER for male and female to verify if the decrease is significant

(Fig. 5 indicates that data of difference between GER for male and female satisfies conditions of normality.)

To test H_0 : There is no difference in GER for male and female.

v/s H_1 : GER for male is greater than GER for female.

Paired t test for (GER for Male) - (GER for Female): -

95% lower bound for mean difference: 1.231

T-Test of mean difference = 0 (vs > 0):

T-Value = 5.73 & P-Value = 0.000

At 5% level of significance, we thus conclude that GER for male is greater than GER for female. Thus, we observe that gender plays a significant role in GER.

India's draft National Education Policy (NEP) aims to increase GER in higher education to at least 50 percent by 2035. Since the current GER stands at just 26.3 percent, doubling it in the next 15 years will necessitate substantial planning, restructuring and sustained implementation. Lack of access has been stated as a major reason behind low intake of higher education in the country.

In this trend analysis for fitting of model, for GER

for Male and Female, value of year has been considered as upper limit of year interval i.e. 2011 is considered as value for interval 2010-11.

Trend Analysis for GER for Male (Fig.6 and Table 3):

Fitted Trend Equation: $Y_t = (10^2) / (3.69267 + 1.64755 * (0.720697)^t)$

Where $t=1, 2, 3, \dots$ represents year = 2013, 2014, 2015, ... respectively.

Accuracy Measures: MAPE 0.936381 ; MAD 0.220738; MSD 0.069811

Fitted trend values using above fitted trend equation are shown in Table 3.

It can be observed that value of Mean absolute percent error (MAPE) is small, it is 0.93 % i.e. fitted value will be off by 0.93%. Also, value of Mean absolute deviation (MAD) and Mean square deviation (MSD) are significantly small so this implies that fitted trend equation is good fit.

Similarly, Trend Analysis for GER for Female (Fig. 7):

Fitted Trend Equation: $Y_t = (10^2) / (3.49932 + 2.71021 * (0.794103)^t)$

Where $t=1, 2, 3, \dots$ represents year = 2013, 2014, 2015, ... respectively.

One can obtain fitted trend values using above fitted trend equation same as GER of male (Table 3).

Accuracy Measures: MAPE 1.20066 ; MAD 0.26559; MSD 0.08722

If the current condition of higher education prevails, the GER for Male and Female in 2035 will be 27.07731927 and 28.50765379 respectively and not as per the NEP aims.

3.2 Distance Education Enrollment

Enrollment in Higher Education is either through

regular (classroom) education or distance education. Distance education is a powerful medium of obtaining degrees for those who have to financially support their families and also for those students who live in remote areas. It is also desirable for working professionals as this mode gives flexibility of time and study schedule. It also aids in making their curriculum vitae more powerful. Distance enrollment constitutes 10-12% of the total enrollment in higher education. The corresponding percentage in 2010 was 12.1% which in 2018-19 dropped to 10.62% indicating that more students now veer towards regular education. Among the distance education students, the percentage of females was 40% in 2010-11 which peaked at 55% in 2016-17 and is currently at 44.12%. Fig. 8 shows the graphs of number of males and females enrolled in distance mode of education. This does not give a clear picture of the trend in enrollment with respect to gender and hence a test of hypothesis is conducted to see if there is a significant difference observed in the number of male and female enrollments in distance mode of education.

To test H_0 : There is no difference in number of distance enrollment by male and female students.

v/s H_1 : The number of male students enrolled for distance education is more than the number of female students.

(From fig. 9, it can be concluded that the difference between the number of male and female enrollments in distance mode of education satisfies the condition of normality.)

Paired t test for (Male enrollment) - (Female enrollment)

T-Test of mean difference = 0 (vs > 0):
T-Value = 9.94 & P-Value = 0.000

At 5% level of significance we reject H_0 and conclude that the number of male students enrolled for distance education is more than the number of female students.

3.3 Social Category-wise Enrollment

Enrollment of students belonging to social category (Fig. 10) as SC, ST, OBC and General has been slowly on the increase. In 2010-11 it was 46.6% of the total enrollment, the corresponding percent being 51% in 2014-15 and in 2018-19 it stands at 56.7%. Further looking at each of them individually, OBC students have a better enrollment percentage growing from 30 to 36%. The enrollment of SC students varies between 12% and 15% of the total. ST student enrollment is very poor and has only increased from 4% to 5% in the last decade. This increase indicates that the government is paying attention to this matter and promoting students from above mentioned social category for higher studies.

3.4 Distance Regular Enrollment Ratio (DRER)

In order to understand the growth of enrollment in higher education in distance mode with respect to enrollment in regular mode we define Distance Regular Enrollment Ratio (DRER) as number of students enrolled for distance education per 100 students enrolled for regular mode of education.

$$\text{DRER} = \frac{\text{Number of students enrolled for distance education}}{\text{Number of students enrolled for regular education}} \times 100$$

If DRER < 100, it indicates more students are in regular as compared to distance.

If DRER > 100, it indicates more students are in distance as compared to regular

If DRER =100, it indicates equal number of students are enrolled in distance as well as regular

Since the bulk of students that are part of the AISHE reports (79%) pursue undergraduate programme in arts, science and commerce, we have compared DRER for the UG programmes namely B.Com., B.Sc. and B.A. as depicted in Fig 11.

It can be observed that current DRER for 2018-19 is 19.16 for BA which means that for every 100 students enrolled in regular mode, only 20 are enrolled in distance. The corresponding ratio for B.Com. is 11 and

for B.Sc. is 5.

From Fig. 11, we also observe that the DRER for B.A. has shown an increment from 2014 to 2019 whereas there is decrement in enrollment ratio for the year 2018-19 in comparison of 2013-14 in case of both B.Com. and B.Sc. B.Sc. has the lowest DRER as it requires more contact hours in the form of practicals.

3.5 Enrollment to post graduate level from under graduate level in regular mode of education

$$\text{Enrollment Ratio of UG to PG} = \frac{\text{No. of UG student enrollment to PG}}{\text{No. of enrollment in UG}} \times 100$$

The above formula gives the number of students opting for PG level education for every 100 students pursuing UG level education. This will help us to ascertain the importance students give to completing a PG program after UG.

Fig. 12 gives this ratio for Commerce, Arts and Science. The above-mentioned ratio for the year 2011-12 is 15.69 and for year 2018-19 is 13.22 in case of science. The graph shows a downward trend from 2011 to 2015 for pure science PG courses which has marginally improved and is at 13.22 in 2019. Whereas in case of 'B.Com. to M.Com.' and 'B.A. to M.A.', Fig. 12 shows improving trend from 2014 with movement in downward direction for initial few years.

4. Education for people with disabilities (PWD)

In India around 2.21% (2.68 of 121cr) of the population is differently abled. Considerable exclusion and discrimination in accessing higher education has been faced by them. In order to secure the rights of differently abled people, the Rights of Persons with Disabilities Act (RPWD Act) was enacted in 2016. Section 32 of the RPWD Act creates a mandatory obligation for all government higher educational institutions to reserve at least 5% of seats for "persons with benchmark disabilities". Section 16 of the Act requires all educational institutions recognized and funded by government to provide inclusive education to differently abled students and make their campuses accessible.

The ground reality however is grim. It has been observed that in the higher education context, students with disability face many accessibility barriers such as no provision for ramps to help with wheelchair mobility, inaccessible washrooms, unavailability of lifts and lack of special transport. The lack of sensitization and no adequate training to academic and non-academic staff and students to understand the requirements of differently abled students also makes it extremely difficult for differently abled students to survive life on campus. Thus, even with the 5% reservation, the enrollment rate of differently abled students remains low.

As per the 2011 census and the report on Differently abled People in India-A Statistical Profile 2016 created by the Social Statistics Division MOSPI, approximately 26 lakhs of differently abled people fall in the age group suitable for availing of higher education. Of these just about 2% of the differently abled people enrolled for higher education in 2011 which in 2019 has increased to 3%. This is a dismal state of affairs and highlights the non-inclusiveness in our country.

From the Fig.13 we observe that there has been a 59% increase in the total number of PWDs enrolling for higher education in 2018-19 as compared to that in 2010-11. This improvement could be attributed to the 5% reservation introduced in 2017-18. However, observing the annual figures in fig. 13, the increase is not uniform.

It can be observed from fig. 13 that the rise in enrollment in the age group 18-23 among males is 81% whereas the corresponding percentage increase for females is just at 37%.

We can conclude that strong continued efforts are required from all the stake holders to ensure mainstream education is accessible and affordable for differently abled students.

5. Inflow of Foreign Students

Globally, there are about 5 million students studying in higher education outside their home country. In 2018-19, approximately 47,000 foreign students were studying in India and they represented less than 1 per cent of the global total. This is a strong contrast to the number of Indian students who are studying abroad, which is around 300,000 or 6 per cent of the global total. To improve the numbers Government of India has launched a unique initiative in April 2018 named 'Study in India' with the objective of targeting 2 lakh foreign students by 2023. The Government has collaborated with 150 premier institutes including IITs and IIMs with the goal of doubling India's market share of global education exports to 2%.

As per the AISHE reports, in 2010-11, the total number of foreign national students enrolled in Indian Universities and Colleges were 27,531 which has increased to 47,427 in 2018-19 (a 58% increase). The graph (Fig. 14) from the AISHE report shows that there is a gradual increase of foreign students over the years. The highest share of students come from the neighboring country of Nepal. In the academic years ranging from 2010 11 to 2018-19, it can be observed that at least 70 75% of the foreign students are enrolled in undergraduate courses and about 15-20% in post graduate courses. The remaining 5-15% of students are scattered in all other courses. If we look at the programme-wise distribution of foreign students in the last four years, it is observed that top priority is given by students for B.Tech. followed by B.B.A., B.Sc., B.A. and B.Com.

Considering state wise distribution, from AISHE report, Karnataka has the highest number of students coming from foreign countries. Apart from Karnataka, Tamil Nadu, Maharashtra, Uttar Pradesh and Punjab are states that see a better inflow of foreign students.

6. Gender Parity Index (GPI) for various categories

The Gender Parity Index (GPI) is a

socioeconomic index designed to measure the relative access to education of males and females. This index, released by UNESCO, is calculated as the quotient of the number of females by the number of males enrolled in secondary education. A GPI equal to one signifies equality between males and females. A GPI less than one is an indication that gender parity favors males while a GPI greater than one indicates a gender parity that favors females. The nearer a GPI is to one, the closer a country is to achieving equality of access between males and females.

From the AISHE reports (Fig. 15), GPI can be obtained for all students (ALL) and also for SC and ST categories. The GPI for ALL has increased from 0.88 in 2011-12 to 1 in 2018-19 indicating a very positive result overall. In all the three categories the GPI depicts an increasing trend which implies that the proportion of females securing seats for higher education is improving. Further the GPI is significantly more for category SC than category ST during entire period 2010-19. GPI for ST is 0.78 during 2011-12 and 0.92 during 2018-19 whereas GPI for SC category is 0.88 at 2011-12 and increases to 1.02 in 2018-19.

7. Teacher Strength

The total number of teachers in higher education as per the AISHE report of 2010-11 from responding institutions was 7,65,349 which has increased to 14,16,299 in 2018-19 from 12,84,755 in 2017-18, a rise of 85% over the last 8 years.

It is important to note here that there has been a decline in the total number of teachers in higher education institutes as per the AISHE reports in the earlier 3 years. In 2015-16, the number of teachers was 15,18,813. The 2016-17 AISHE report recorded the same at 13,65,786 which further fell to 12,84,755 in 2017-18. The main reason for this decline appears to be that it was made compulsory from 2016-17 that Aadhar number had to be furnished for individual teachers. As a result, details of such teachers who either did not have Aadhar numbers or declined to share the number were not counted in

the survey.

Of the total number of teachers, the percentage of male teachers was 62.8% in 2010-11 which decreased to 57.85% in 2018-19 indicating an improved presence of female teachers in higher education as per Fig. 16.

The lowest recorded gender proportion among teachers is in the state of Bihar. In 2010-11 female teachers were 5 times lesser than male teaching staff (5:1). The only improvement in the current scenario is that this ratio has changed to 4:1. Other states with low female presence in higher education are Arunachal Pradesh, Jharkhand, Odisha and West Bengal.

A few well performing states like Kerala, Punjab, Haryana, Chandigarh, Meghalaya and Nagaland on the other hand have consistently more female teachers than male teachers.

At the All-India level, teachers belonging to the General category (Fig. 17) have decreased from 69% to 56.7% in the past 8 years indicating greater presence of teachers from the various reserved categories.

The overall number of female teachers per 100 male teachers was 59 in 2010 and is currently at 73 indicating presence of more women in higher education teaching. However, from Fig. 18, it is observed that higher the post, the lesser the representation of female teachers in all the years.

8. Pupil Teacher Ratio (PTR) in universities and colleges

Pupil teacher ratio or student teacher ratio is the number of students who attend an institution divided by the number of teachers in that institution. Taking into account all types of Institutions (University, College and Stand-Alone), and both distance and regular mode of education, the PTR in India had increased from 23 in 2011-12 to 29 in 2017-18 but was at 26 in 2018-19.

If only the regular mode of education (Fig. 19) is considered, the PTR is marginally better at 30 in 2017-18 and 29 in 2018-19. States like Bihar and Jharkhand have the highest PTR, above 50, for the last six years indicating the burden on a single teacher of teaching multiple students as well as the lack of time that each student gets. Karnataka has a better PTR ranging between 13 and 16 over the last 8 years.

In this trend analysis for fitting of model for PTR in universities and colleges in regular mode, the value of the year has been considered as the upper limit of the year interval i.e. 2013 is considered as the value for the interval 2012-13.

Trend Analysis for PTR (Pupil Teacher Ratio)

Fitted Trend Equation: $Y_t = 25.14 - 2.52 \times t + 0.476 \times t^2$

Where $t=1, 2, 3, \dots$ represents year = 2013, 2014, 2015, ... respectively.

Accuracy Measures: MAPE 5.02384 ; MAD 1.27891; MSD 2.34014

It can be observed that value of Mean absolute percent error (MAPE) is small, it is 5.02 % i.e. fitted value will be off by 5.02%. Also, value of Mean absolute deviation (MAD) and Mean square deviation (MSD) are not high and hence it implies that fitted trend equation is good fit.

If current condition of higher education prevails, the PTR in say 2020, after a year, will be 35.444.

Conclusions :

In order to study and comprehend the status of higher education in our country, the Ministry of Human Resource Development has striven to conduct the annual web-based survey 'All India Survey on Higher Education (AISHE)' since 2010-11 taking into account all the institutions in the country engaged in imparting of higher education. Data as we have observed in this paper has been obtained on several parameters and various indicators of education have been developed such as College Density, Gross Enrollment Ratio, Pupil-Teacher ratio, Gender Parity Index etc. From the

AISHE reports that have been analysed in this paper, it can be understood that India is a rapidly evolving country in which inclusive, strong education is of great importance for its future success. Our country currently has the largest youth population in the world, approximately 600 million. It is home to one-fifth of the world's youth, the most valuable asset.

Some vital findings from the analysis of the AISHE reports are stated here as concluding remarks.

1. Remarkable progress in enrollment in AISHE by colleges and stand-alone universities has been noticed in the past nine years. There has been a 15.6% rise overall in higher education institutes in the country over the last nine years.
2. Telangana, Karnataka, Andhra Pradesh & Maharashtra are the top 4 states in India having the highest college density. Uttar Pradesh and Maharashtra are the top two states in terms of highest number of colleges whereas Bihar is the worst faring state.
3. The percentage of colleges in rural areas has increased over the last decade. Number of colleges exclusively for women has also improved marginally.
4. There is an increase in enrollment of females in both sciences and humanities at both UG & PG levels. Strong male domination continues in Engineering & Technology followed by MBA programs. GER for males & females have increased indicating awareness of importance of education.
5. Distance enrollment has dropped which indicates that more students veer towards regular education. Among the distance education students, male students are more than females.
6. Enrollment of students belonging to social category SC, ST and OBC has been slowly on the increase where as general category has shown considerable downward trend.
7. Percentage of enrollment to post graduate level from under graduate level in regular mode of

education is improving over the past five years.

8. The enrollment of differently abled persons in higher education has always been very poor in our country. However, after the implementation of the RPWD Act it has improved giving us the understanding that continued efforts are required.
9. There has been a gradual increase of foreign students over the years with the highest share of students coming from Nepal. Three fourths of the foreign students enroll in the undergraduate programs and B.Tech. is the most sought-after course. Karnataka has the highest number of foreign students followed by Tamil Nadu and Maharashtra.
10. The GPI displays an increasing trend indicating that the proportion of females securing seats for higher education is improving.
11. The total number of teachers involved in higher education has increased over the decade and an improved presence of female teachers is observed. Bihar has lowest gender proportion among teachers whereas states like Kerala, Punjab, Haryana, Chandigarh, Meghalaya and Nagaland have more female teacher presence in higher education. It is observed that the higher the post, the lesser the representation of female teachers in all the past years.
12. Pupil Teacher Ratio in India has increased. Bihar & Jharkhand have the highest PTR above 50 from the last six years and Karnataka has a better PTR ranging between 13 and 16 over the last 8 years.

The need of the hour is to harness the potential of the youth of our country by educating them and making them employable, confident and self-reliant future torch bearers. It is also very essential that the youth from all strata of society have access to education irrespective of their social or economic status. Only then will our country be able to realize its true growth potential. Education should be given importance by the Government when policies are formed and funds allocated as it is the most powerful tool to reduce poverty and inequality. It lays a foundation for sustained economic growth of the individual and thus

the nation as a whole.

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Appendix

<i>Year</i>	<i>Avg . All India</i>	<i>Tel</i>	<i>Kar</i>	<i>AP</i>	<i>Mah</i>	<i>Raj</i>	<i>Bih</i>	<i>Rur clg. %</i>	<i>Girls clg. %</i>
2010-11	23	-	44	48	35	29	5	54.3	9.1
2011-12	25	-	41	48	34	32	6	55	10.2
2012-13	25	-	44	44	33	32	6	55	10
2013-14	26	-	46	45	34	33	7	56	10
2014-15	27	60	49	47	35	34	7	58	10.7
2015-16	28	59	50	45	34	35	7	60	11.1
2016-17	28	51	53	48	32	36	7	59.34	9.3
2017-18	28	60	51	48	33	33	7	60.48	11.04
2018-19	28	50	53	49	33	35	7	60.53	10.8

(Avg. – average , Tel – Telangana, Kar – Karnataka, AP - Andhra Pradesh, Mah – Maharashtra, Raj – Rajasthan, Bih – Bihar, Rur – Rural, clg - college)

Table 1 : College density of a few states and special colleges during 2010-19

<i>Year</i>	<i>Total Enrollment (millions)</i>	<i>Girls (%)</i>	<i>GER</i>	<i>GER Male</i>	<i>GER Female</i>
	<i>(1)</i>	<i>(2)</i>	<i>(3)</i>	<i>(4)</i>	<i>(5)</i>
2010-11	27.5	44	19.4	20.8	17.9
2011-12	29.2	45	20.8	22.1	19.4
2012-13	30.2	45	21.5	22.7	20.1
2013-14	32.3	46	23	23.9	22
2014-15	34.2	45.5	24.3	25.3	23.2
2015-16	34.6	46.2	24.5	25.4	23.5
2016-17	35.7	46.8	25.2	26	24.5
2017-18	36.6	47.6	25.8	26.3	25.4
2018-19	37.3	48.64	26.3	26.3	26.4

Table 2 : Enrollment and GER during 2010-18

Table 3 : Trend value for GER of male

<i>Actual Year</i>	<i>Year</i>	<i>t = Year – 2010</i>	<i>Actual GER</i>	<i>Fitted GER</i>	<i>Residual</i>
2010-11	2011	1	20.8	20.4916	0.308418
2011-12	2012	2	22.1	21.9857	0.114307
2012-13	2013	3	22.7	23.2051	-0.50508
2013-14	2014	4	23.9	24.1713	-0.27126
2014-15	2015	5	25.3	24.919	0.380994
2015-16	2016	6	25.4	25.4872	-0.08725
2016-17	2017	7	26	25.9131	0.086888
2017-18	2018	8	26.3	26.229	0.071035
2018-19	2019	9	26.3	26.4614	-0.16142

Table 4 : Trend value for Pupil Teacher Ratio

<i>Year Interval</i>	<i>Year</i>	<i>t = Year – 2012</i>	<i>Actual PTR</i>	<i>Fitted PTR</i>	<i>Residual</i>
2012-13	2013	1	24	23.0952	0.90476
2013-14	2014	2	21	22.0000	-1.00000
2014-15	2015	3	22	21.8571	0.14286
2015-16	2016	4	21	22.6667	-1.66667
2016-17	2017	5	25	24.4286	0.57143
2017-18	2018	6	30	27.1429	2.85714
2018-19	2019	7	29	30.8095	-1.80952

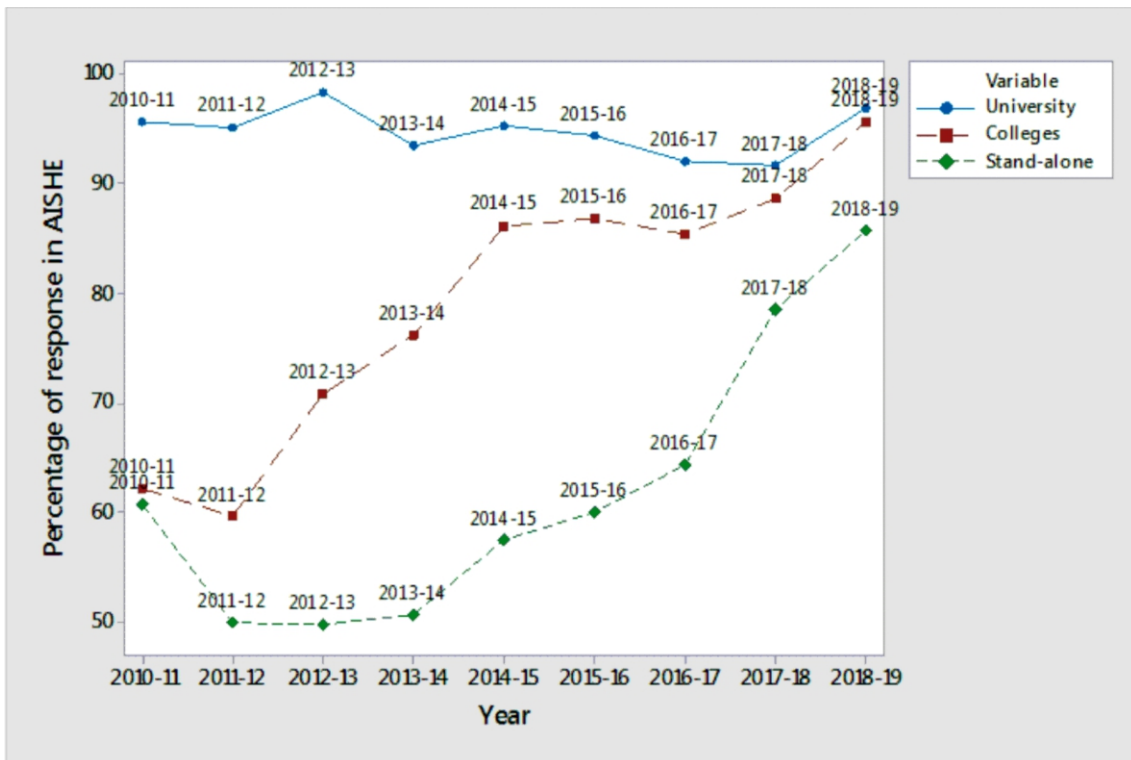


Fig. 1: Percentage of response in AISHE during 2010-19 by universities, colleges and stand-alone institutions

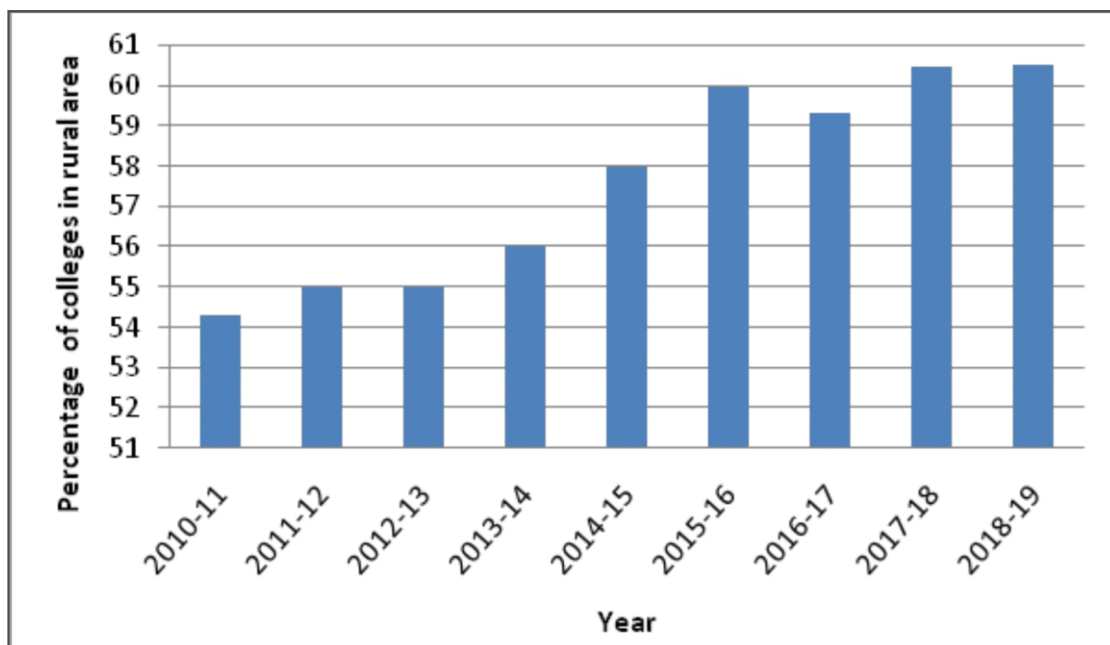


Fig. 2 – Percentage of colleges in rural area during 2010-19

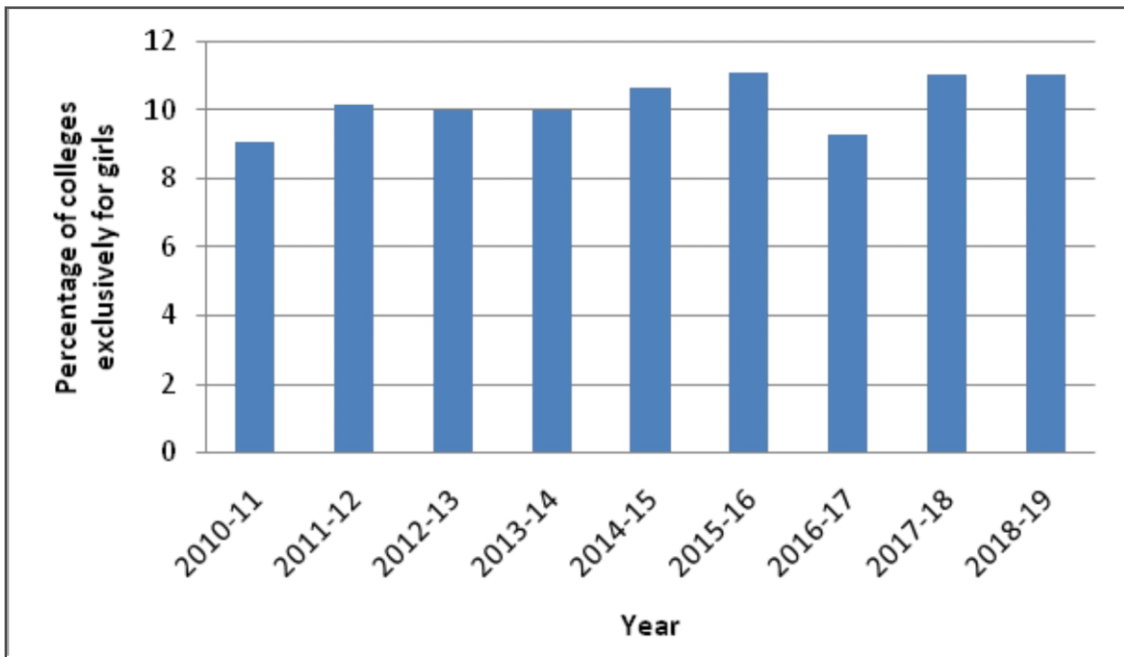


Fig. 3 - Percentage of colleges exclusively for girls

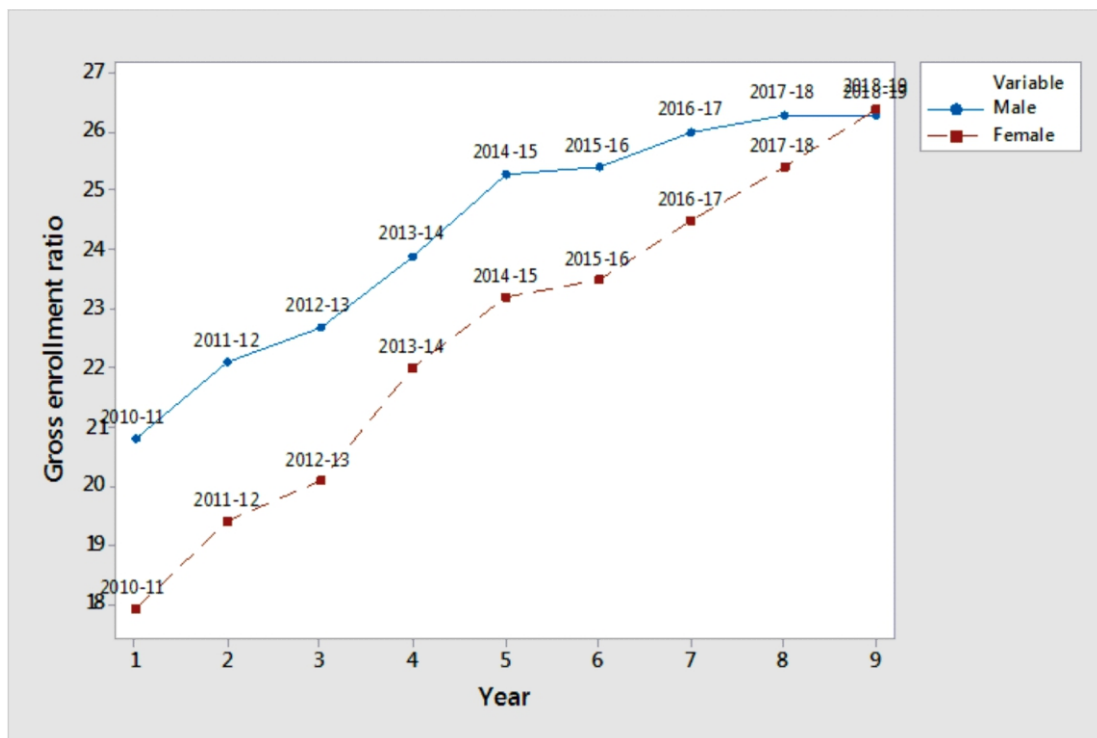


Fig. 4 - Gross enrollment ratio during 2010-19

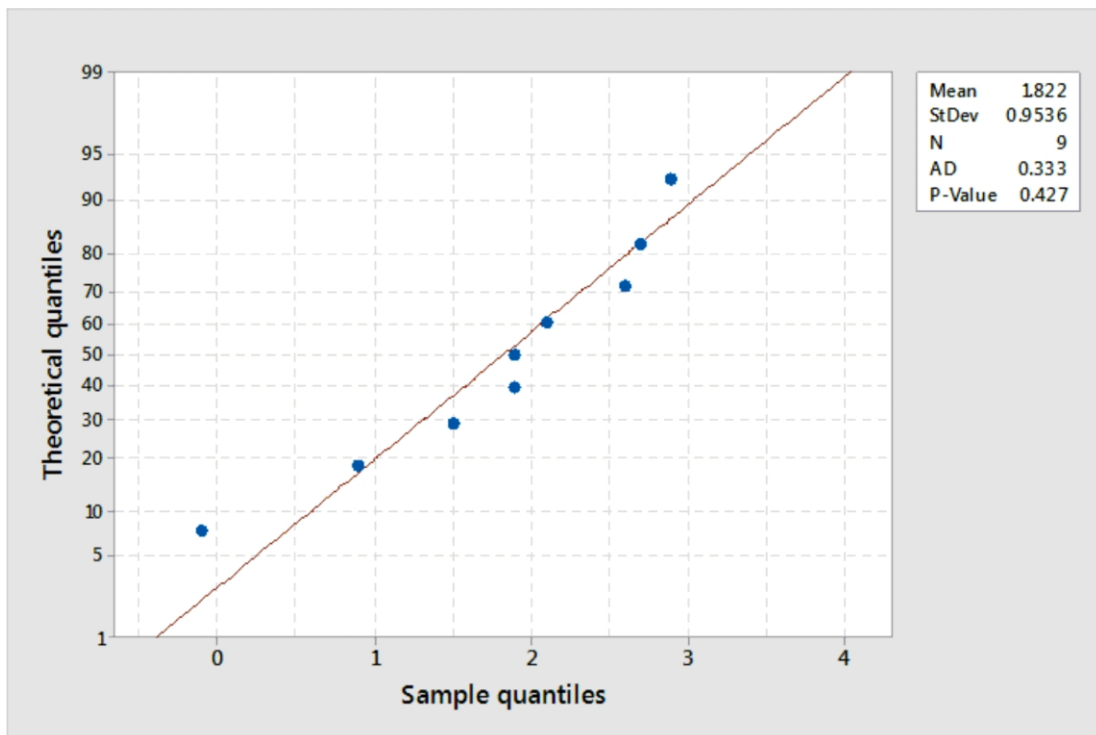


Fig. 5 - Normal probability plot of difference between GER for male and female

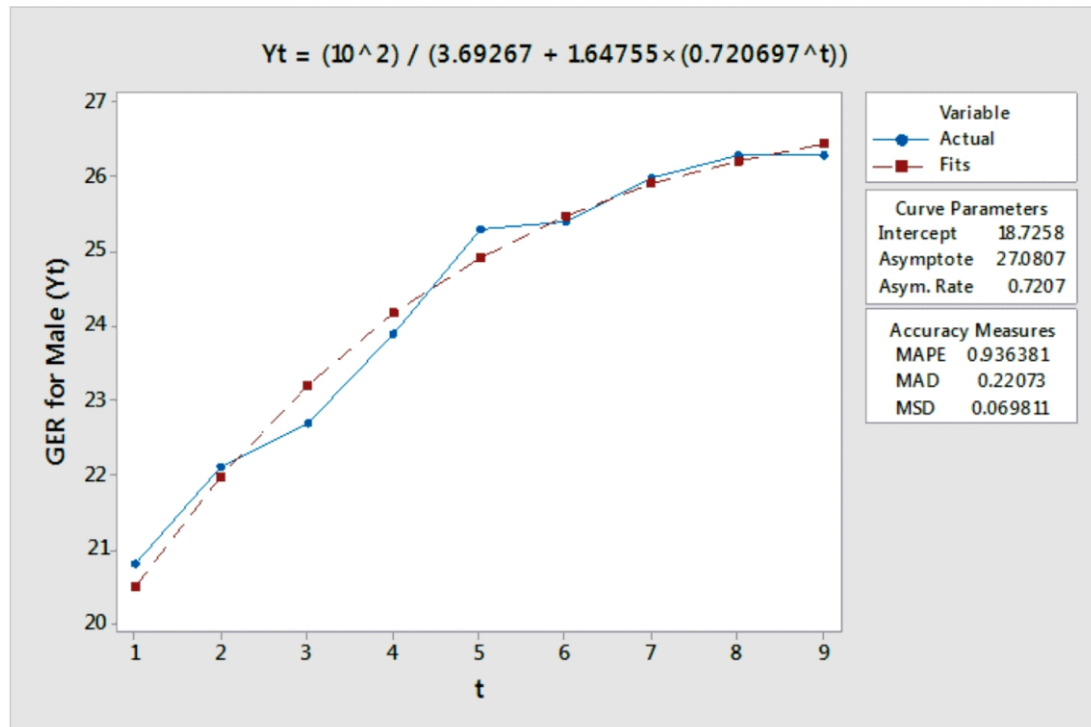


Fig. 6 - S - Curve trend model for GER of male

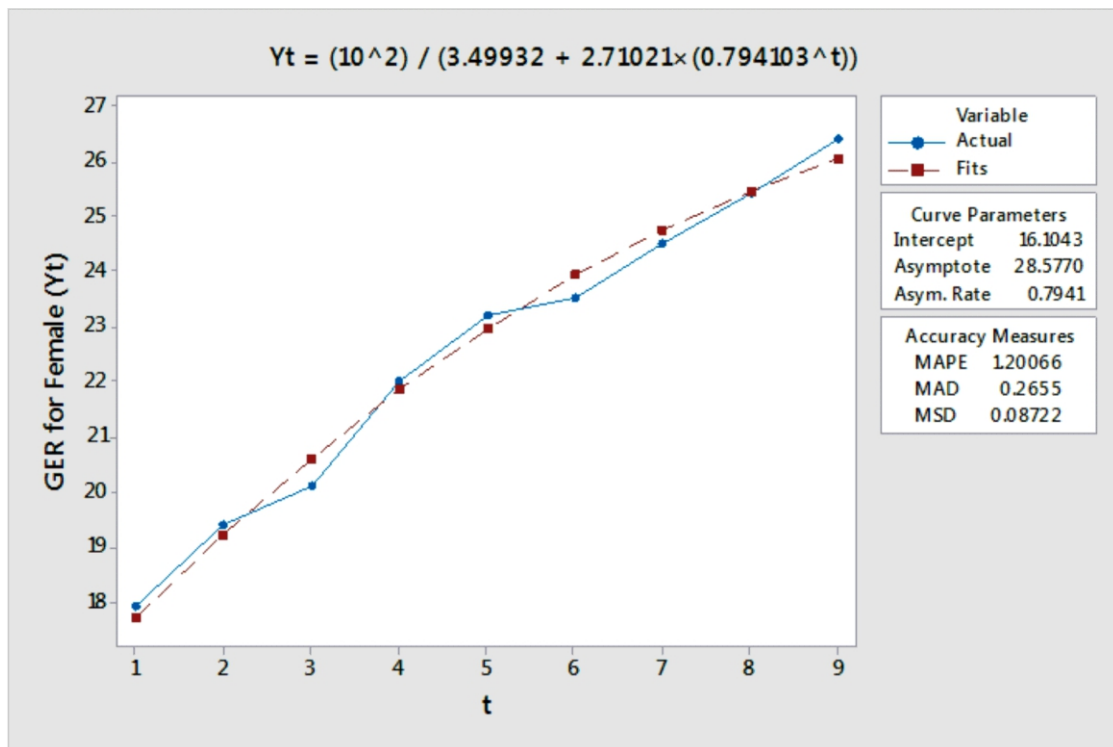


Fig. 7 – S - Curve trend model for GER of female

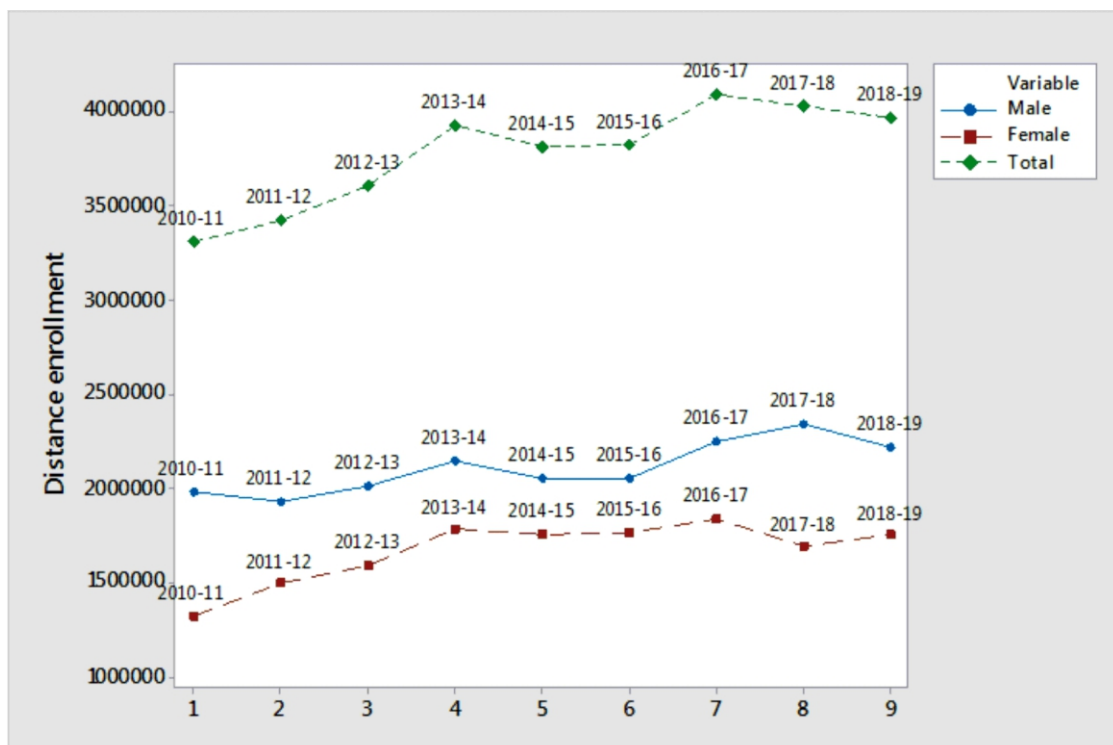
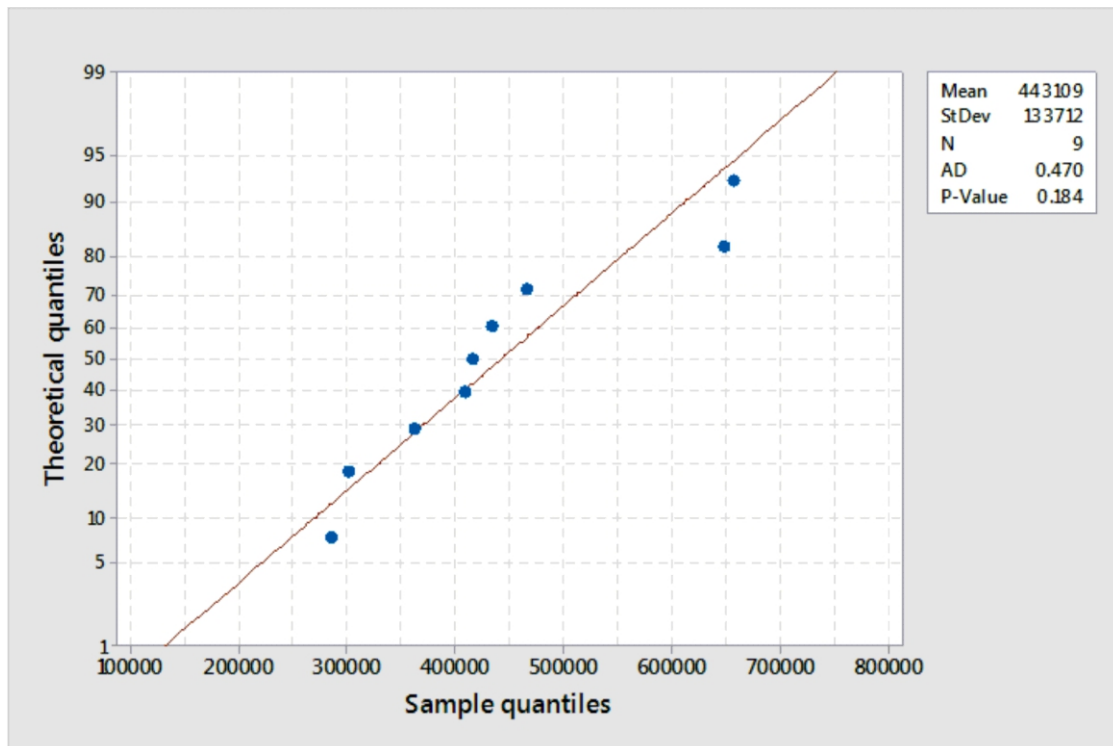


Fig. 8– Number of distance enrollment by male and female during 2010-19



(AD – Anderson Darling test statistic, N – number of observations)

Fig. 9 - Normal probability plot for difference between number of male and female enrollment in distance mode of education

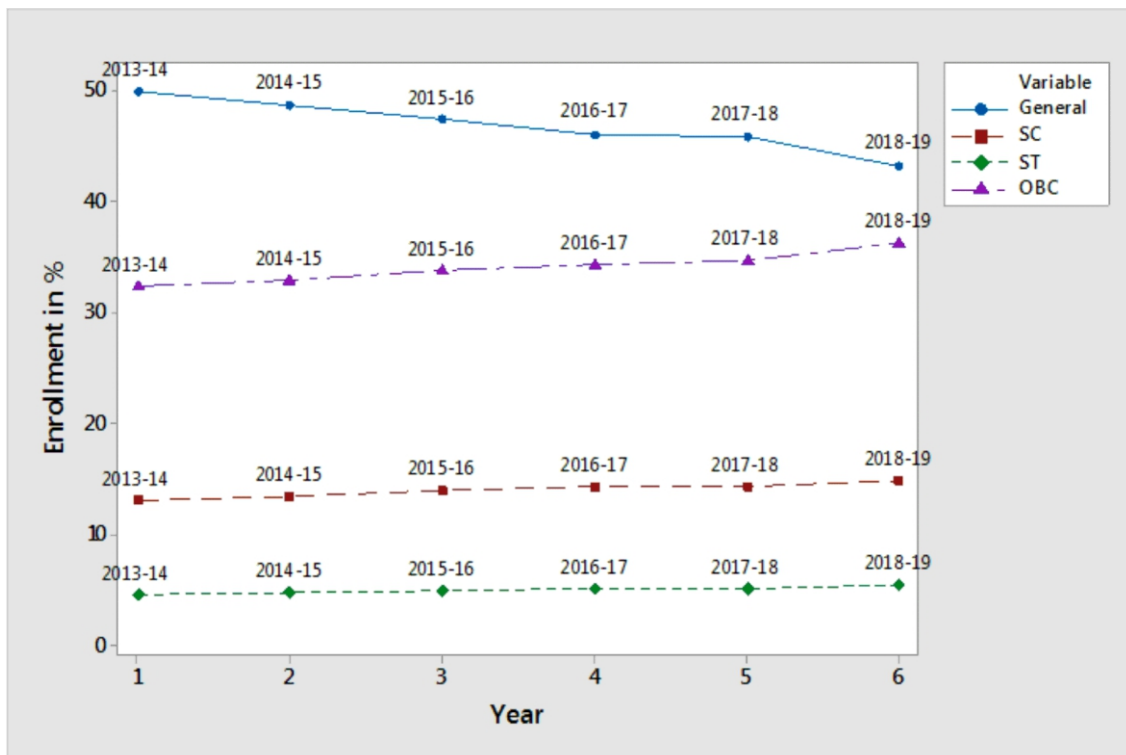


Fig. 10- Student enrollment percentage for various social categories during year 2013-19

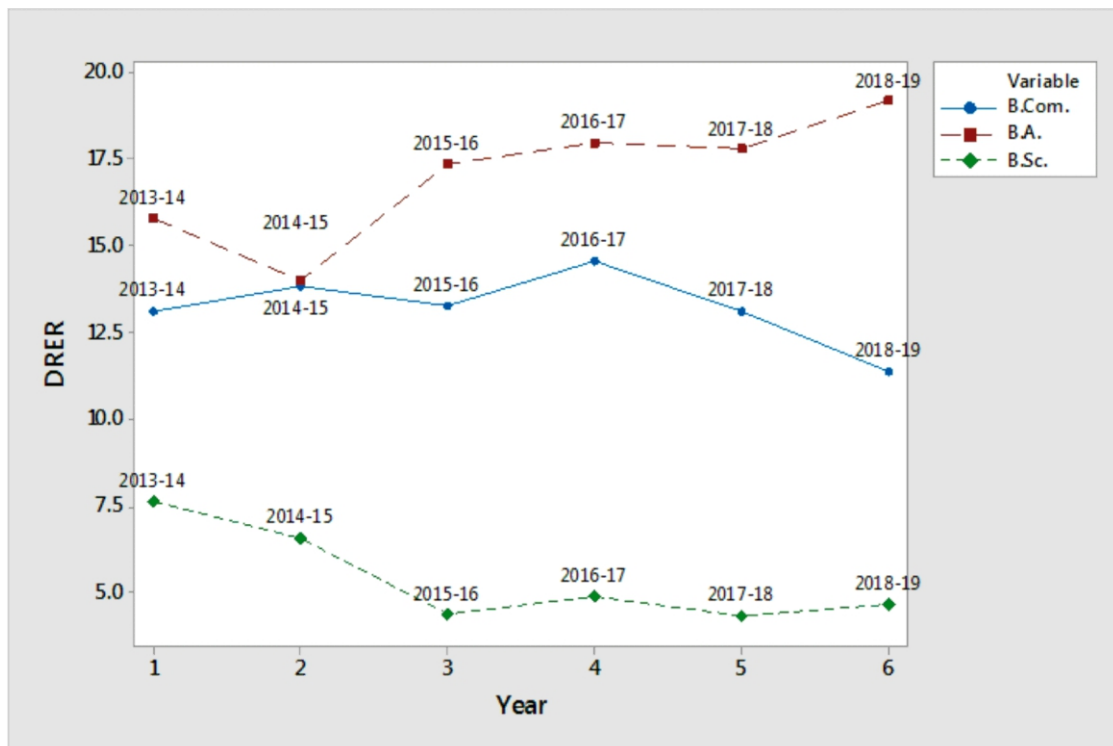


Fig. 11 - Distance Regular Enrollment Ratio (DRER) for B.Com., B.A. & B.Sc. during 2013 - 19

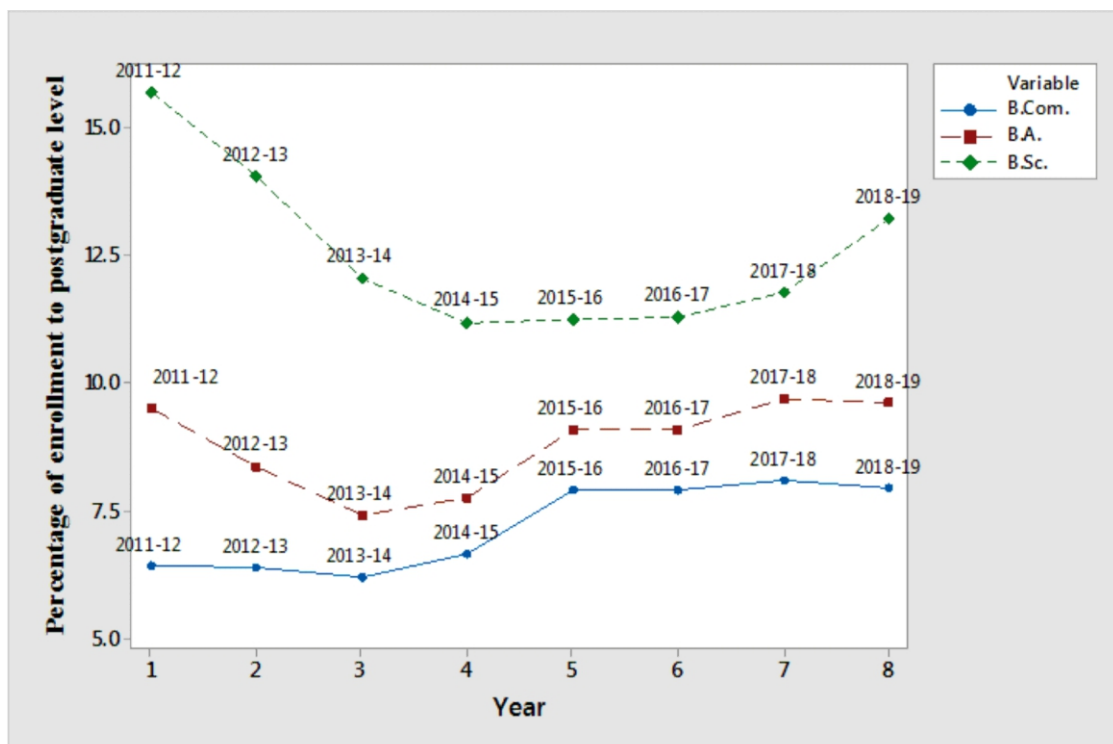


Fig. 12 - Percentage of enrollment to post graduate level in regular mode of education

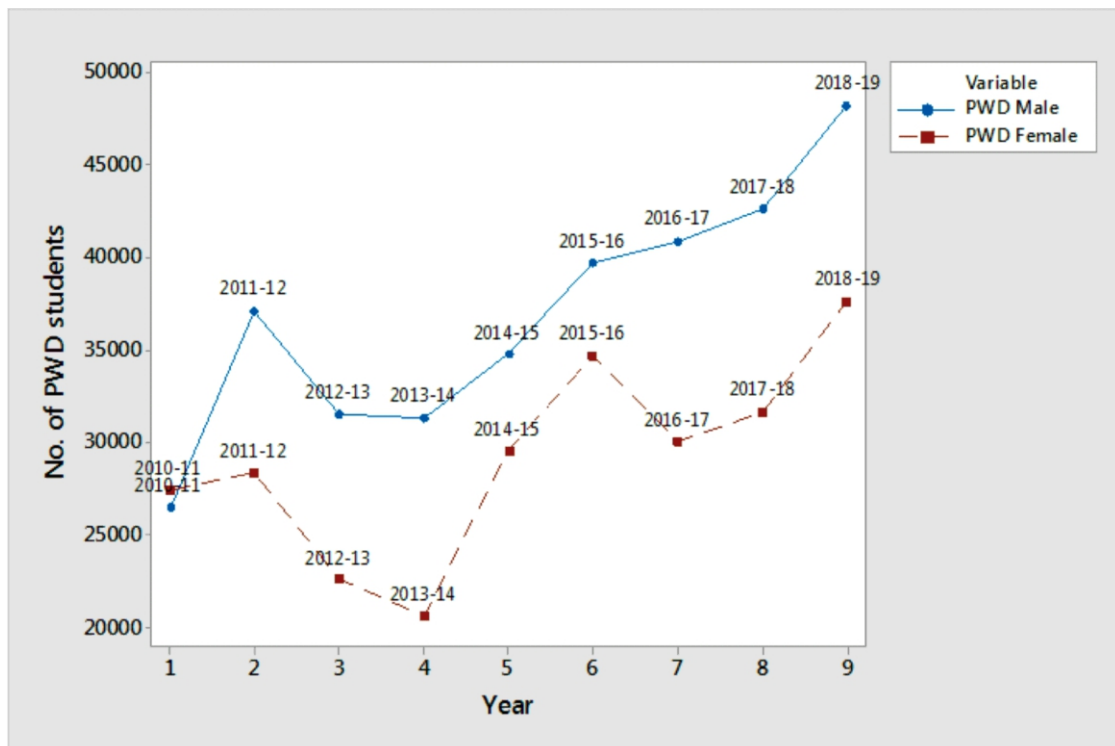


Fig. 13 :Number of PWD students enrolled during 2010 – 2019

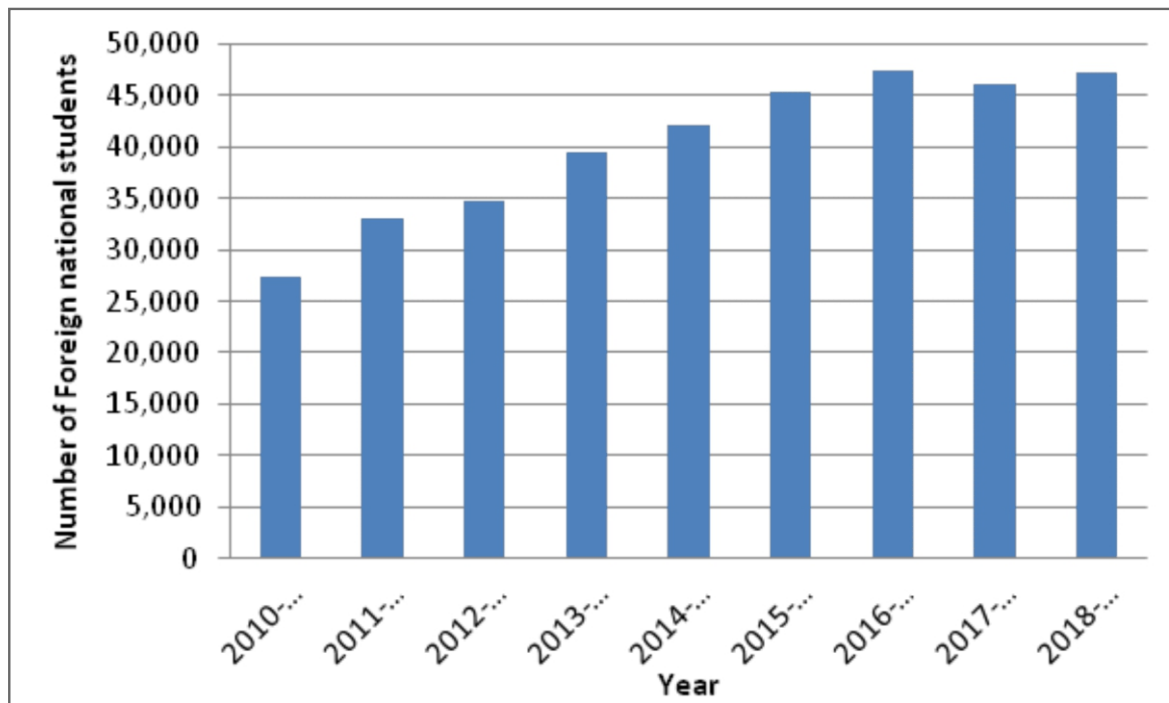


Fig. 14 - Number of foreign national students during 2010-19

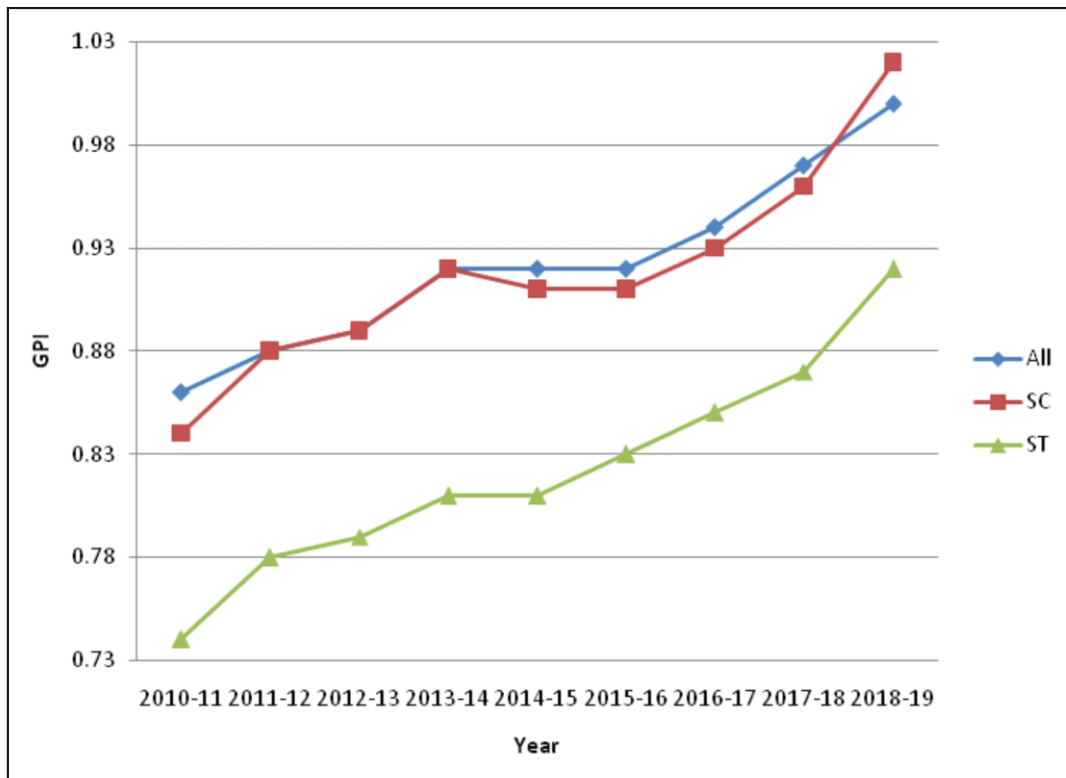


Fig. 15 - GPI for ALL, SC and ST during 2010-2019

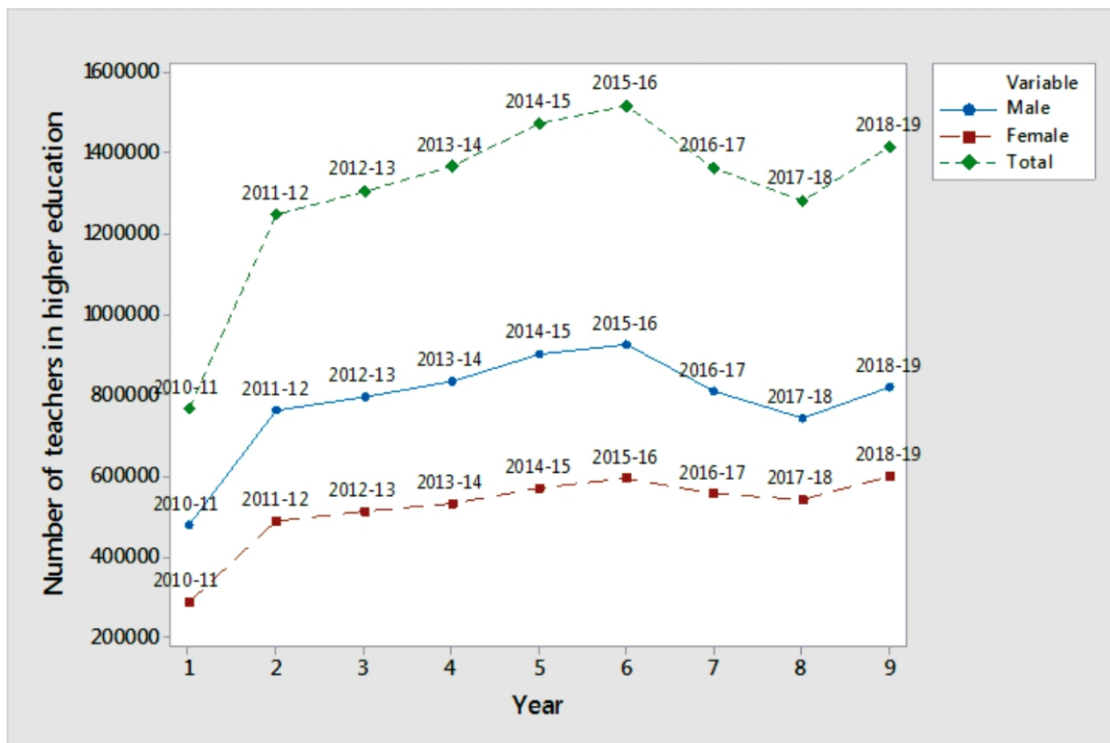
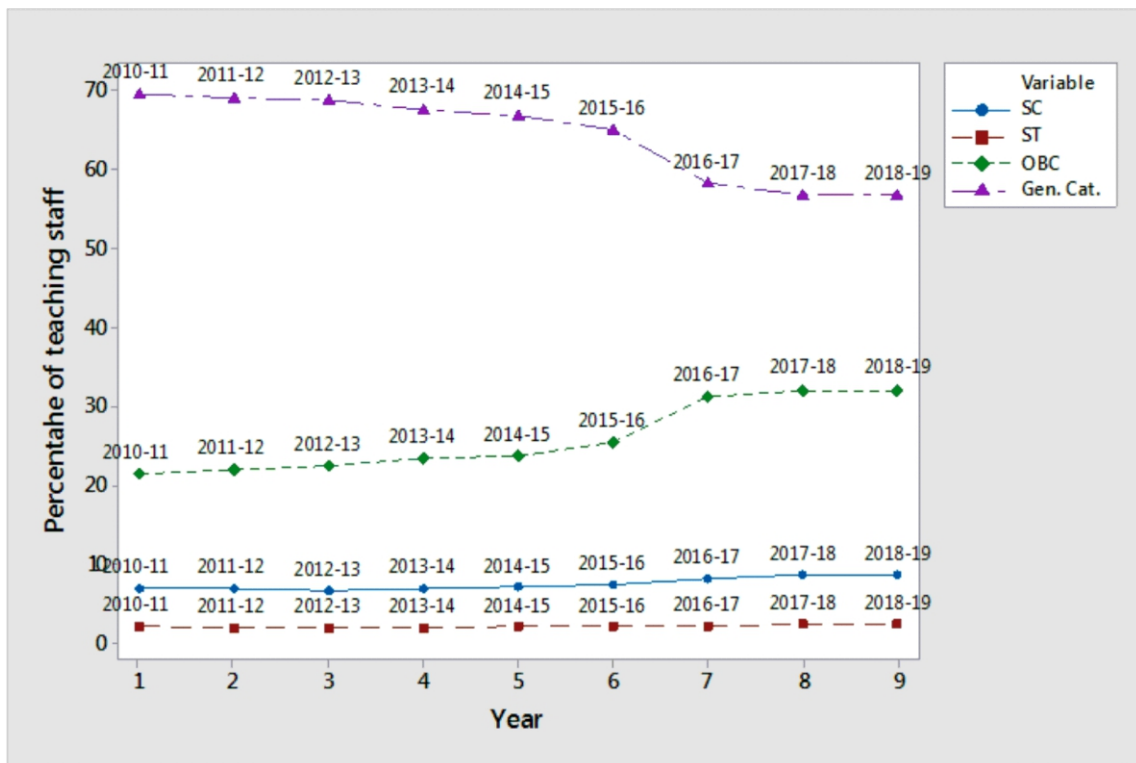


Fig. 16 – Number of teachers in higher education during 2010-19



(Gen. Cat. – General Category)

Fig. 17 – Social category-wise distribution of Teaching Staff during 2010-19

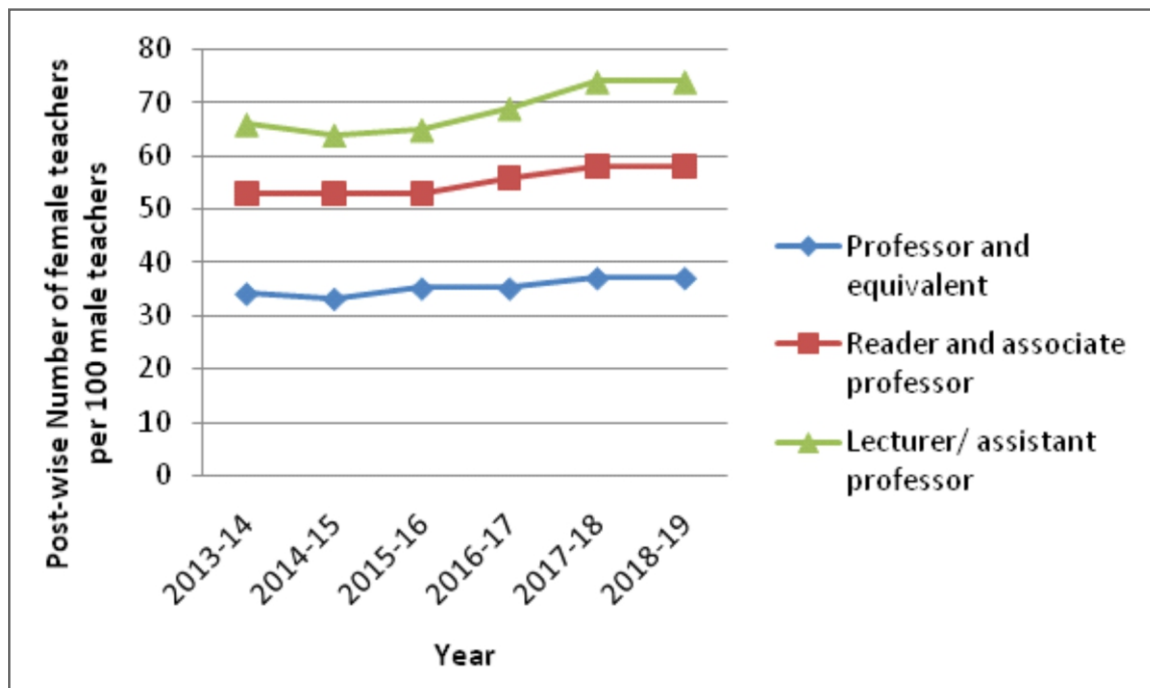


Fig. 18 - Post-wise Number of female teachers per 100 male teachers

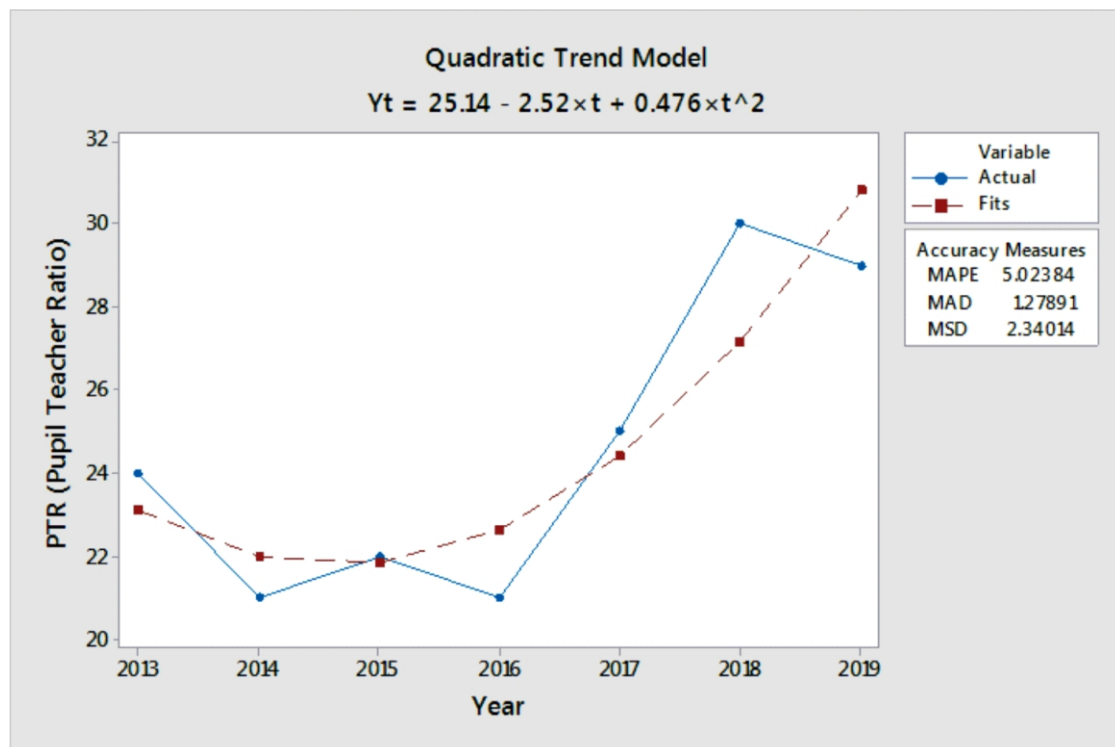


Fig. 19 - Trend Analysis Plot for PTR (Pupil Teacher Ratio) in case of regular enrollment

Rotational Dynamics of a Flywheel

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Abstract

This paper proposes the use of "Tracker" a freeware to observe the frictional torque in a flywheel system. Two experiments have been performed to establish this method. In the first experiment 'Tracker' has been used to find the angular acceleration of the flywheel. In the second experiment the flywheel has been used as a compound pendulum to determine its moment of inertia. The set-up is constructed from all locally available materials.

Keywords : Rotation, Angular, Velocity, Video, Tracker, acceleration, Flywheel, Friction

1. Introduction

From last few years use of slow-motion videos has become very common due to advent of smartphones. Learning mechanics has been hugely influenced by this phenomenon. A number of research papers has come up where a video analysis of moving bodies is done to extract relevant information. Loo Kang Wee² has shown a promising use of "Tracker" as a pedagogical tool for understanding projectile motion. Brian⁴ has shown an energy analysis of bouncing ball. Douglas Brown¹ did a brave effort of Combining computational physics with video analysis. Rajesh³ has done a relative analysis of relative motion between two bodies. Although these works are promising, they don't establish video analysis as an objective tool for mechanics experiments. This paper attempts to establish tracker as an effective tool to perform mechanics experiments in a Physics Lab.

Acceleration of a rotating flywheel is a standard observable in undergraduate laboratories. Standard procedure is as follows. A known torque is applied on a flywheel. Time taken for the flywheel to stop is noted. So is number of turns it takes before it stops. From that one can calculate the angular acceleration of the flywheel. Although this method is quite popular, this is not a direct method of measurement. Another method which is generally used is by using rotation sensors which measures the angular velocity directly. Since such sensors are expensive, this method is hardly popular.

Video analysis offers an alternative low-cost solution. It not only offers a direct measurement of angular displacement but also frees us from restrictions of applying any known torques on the system. T Eadkhong⁶ and his team in his paper has worked out on a problem of rotational dynamics with "Tracker". Although they have assumed that frictional torque is proportional to first power of angular velocity which according to me is unnecessary as frictional torque may remain constant or even fluctuate in an unpredictable way. Also, my method of determination of moment of inertia is different from them.

2. Experimental Setup

Set up consists of a flywheel and a slow-motion camera to track the motion of the flywheel.

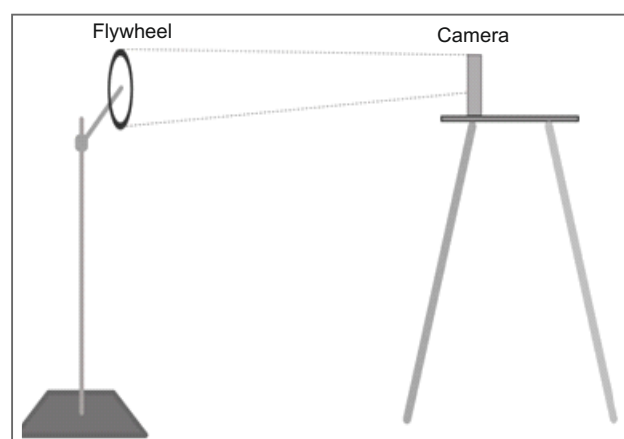


Figure 1

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3. Methodology

3.1 I have used a slow-motion camera (Figure 1). Although it's not required but since these days such cameras are readily available one can employ them. It was set on a fixed sturdy surface and not hand held. A plane screen was used in the background³. An identifier mark was created on the rim of the flywheel. Camera had been kept at distance of around one meter from the flywheel (diameter = 10.5cm) and the line of sight of the camera is perpendicular to and centred on the rotating plane. So that The flywheel is then given some rotation with a finger.

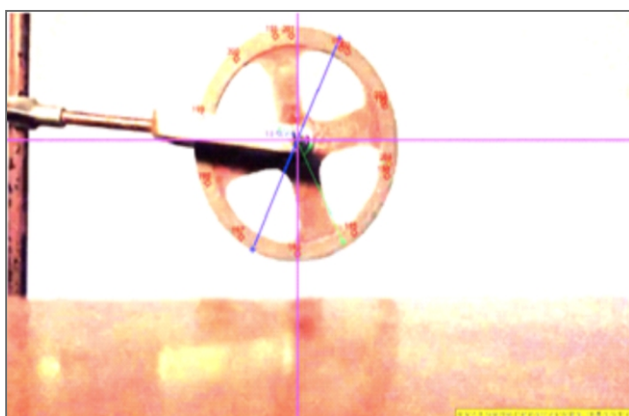


Figure 2

3.2 The videos then loaded in Tracker6 and tracked manually³ or auto track⁶ (Figure 2). Tracking of the identifier mark is done without skipping any frame. The origin was set at the center of the flywheel and subsequently vertical was chosen as Y axis and horizontal was X axis.

We use the angle measurement tool (protractor tool) of tracker. It measures the angle from 0 to π and then resets back to zero at every half rotation. Although it calculates and gives a track of total angle measurement (Figure 3). Clockwise rotation is considered negative. All the angular measurements are in radian.

The motion lasted for around 17 second. A plot of angular displacement vs time is obtained.

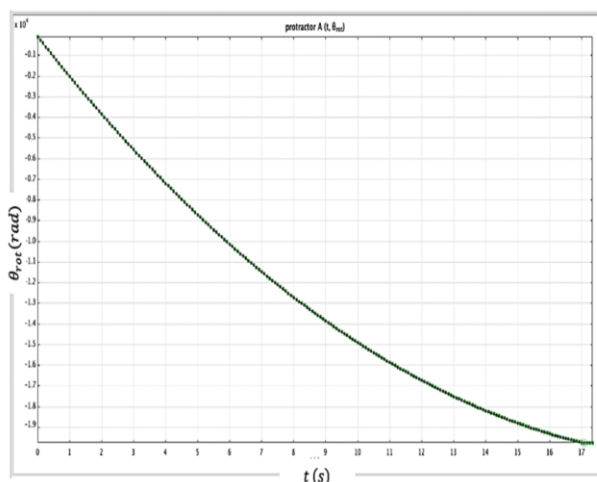


Figure 3

3.3 At every second the slope of the curve of θ vs t . is obtained (Figure 4). This can be readily done in 'Tracker'. From this data angular acceleration α can be calculated at each second (Table 1).

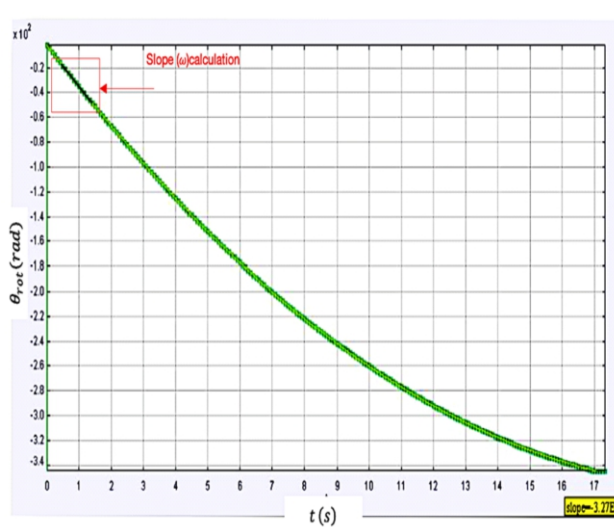


Figure 4

Tabulated data for angular velocity vs time

Time (t) sec	Angular Velocity ω = (rad/s)
0	34.40
1	32.70
2	30.90
3	29.20
4	27.50
5	25.80
6	24.10
7	22.40
8	20.80
9	19.20
10	17.60
11	16.00
12	14.30
13	12.80
14	11.20
15	9.70
16	8.18
17	6.67

Table 1

A graph of angular velocity and angular acceleration can be plotted against Time(Figure 5). Slope of ω vs t graph is -1.63 rad/sec^2 which is angular acceleration.

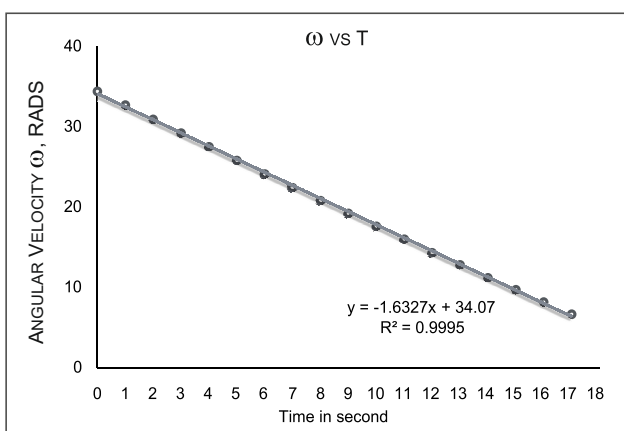


Figure 5

3.4 Determination of moment of inertia of the wheel
The wheel is pivoted about its rim and its average time period (table 2) for small oscillations is determined.



Table 2

Data for time period

Obs No.	Time for 10 osc. t(sec)	T(time period)=t/10
1	5.8	0.58
2	5.9	0.59
3	6.0	0.60
4	5.9	0.59
5	6.1	0.61
mean time period(T)		0.594 sec

4. Analysis and results

From video analysis we obtain the following results

The angular acceleration of the flywheel is -1.63 rad/sec^2 .

Time period of oscillations about a point on the rim is 0.594 se

Diameter of the flywheel = 10.50 cm .

Acceleration due to gravity = $g = 9.80 \text{ m/s}^2$.

Mass of the flywheel = $m = 47.5 \times 10^{-3} \text{ kg}$

Distance from the center of the wheel to the pivot (point of suspension) for calculating its

time period = $d = 4.45 \text{ cm}$

Calculations

$$\text{Time Period } T = 2\pi\sqrt{I/Mgd}$$

Moment of inertia about an axis passing through the point of suspension.

$$= I = \frac{T^2 Mgd}{4\pi^2} = \frac{0.594^2 \times 47.5 \times 10^{-3} \times 9.8 \times 4.47 \times 10^{-2}}{4 \times 3.14^2}$$

$$= 1.86 \times 10^{-4} \text{ kgm}^2$$

Therefore, one the moment of inertia of the flywheel about the geometrical axis is obtained using parallel axis theorem.

$$\text{Moment of Inertia } [I_0] = I - md^2$$

$$= (1.86 \times 10^{-4}) - (47.5 \times 10^{-3})(4.45 \times 10^{-2})^2$$

$$= 9.19 \times 10^{-5} \text{ kgm}^2$$

$$\text{Therefore Frictional Torque } T = I_0 \alpha$$

$$= (9.19 \times 10^{-5} \text{ kgm}^2)(-1.63 \text{ rad/s}^2)$$

$$= -1.49 \times 10^{-4} \text{ Nm}$$

Negative sign shows that torque is opposite to angular velocity and flywheel is slowing down.

5. Conclusion

Here a method has been devised for measuring frictional torque on a flywheel. It will help to understand rotational dynamics of a flywheel. Here the help of a freely available open source software called 'Tracker' is taken to analyze the motion. The video camera acts as a tool to collect data. This demonstration clearly displays the feasibility of use of tracker in undergraduate laboratories. All the apparatus is inexpensive and results are fairly accurate. The method established here can be extended to other bodies and frictional system.

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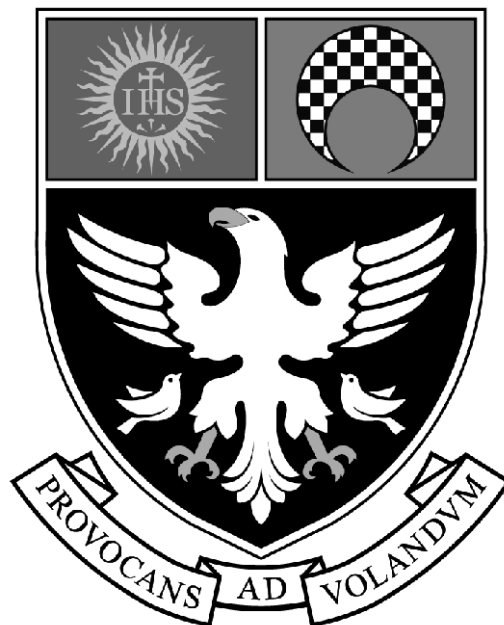
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Humanities-Social Sciences



ST. XAVIER'S COLLEGE, MUMBAI

Cult of Mahesha during the Rashtrakuta Era in Maharashtra

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Abstract :

This research paper focuses on the development of Mahesha cult in Maharashtra through sculptural art at caves located in Elephanta and Ellora in Maharashtra.

The researcher has tried to comprehend the concept of the Śaiva doctrine behind the creation of Maheshamurti. However, the described image of Mahesha in the Suprabhedāgama with its Śaiva philosophy would not be effective if sculpted, as it may be difficult for a Śaiva devotee to understand the five tatvas and the Śaktis which create the Sakalamurti. Hence it was only after experimentation that the ultimate manifestation of Śiva as Maheshamurti is observed at Elephanta. It was not merely a dynasty which was responsible for its creation but it was the efforts of the Śaiva devotees which made it possible.

Keywords : Mahesha , Sakala, Nishkala, Aghora, Tatpurusha, Vamadeva

While observing the upper shrines at Ellora namely the Ganesha leni complex and the Jogeshwari complex the researcher saw several Maheshamurtis in smaller units. These murtis were carved on the rear wall behind the linga in the shrine or within circular linga pitha in the front and a linga in the centre. A total of eleven Maheśamurtis have been carved in shrines belonging to the Rashtrakuta period at Ellora.

Excluding the image in the 16 A or the Lankeśwara cave which was excavated later than the Kailaśa shrine, no Trimurti is seen even in the monolithic shrine of Kailaśa at Ellora, which makes one skeptical about the existence of a new cult at Ellora that ultimately resulted in the creation of the largest Maheshamurti in cave No 1 at Elephanta.

Table 1 : Description of Maheshmurtis at Ellora.

No.	Cave No.	Table 1 : Features of Maheshamurt
1.	XXIII Southern Unit	Vamadeva to the proper right. Aghora to the proper left of the Tatpurusha (unlike Elephanta). He holds a fruit in one of his left hands, while his right hand is in vyākhyā-mudra. The shrine is faces west. Its height is 8.6 ft and width 7.3 ft,
2.	XVa. Side cave in the yard of Daśavatara cave	Aghora to the right and Vamadeva to the left of Tatpurusha. Its shrine door faces south.
3.	Cave above XXIII and XXIV (XVII A)	Behind the circular linga pitha is the image of Mahesha with Vāmadeva to the left of Tatpurusha and Aghora to the right. Height is 7.4 ft and width is 6.4 ft. Shrine faces west.

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No.	Cave No.	Table 1 : Features of Maheshamurt
4.	Ganeśa Leni Shrine No..2	The Mahesha murti shows Aghora to the left and Vamadeva to the right of the Tatpurusha. The ceiling is painted with a geometrical design in black and orange. The shrine faces west and its height 4.8 ft and width 4 ft.
5.	Ganeśa Leni Shrine No. 3	Maheshamurti on the rear wall shows Aghora to the left and the Vamadeva to the right side of Tatpurusha with additional Ganas and Vidyadharas. The height is 6.5 ft and breadth 7.4 ft. The shrine faces west.
6.	Ganeśa Leni Shrine No. 7	The rear wall of the sanctum shows Aghora on the left and Vamadeva on the right of the Tatpurusha. Its height is 7.7 ft and width 6.10ft. The shrine faces North. There were attempts to make a circumambulatory path, Mukhamandapa and a porch.
7.	Ganeśa Leni Shrine No. 17	The Maheshamurti is very large on the rear wall with Aghora on the right and Vamadeva on the left of Tatpurusha. The height of the Maheshamurti is 7.7 ft and width is 6.6 ft. The shrine faces the south.
8.	Ganeśa Leni Shrine No. 18	The rear wall shows Maheshamurti with Aghora on the right and Vamadeva on the left. The image is more ornamental. Its height is 5.10 ft and width is 5.4 ft. The shrine faces the south.
9.	Jogeshwari cave complex shrine No.2	Vamadeva on the right and Aghora on the left of Tatpurusha. The ropy lava has spoilt the image. Its height is 4 ft and width is 5.5 ft. The shrine faces the north.
10.	Jogeshwari cave complex shrine No.1	There are two dvarapalas flanking the door with Lakulisha on the left, and a huge Maheshamurti in debris.
11.	Lankeśwara cave. Cave No. XVI (Kailasha)	The sanctum appears more developed. On the rear wall Maheshamurti has Vamadeva on the right and Aghora on the left. The Tatpurusha has four hands. The two left hands, are shown carrying Naga and Matulunga. While the right ones carry a Khatvāṅga and vyākhyāmudra and has a trinetra. The shrine is shown facing the west.
12.	Maheshamurti at Elephanta	Aghora on the left side of Tatpurusha and Vamadeva on the right, Śivalinga is in the sanctum on the right side of the hall. The image is facing north. (h 20 ft by 7 inches)

Probably, through the philosophy of Śuddha-Śaiva school of Śaivism one is able to understand the existence of Maheśamurti and other sculptural forms of Śiva. According to the Śaiva-Siddhantins there are three tatvas (realities) called Śiva, Sadāśiva and

Maheśa, and these are said to be the nishkalā, the sakalā-nishkalā and the sakalā aspects of God. The word kalā implies limbs. Hence, the term nishkalā would mean, that which has no form or limbs; in other words, an undifferentiated formless entity. Probably

the Nishkalā aspect of the almighty would be represented by the Śivalinga, as it is in this state, all created beings merge their bodies, which they had obtained for the purpose of the enjoyment of actions of the pure and impure kinds, in the primeval cause, and therein suppress all activities. Thus “transcendental reality and ontological becoming, together with phenomenal existence, have their symbols in the linga.”¹

In the nishkala state the Supreme Being has no beginning, no limit or boundary and is indestructible and pervading everywhere. The nishkalā aspect of Śiva as a Supreme Being is represented in the description of the lingodbhavomūrti, wherein Śiva appears as a column of fire in front of Brahmā and

Vishnu.

In the Nishkalā state of Śiva, emerge five energies or Śaktis. Each Śakti emerges from another through which appear the five different Śadāśiva - tatvas interdependent of its predecessors; which then leads to the existence of Maheśamurti who is then ultimately responsible for the acts of Srīṣṭi or creation, stithi (protection) and laya (reabsorption) and therefore he is understood as a sakalamūrti.

Through the following table the researcher has tried to comprehend the concept of the Śaiva doctrine behind the creation of Maheshamurti.

Table 2 : The Path towards Śakalamurti

No.	Śakti or energies	Second name for Śakti	Philosophical meaning	Tatvas derived through energies	Direction
1.	Parāśakti	Śantyātitaśakti	It is the source through which souls attain the knowledge of the sat-chit-ānanda swarupa of the supreme being	Śadākhyas Iśāna	Top
2.	Adiśakti	Śāmtiśakti	It destroys Mala māyā and Karma	Tatpurusha	East
3.	Ichchhāśakti	Vidyāśakti	It understands maya and the distinction of the soul	Sadyojata	West
4.	Jñānaśakti	Pratishthaśakti	It yokes to purushatatvas which are naturally inert and extremely subtle	Aghora	South
5.	Kriyāśakti	Nivruttiśakti	It produces the faculty in souls of the enjoyment of pleasures of karmas of life.	Vāmadeva	North

It is from these five faces, the twenty eight Śaivagamas were given to the world. It is this Mahēśamurti that manifests himself to the devotees in different forms, performing several sports (lilās) as seated or standing, dancing or riding upon vehicles, as violent (ugra) or as pacific (saumya) etc.

This concept of Maheshamurti was achieved by artisans only after experimentation, which can be seen at Ellora. However, Maheśa is described in the Suprabhedagama as having one face set with three eyes, the head adorned with a jata-mukuta, four-arms, and standing on a padmasana. In two of his hands are the mriga and the Paraśu, and the remaining two hands are held in the abhaya and the varada poses.

महेश²

पञ्चमूर्धं चतुर्वकं नेत्रेर्द्वादशभिर्युतम् ।
 चतुरास्यं चतुर्नासी वसुश्रोत्रं चतुर्गळम् ॥
 अभयं शूलपरशुं वज्रं खंडं च दक्षिणे ।
 खेटकाडकुशपाशं च घण्टां वरदवामके ॥
 कुर्यादेवं महेशं तु शक्तेस्तु लक्षणं क्षृणु ।
 चतुर्भुजां त्रिनेत्रां च सर्वालंकारसंयुताम् ॥
 वरदाभयहस्तां वै दुकूलवसनान्चिताम् ।
 करण्डमकुटोपेतामीश्वरस्य तु वामके ॥
 सुप्रभेदागमे चतुस्तिंशतमपटले

However, the described image of Mahesha in the Suprabhedāgama with its Śaiva philosophy would not be effective if sculpted, as it may be difficult for a Śaiva devotee to understand the five tatvas and the Śaktis which create the

Sakalamurti. Indeed, it has to be different from the lilāmurtis of Mahesha which were already elegant and beautiful.

Hence it was only after experimentation that the ultimate manifestation of Śiva as Maheshamurti is observed at Elephanta. It was not merely a dynasty which was responsible for its creation but it was the efforts of the Śaiva devotees which made it possible. In fact at Ganesha leni the artists tried to paint on the ceiling a standing Maheshamurti wherein only three heads are visible.

The Manor plates of Dantidurga³ mention a Brahma temple at Śripuri probably as mentioned earlier, the image, that of Brahma, is now kept in the Chatrapati Shivaji Maharaj Vastu Sangrahalaya, Mumbai, could then be a Sadāśivamūrti and not Brahma. It has well executed jata-mukutas with a row of small curls of hair fringing the Ushnisha or forehead, the necklaces and the yajñopavita.

This could also indicate that probably this cult originated in the south in Mamallapuram and because of the influence of the mercantile class it may have been installed on the Elephanta island. It cannot be Brahma because according to Pauranic mythology, Brahma cannot be worshipped as an independent deity in a temple, though he can be a part of the pantheon. Hence the evolution of the Maheshamurti was of a much later period and its absence is noticeable even in Dhumarlena (Cave No. 29). Incidentally,

only the bust seems to have been portrayed in Maharashtra, unlike at Melcheri, Kaveripakkam in the North Arcot District⁴. He is shown as a seated figure. This image belongs to the later Pallava period, perhaps to the reign of Nandivarman, son of Dantivarman (About AD eight century). Also, Shri Hirananda Shastri mainly guided by a few decipherable letters of a much later inscription on its pedestal, identified it as an image of Sadashiva.

The inscription reads as follows :

नळवारी प्रतिष्ठा शिव रसामिकमि

consecrated by Baladari... Shiva.⁵

However, the controversy yet remains whether this image could then be identified as Sadashiva or Brahma. Certain points in this regard could be discussed.

- a) The pedestal was lying just in front of the image of the sculpture, need not be that of the image
- b) Few scholars think that it could be Brahma because of the presence of the paw of a swan. The mount of Brahma, on this fragmented pedestal may have been a part of the sculpture.
- c) Another argument is that the sculpture is also pot bellied, and Śiva being a yogi is unlikely to be carved as a pot-bellied figure. However the central image of the sculpture represents Tatpurusha with a jatamukuta wearing a yajñopavita as described and referred earlier in Rupamande.⁶ Invariably, on top of the four heads is a representation of a flower, and is adorned with various ornaments, a thick necklace, hollow cast earrings, a torque, and also wears the skin of

an antelope and yajnopavita on his shoulder. Representation of Maheśamurti, is such a form, as mentioned earlier, is also seen in the Maheshamurti found in stone at Kaveripākkam⁷ that is also adorned with ornaments and earrings.

- d) A Eight faced pot bellied image of Śiva was also found in Mandhal of circa fourth-fifth century AD and at present is in the Nagpur museum.^{7a.}

The image is carved in the round only upto the lower part of the neck on the rear side. The artist had carved a smooth vertical slab at the back probably to fix the image on a vertical support. This is the only known figure from Elephanta which is carved in the round and is seen from all the four sides. Hence, it is probable that the sculpture was installed in the shrine for the devotees to do pradakshina or circumambulation.⁸

Though there are various opinion regarding its placement at Elephanta, its installation in the main shrine above the yoni pitha cannot be ruled out, surrounded by his lila murtis before the excavation of the grand Maheshamurti. Similarly if this was the shrine of Brahma at Puri (Gharapuri) which Dantidurga mentions in the Manor inscription, to whom he specially pays homage, then how is it that Dantidurga, an ardent follower of Shaivism, did not mention the majestic Maheshamurti, and how did it go unnoticed? Or probably the Maheshamurti could never have existed? Or surely, one would have seen it excavated in the main Dashavatara cave at Ellora. It would not have been excavated in a side shrine, with Brahma and Vishnu.

The Manor inscription⁹ records the grant of a village, Tambasahika (modern Tamasahi near Manor) in favour of a temple at Sripura. Sripura near Manor is

identified by scholars as Puri or Gharapuri.¹⁰ However, in this regard the researcher would like to point out the vast distance between Manor, an island on the western coast, and Gharapuri located on the east of Mumbai. Why would Dantidurga give a grant of a village near Manor to a temple on the island of Gharapuri? There were many other islands in Sashti. Logically, it would have been difficult to communicate. H.S. Thosar identifies Tambaśāhikā with Tamsai a village in Panvel taluka, Raigad district, and this connection sounds more logical.¹¹ However, the researcher would like to state that an image of Brahma was found at Chakreshwara Temple in Sopara, along with sculptures of Ganesha, Parśvanatha, Viragals and a beautiful statue of Brahma (6'4" x 2') about seven feet three inches long. Brahma is a three headed figure with four arms, with a central face and two side faces, but only the central face has a beard. On the head are jatāmukutas and a yajñopavita with kalisutra and other ornaments. In the right front hand of the image is held a lotus; in the back right hand is the sruk, in the back left hand a kūrcha and in the front left hand a kamandalu. On either side of the figure of Brahmā stands a female

figure, perhaps representing Saraswati and Savitri, apparently carrying in their hands bundles of Kuśa grass. To the left of Brahmā is his vehicle, the swan, and to the right a brahmachari boy. Here the figure of Brahma has a big belly but not a pot belly, which is bound with anudarabandha. A similar image of Brahma of the Chalukya Hoysala style is kept in the Chennai museum.¹²

Other images of Brahma from Aihole¹³ also have a pointed beard. The image of Brahma from the Nagēśvarasvāmin temple at Kumbhakōnam is also identical with the Sopara figure but is without a beard on the face of the central figure.¹⁴ The Rūpamandana gives a complete description of a temple of Brahmā

and mentions its parivara devatas, the dvārapalakas etc. Thus these images and the sculptures of Brahma found at Ellora are different as compared to the image of Sadashiva misinterpreted as Brahma at Elephanta.

Incidentally, at Sopara there is also a presence of Brahma Hill known as Vaka.¹⁵ Though the place is quarried, there are fragments of a Hindu temple. Much research needs to be done on this area. However these stray evidences could prove that probably Dantidurga visited this Brahma shrine near Sopara which was a town known as Sripuri located on a hill identified as Brahma hill. The image now placed in the courtyard of Chakreshwara temple may have originally been on the Brahma hill. This would sound rational because Dantidurga impressed by this temple donated a village grant located near Manor which is not so far from Sopara.

A very rudimentary form of Maheshamurti was found near the Gokak falls in the Belgaum district¹⁶ which is seated in the yogāsana posture and has four faces (of which three are visible) and six arms. The front face is that of Aghora while the two side ones appear peaceful. The hands carry the śula, akshamālā, damaru and a fruit. The Maheshamurti is mistaken as a Trimurti as that of Brahma, Vishnu and Mahesha, However all the three images are adorned with Jatamukuta, if it was Vishnu then he would have had a headdress as of Kirtimukha. Similarly the Maheshamurti is surrounded by these manifestations of lilas, and hence it is undoubtedly the sakala form of Śiba. The controversy whether the central image is that of Sadyojata or Tatpurusha can be verified by the description of the Tatpurusha in the Rupamandanem Tatpurusha is described carrying the Matulunga or the citron fruit.

पीताम्बरस्तत्पुररूषः पीतयज्ञोपवीतवान् ।
मातुलिंगं करे बामे ऽ क्षमाला दक्षिणे मया
(रूपमण्डने)¹⁷

This affirms that the centre figure is Tatpurusha and not Sadyojata.

Evolution of smaller Maheshamurti can be seen by the recent findings of a Maheshamurti in Thane city which has a lot of affinity with the Maheshamurti image made in buff sandstone as is the 117 cm high of 10th CAD, Madhya Pradesh. Incidentally, the wavy pattern of the Jatamukuta is similar to that of the Sadashiva of Elephanta in the same sculptural gallery. Though it is a bust, the belly is very prominent with an udarbandha of a snake. The matulunga fruit in the left hand is very striking. The image is shown with Dampatis on either side flanked by Ganesha on the left and Kartikeya on his right and Brahma and Vishnu on small pedestals on either side, on the top.

This image shows an evolution of small Maheshamurtis and also the popularity of the Mahesha cult in Thane under the Silaharas and its spread into central India. This kind of development of Vishnu is observed in the Śaktimaya-vyuha of Vaishnavism, and is discussed in the Brihad- brahma-samhita. The Supreme Brahman who has neither beginning nor end and who has myriads of forms is termed as Vasudeva. Just as Śiva has lilamurtis, Vishnu too has twenty four forms of which Vāsudeva, Samkarshana Pradyumna and Annirudha are considered to be of special importance for the reason that they make up the Śakti-maya-vyuha.

The Mahayana philosophy also has a parallel wherein the five Boddhisattvas namely Ratnapānī, Vajrapānī, Samantabhadra, Padmapānī and Viśvapānī also possess similar powers and functions.

Probably the growing popularity of Buddhism and Vaishnavism and the evolution of energies from the omnipresent acted as a challenge for Shaivism, for then from Paśupata ideal, evolved the Maheśa cult

which led a human being on the path from Sakala to Nishkalā, leading to the creation of Maheshamurtis in the Rashtrakuta period.

Endnotes

1. Stella Kramrisch - The presence of Śiva 1988 pg 189
2. Suprabhedgama in T. A. Gopinatha Rao op.cit. Reprint Vol Two part II 1993 pg 191-192
3. V.V.Mirashi, IHQ Vol. XXXV pp 183-188
4. T.A. Gopinatha Rao. Op.cit. Fig. CXVI
5. Kalpana Desai. Jewels of the crescent., Masterpieces of Cchatrapati Shivaji Maharaj Vastu Sangrahalaya. 2002. Pg 235
6. Tatpurusha as mentioned in Rupamandan op cit pg 189
7. Plate CXVI in T. A. Gopinatha Rao op cit
- 7a. Michael M. in Discourses on Shiva op.cit. plate No. 38
8. Kalpana Desai Op cit pg 235
9. V.V. Mirashi IHQ op.cit
10. Kalpana Desai Op.cit.
11. H.S. Thosar op.cit. 2004 pg 157
12. T.A. Gopinatha Rao Plate CXLIII fig 2
13. Ibid PL CXLIV
14. Ibid PL CXLVII
15. Thana places of interest Vol XIV op.cit. pp 324-325
16. Ibid CXIV fig 1 and pg 382
17. Rupamandana in Pratimalakshanani of Tatpurusha in T.A. Gopinatha Rao op.cit. pg 189

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Plate No 1 - Mahesha Murti

Front and side view of the Image of Sadashiva, Buff Sandstone Madhya pradesh, 10TH Cent. A.D (Courtesy CSMVS)



1.1 Tat purusha



1.2 Vamadeva



1.3 Aghora

Maheshmurti found in Thane (Kala Dalan)



1.4 Tatpurusha



1.5 Vamadeva



1.6 Aghora



1.7 Maheshamurti in Lankeshwar cave Kailasha XV

Plate No 2 - Maheshamurtis At Ellora



2.1 Jogeshwari leni I



2.2 Jogeshwari leni I



2.3 Jogeshwari leni I

(Incomplete Maheshmurti discovered under debris by the researcher)



2.4 Ganesh leni XVII



2.5 Ganesh leni XVII



2.6 Jogeshwari Leni II



2.7 Jogeshwari Leni II



2.8 Cave No IX A



2.9 Cave No IX A

Plate No 3 – Maheshamurtis At Ellora



3.1 Ganesh Leni II



3.2 Ganesh Leni II



3.3 Painting of Maheshamurti on the ceiling in Ganesh Leni



3.4 Close view of the Painting



3.5 View of Ganesh Leni



3.6 View of Jogeshwari Leni

Plate No 4 - Glimpses of Mahesha Murtis in Ganesha leni.



4.1 Cave No III



4.2 Cave No III



4.3 Cave No V



4.4 Cave No VI



4.5 Cave No VII



4.6 Cave No VIII



4.7 Cave No IX



4.8 Cave No XVI



4.9 Cave No XVII

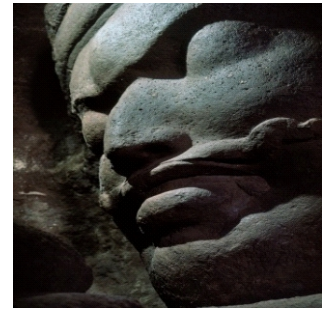
Plate No 5 - Elephanta



5.1 Maheshamurti in Elephanta Cave



5.2 Vamadeva at Elephanta



5.3 Aghora at Elephanta (Courtesy late Dr Walter Spink)



5.4 Brahma, XVI Ellora



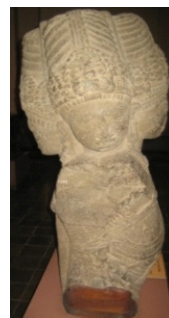
5.5 Brahma, XIX Ellora



5.6 Brahma from Sopara



5.7 Brahma from Kailasha XVI



5.8 - 5.11 Sculpture of Brahma from Elephanta Courtesy CSMVS

The Virtue of Benevolence in Two Zoroastrian Daily Prayers

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Abstract :

The Zoroastrians are enjoined to recite certain formulaic prayers ('farazyaat') on an everyday basis. Among other prayers, the compositions known as 'Yenghe Hataam' and 'Mah Bokhtar Niyaaesh' feature the ethical virtue of benevolence very prominently. 'Yenghe Hataam' is a brief prayer which is usually entwined with the concluding sections of almost all the longer prayers. 'Mah Bokhtar Niyaaesh' (litany in praise of the moon) is one of the five 'Niyaaesh' compositions, which are essentially songs of praise to the forces of nature to whom each Niyaaesh is dedicated.

This paper seeks to observe what two eminent Gujarati translations reveal in respect of the theme of benevolence (a cardinal Zoroastrian virtue) in the context of 'Yenghe Hataam' and 'Mah Bokhtar Niyaaesh' The translations referred to in this paper are extracts from 'Khordeh Avesta Baa Kshnoom Taavil' by Dr Framroze Sohrabji Chiniwalla and 'Khordeh Avesta' by Ervad Kavasji Edulji Kanga.

Keywords: Avesta, benevolence, 'Farazyaat', 'gav', kine, 'Mah', 'Varasyaji', 'Yenghe Hataam', Zoroastrianism.

Introduction

Avesta and Pahlavi are the ancient languages in which most of the Zoroastrian scriptures are composed. An excellent attempt at translation and commentary on the ancient Avestan scriptural writings has been offered during the last hundred and fifty years by several Zoroastrian religious scholars among whom Ervad Kavasji Edulji Kanga and Dr. Framroze Sohrabji Chiniwalla are eminent. Ervad Kanga, illustrious author of the Avesta and Pahlavi dictionary and several volumes of translation and commentary on the Zoroastrian scriptural texts has made ample use of the findings of Western scholars such as Dr. Westergaard and Dr. Haug. Dr. Chiniwalla, disciple of the exegete Behramshah Shroff - doyen of Ilm-e-Kshnoom, (a mystical branch of Zoroastrianism) has written innumerable volumes based on the somewhat esoteric teachings of Ilm-e-Kshnoom. Both scholars – Ervad Kanga and Dr. Framroze Sohrabji Chiniwalla have translated the scriptures from Avesta and Pahlavi into the language of Gujarati.

This paper seeks to observe what the translations reveal in respect of the theme of benevolence (a

cardinal Zoroastrian virtue) in the context of two scriptural texts, 'Yenghe Hataam' and 'Mah Bokhtar Niyaaesh' The translations referred to in this paper are extracts from 'Khordeh Avesta Baa Kshnoom Taavil' by Dr Framroze Sohrabji Chiniwalla and 'Khordeh Avesta' by Ervad Kavasji Edulji Kanga.

Since the scriptures often refer to the elements of Zoroastrian cosmology, a basic diagrammatic sketch (Figure 1) is appended to this paper for quick and easy reference. It depicts 'Hasti', the celestial realm with its nine heavens and 'Nisti', the evanescent world, informed by the seven 'dakhyu' (realms). The mortal world is a part of 'Nisti'. Between 'Hasti' and 'Nisti', is depicted the vast expanse of a certain type of Fire known as 'Atash - e - mino - karko' which divides the two realms.

Two significant terms occurring within the scriptural text 'Mah Bokhtar Niyaaesh'

Dr. Chiniwalla has translated among other prayers, the 'Niyaaesh' (Avesta for hymn in praise of the elements such as the sun, the moon etc.) in worship of Mah Bokhtar, the Angel presiding over the moon. Relevant

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to the theme of benevolence are his in-depth writings on two terms ('geush aevo – daata' and 'geush pouru – saredha') recurring in the Mah Bokhtar Niyaaesh. These terms have a bearing on the theme of benevolence, one of the core teachings of the Zoroastrian faith. The term, 'geush' as also the term, 'gav' literally means cattle or kine. Connotatively, it refers to saintly souls, who possess the blissful temperament and altruistic characteristics associated in literature with kine. The term 'Mah Bokhtar' refers to the Angel, 'Mah', who presides over the moon. Scholars who consider reincarnation to be supported by Zoroastrian theology believe that Mah is charged with the function of leading imperfect souls towards perfection so that they may attain liberation ('bokhtagi') from the necessity of further incarnations.

An account of the terms occurring in 'Mah Bokhtar Niyaaesh' is included in the final appendix to Dr. Chiniwalla's magnum opus, 'Khordeh Avesta Baa Kshnoom Taavil' which is titled, "A Brief Note on 'Geush Aevo-daata' and 'Geush Pouru-sareda' as occurring in the Kshnuman (verse of propitiation) of 'Mah Niyaaesh'". Since there is no English translation of the same attempted yet, I have given one of my own, below. (The diagram accompanying this paper, depicting Zoroastrian cosmology, may be used for reference):

"Mah Bokhtar' has been termed the ruler of 'gava-chithra' which is the cause of 'Nisti-geti' [the manifest world in Zoroastrian cosmology]. The element of light is enwrapped in 'gava-chithra' which is the element of air. Out of this element proceeds the formation of the four elements, 'anasars'. Further, 'chithra' [literally meaning 'seed', loosely translated to mean, 'atoms'] are constantly produced in 'Hasti' (celestial world) and conveyed by Khurshed Yazad (Angel presiding over the sun) to Mah Yazad (Angel presiding over the moon). Mah for its part transforms the 'Chithra' into 'Gav-chithra'. Thanks to this process, despite being essentially immortal, these Chithra although not needing to take incarnation for the purpose of cleansing or perfecting themselves, nevertheless don the mantle of the flesh and enter the evolving universe. Though possessed of power over nature they subject their own immortal nature to the laws of change, travel from 'Hasti' (heaven), to Nisti (our universe), and thus

lay the foundations for Nisti by relieving the suffering of beings on earth. Such are the 'Gav-chithra' created in 'Hasti'. These 'Chithra' are brought down by Angel Mah and dispersed over the wide expanse of a specific type of fire, viz. Mino Karko, which in Zoroastrian cosmology is said to separate 'Hasti' from 'Nisti'. This initiates the processes going on in creation at the level of 'Nisti' and 'Geti'. Whosoever aids in bringing down these 'Chithra' into 'Nisti' and 'Geti' is said to be a 'Hamkar', collaborator, in the task performed by Angel Mah. In the 'Kshnuman' of the Niyaaesh to Angel Mah, such Hamkars are mentioned by the names, 'Geush-cha Aevo Datayao' and 'Geush-cha Pouru Saredayao'.

The term 'Geush Aevo Daata' refers to certain specific laws namely 'Gav-daata' or 'Gavyodad', to be implemented in a special way. Gavyodad or 'Geush Hu-daata' is the Divine entity specifically appointed for this task. This entity is formed through a mysterious process out of the collective emanations of 'Gav' emerging out of the whole of the human race.

The latter term, 'Geush Pouru Sareda', denotes an entity encompassing all classes and categories of souls. Of all the categories, the one ruled by 'Burjis' (corresponding to Jupiter) is the most comprehensive and proficient in bringing to fulfilment all other categories of spiritual attainment. Among these are the 'Nar' of 'Pouiryo – Tkaesh' (an exalted realm) both those who preceded Prophet Zarathushtra and those who followed him.

It was the reign of the Kayani Dynasty which outlasted Prophet Zarathushtra by about a thousand years, till the reign of Emperor Bahman, which gave rise to Pouiryo – Tkaesh Nar who fall under the class of 'Pouiru-Sareda'. These human beings were the epitome of 'Gav', of beneficence, of benevolence, and worked for the uplift of society. They bore no trace of selfishness. They were the 'Peshrav' i.e. pure and perfectly evolved ones who had merely come down to earth to preserve order in anticipation of the advent of Prophet Zarathushtra who would lead creation upon the ultimate path of virtue. Just as Mah Bokhtar is charged with keeping all creation fresh with showers of 'Gav-Chithra', so also, those veritable angels, people of the Pouiryo-Tkaesha class performed the like office

in their time, by filling creation with 'Gav-chithra', the seeds of benevolence.

Even the Gathas, scriptures generally agreed by all scholars to have been composed by Prophet Zarathushtra himself, contain an interesting reference to these souls. A certain verse in Gatha Haiti (canto) 29.3, makes reference to such persons, when referring to the 'peshravs' as 'Avaeshaam'. Here, Geush-Urvaa, the soul of Creation, entreats Lord Ahura Mazda in a sublimely poetic passage, to send upon earth a saviour, lest evil forces should overpower goodness and bring creation to ruin. In such an eventuality, the cosmic cycle of 81,000 years would not stand to see completion.

Such sublime beings as those of the Pouiryo Tkaesh could scarce withstand the onslaught of evil which then pervaded the earth. Even the epic Shahnameh makes reference to the fierce battles waged by the sovereign emperors and stalwart warriors of Pouiryo Tkaesh against the evil peoples so as to defend humanity. All such noble, exalted and heroic persons are mentioned in the Zoroastrian liturgical ceremonies in the first part of the 'namgrahan' (the invocation of worthy souls by name during ritual ceremonies.) Their names are recited immediately after the names of the Prophet Zarathushtra and His Family. These exalted beings are the very ones referred to as 'Geush Pouru-sareda' for their service of pulling down beneficent heavenly influences into the atmosphere of the earth and thus building several 'gubar' (concentrations) of helpful forces. These 'gubars' are believed to shower blessings as an effect of prayers and ritual ceremonies offered by the devotee.

Further, it is observed that the names recited during ceremonies as part of this section of the 'namgrahan' include the stalwarts up to and including the Kayanian dynasty. This is because the Prophet Zarathushtra, who lived during the Kayanian reign, had defeated the demons, wrested from them, their power over creation and secured the sole dominion of humanity upon the earth. The Prophet then transformed the demons into forces who would aid the evolution of human souls. Hence, there was no longer need for the heroes of the calibre of the Kayanians revered and commemorated

by name in the ceremonies. By the end of the Kayanian Dynasty, there needed no further heavenly assistance of their precise calibre and function. Hence the advent of souls of the Pouiryo-Tkaesha category had ceased. However, the significant contribution of those souls is level with the Angels of heaven and includes the building up of enormous reserves of blessings, gifts and 'Gav-Chithra', showered opportunely upon creation.

Just as the Angels work unseen at the cosmic level and are aided in this work when rituals are performed aright, these extraordinary human beings sustain the field of 'Gav-Chithra', where beneficent currents are wrought and kept in force for the benefit of creation. They with their deeds and consciousness which were in keeping with 'Gav' (the virtue of altruism, benevolence, in a word, goodness) built up what were known as 'gaas', powerhouses of spirituality in which invisible 'Pav-Mahel' are erected. On earth, the Fire-temples represent the material form of the Divine 'Pav-Mahel'. The celestial Pav-Mahel so constructed rains down unseen spiritual gifts. This is but one reason for naming these powerful heroes in the course of the ceremonial chants. The names of the departed souls honoured in the course of the ceremony and committed to the care of the stalwart heroes follow those of the Pouiryo-Tkaesha. These as also the souls of other famed personalities and Sassanian heroes are commemorated by invocation in the second part of the 'Namgrahan'. There is a distinction between the first and second section of the 'Namgrahan'. The first enlists names of those who when invoked enhance the positive and beneficent effects of the ceremonies, they being potent collaborators in the task of Mah. The second consists of those named with the intent of offering reverence.

This suffices to explain the connotation of 'Geush Pouru-sareda'. On the other hand, 'Geush Aevo-daat' embodies the Divine and Angelic personality of Gavyodad. The sacred bull termed 'Varasyaji' has a direct relation to this. Hence, the 'Ab-e-zar' [consecrated urine of the sacred bull], a product of the Nirangdin ritual [one of the highest Zoroastrian liturgical ceremonies] functions as 'gav-dat', in that it strengthens the benign aspect of Creation. The Masters of Pahelvi refer to 'Geush Pouru-sareda' with

the words, 'Thora Zakar I Aivikdaat' which connotes the sacred bull as manifested in 'Varasyaji' in the physical world as well as 'Gavyodad' in the unseen spiritual realm. Suffice it to say that Varasyaji, owing to his connection with Gavyodad, is one who keeps 'gav-dat' in motion and so is a veritable Dastur [literally, one who takes and leads by the hand on the path of spiritual progress]."

The Power of Benevolence: A Stepping Stone Towards Perfection

A glance at the above translation of Dr. Framroze Bhiniwalla's note reveals the virtue of benevolence as being central to the cosmic processes as indicated by the terms and references that recur in the Mah Bokhtar Niyaaesh. Also, the passage indicates the symbolic significance of 'Varasyaji' or the sacred bull in the context of taking creation ahead on the ladder of evolution.

Where Ervad Kanga's translation of 'Mah Bokhtar Niyaaesh' is concerned, there is a congruence between the deep connection between Angel Mah, as the 'keeper of the seed of the bull' and 'Gavyo-dad' the human being in whom benevolence predominates. The bull is significant in that it represents the element of selflessness, kindness and benevolence.

'Yenghe Hataam': Those Who are Deemed Worthy to be Adored

Turning to the prayer, 'Yenghe Hataam', we observe a similar emphasis on the life of goodness. The prayer runs thus:

"Yenghe hataam, aat yesne paiti
Vangho Mazdaao ahuro vaetha
Ashaat hachaa yaaonghaam, -cha –
Taas -cha taaos -cha yazamaidey."

Irach J. S. Taraporewalla renders its liberal English translation as follows,

"Those men and women both do we adore,
Whose every act of worship is alive
With ASA, THE ETERNAL LAW OF LIFE;
Who are in sight of Mazda Ahura
As best and noblest mortals recognized; –
These are the truest leaders of mankind."

(*The Religion of Zarathushtra: 91*)

Ervad Irach Taraporewalla explains that for the term, Asha, (a central Zoroastrian ethical tenet) the closest equivalent in meaning is the word, 'righteousness'.

Ervad Kanga does not include a separate translation of '*Yenghe Hataam*' in his compendious work, '*Khordeh Avesta*'. However, in a footnote to his translation of the short prayer, '*Ashem Vohu*', Ervad Kanga makes a few observations regarding '*Yenghe Hataam*'. He points out that according to the scriptural verse of Yasna 21, '*Yenghe Hataam*' was a prayer composed by Prophet Zarathustra. In the chapters of the Yasna, an important Zoroastrian scriptural text having 72 Haiti (cantos), this prayer, 'Yatha Ahu Vairyo' and 'Ashem Vohu' all together are termed the Baghan Yasht. He notes that all three prayers have been eulogised in Yasna 61.

Dr. Framroze Chiniwalla, in his commentary accompanying the Gujarati translation of the original Avestan prayer, '*Yenghe Hataam*', mentions that taken together, these three basic Zoroastrian prayers form a triad. Firstly, he looks upon these prayers - 'Yatha Ahu Vairyo', 'Ashem Vohu' and '*Yenghe Hataam*', as conscious entities and claims that they give rise to certain effects upon the psyche of one who recites them with faith. He likens 'Yatha Ahu Vairyo' to the ocean which has to be crossed on the evolutionary journey. 'Ashem Vohu' is compared to the trusty vessel which bears us mortals across. He adds that it is '*Yenghe Hataam*' however, which offers solace and healing when the lessons on life's journey become stressful. It works as a soothing balm and liberates from excessive travail. Dr. Chiniwalla notes that '*Yenghe Hataam*' suggests that communion with righteous men and women, known by the Divine to be worthy of worship and emulation proves beneficial to the spiritual aspirant.

In this way, various interpretations and commentaries provided by the translators of these prayers point to the importance of benevolence as a cherished virtue as taught in these two Zoroastrian scriptures.

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Figure 1 : Zoroastrian Cosmology.
(Thus Spake the Magavs: 10)

Forest Policies in Ancient India

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Abstract :

Ancient Indian wisdom regarding forest wealth is in abundance. Due to this knowledge, the forest wealth was well preserved and wisely used in ancient India. One of the primary reasons of the British conquering India was the rich forest wealth, which was looted and destroyed by the British. However, modern India has forgotten the ancient wisdom of revering and preserving forests and forest wealth. This paper attempts to explore and document the ancient knowledge and practices to preserve forest right from the Vedic age till Shivaji's rule. It also highlights the importance of going back to the ancient wisdom to secure our future.

Key words: Forest wealth, wild life, commercial use of forest, conservation, environment.

Before the industrial revolution, India produced about 25 percent of the world industrial output. India through its decentralized guild-based production was using its own raw material and the economy was far more equitable. This was the reason for the race to reach India through land and sea routes. However, the Industrial Revolution changed the entire scenario as the European industries now looked for sourcing just raw material from the entire world. Within a span of a century, the consumers of Indian goods became producers of similar goods. As these traders took up the political reins of India a systematic approach was implemented to de-industrialize India, (Clingsmith & Williamson, 2004)

As these traders gradually took the political reins of India a systematic policy was pursued to de-industrialize India and to convert it into a mere source of raw materials. The resultant destruction of India's production capabilities and loss of livelihood triggered red famines on a gigantic scale. In his compelling book titled 'Late Victorian Holocausts', Davis, (2000) states that 'the great famines are the missing pages-the absent defining moments, if you prefer - in virtually every overview of the Victorian era. Yet there are compelling even urgent reasons for revisiting this secret history. What seemed from a metropolitan perspective the 19th century's final blaze of imperial glory was, from an Asian or African viewpoint, only the hideous light of a giant funeral pyre.' Thus, the recent researches are now turning attention to these issues.

Similarly, how imperialism usurped the natural resources of India and changed the character of forests is well documented. The forests underwent further transformation through the sale of large forested areas for the development of tea, coffee and rubber plantations. The plantation economy itself had a high level of timber demand for fuel and packaging, (Gadgil and Guha, 2000).

Objective

A lot needs to be understood about how Indian civilization used its natural resources before the entry of colonialism. The present paper is an attempt to systematically produce various evidences on the use of natural resources from ancient India to the pre-colonial period. Such an understanding might help in developing the sustainable resource use policy for India. Instead of relying upon the west for guidance in forest conservation and forest use, we need to go back to our ancient traditional knowledge.

Methodology

This study is conducted relying on secondary sources. Various archival resources, books and research papers written by Indian and foreign authors were referred to and information was collected from the same. The aspects covered range from Pre Vedic to Shivaji's rule i.e. 17th Century. Although the information is very expansive, due to the prescribed word limit the researcher has given a brief account of various periods, covering policies pertaining to flora and fauna over the years.

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Forest Wealth and Awareness in Ancient India:

Pre-Vedic Period

In the Harappan civilization a remnant of Chalcolithic civilization also people were using four different varieties of wood for different purposes. [Archeological Survey of India- Vol 1-17] The objects found at the excavation sites give ample proof of the existence of the use of forest wealth by a civilization which may have also been worshipping the forces of nature. Animal carvings on seals and other objects like terracotta icons with monkeys and squirrels have been found. Animals like the bull, elephant, tiger, rhinoceros etc. are also found depicted on many objects. A seal discovered in the excavation at Mohenjodaro, Indus Valley Civilization, (3000-1700 BC) also suggests worshipping the Peepal Tree, (Kumar, 2008). The oldest record of wood use in India is from the Harrappan civilization. The wood of Deodar and Rosewood was used for coffins, and for pounding grains, wooden mortar. The charred timber recovered from Lothal, in Gujarat, was wood which is good for burning. Thus, it is evident that people in the Harrappan civilization not only used wood, but were as well aware of the quality of these timbers as modern-day people. [Archeological Survey of India- Vol 1-17]

The Vedic Period

"The Rigveda describes forests as "Aranyani" or mother goddess who takes care of wild life and ensures availability of food to man," (Rawat, A.S, 1991) The Vedic literature revolves around nature and life, (Tiwari, 2009) and the Vedic hymns are a reflection of the life and thoughts, rich experience and awareness of the sages which guided the lives of the people, (Pandey & Pandey, 1991).

According to several scholars the Vedas are basically scriptures on cosmology, providing a simple form of Nature-worship, highlighting the importance of Mother Nature and its vital role in human life, (Tiwari, 2009)

All the four Vedas in one form or the other refer to the significance of the forest and medicinal value of the plant species. The Rig-Veda instructs that forests should not be destroyed and the Atharva Veda talks about the relation of plants with the earth, 'The earth is

keeper of creation, container of forests, trees and herbs.' It believes that plants are live. There is an important quotation in the Puranas which says, 'One tree is equal to ten sons.' The Atharva Veda prays for the continuous growth of herbs, 'O Earth! What on you, I dig out, let that quickly grow over.' And another prayer says, 'O Earth! Let me not hit your vitals,' (Tiwari, 2009)

As mentioned earlier one of the most outstanding features of Indian philosophy is its theory of cosmic relativity. It is astonishing to find that thousands of years ago our scholars knew about the universe, the earth and the cosmic connection between all. As per this philosophy every object existing not only on the earth but in the entire universe is "intrinsically related and integrally balanced as part of the cosmic whole," (Rawat, A.S,1991) Not only does it acknowledge the interrelation of all beings universally but also has the ancient tradition of venerating nature. "Although different phenomenon was given different name such as Varuna, the protector of the eternal laws of nature, Indra, the God of war and rain, Agni the fire, Surya the sun, Usha the dawn, but these are all considered as reflections of one and the same god- the Brahma." The plant life as a whole was called Vanaspatridevta-the vegetation god, [Atharva Veda Samhita, chapter six] (Rawat, Anil, 1991)

The importance of forests in community and individual life can be understood by the Vedic tradition that a village would be considered as complete only if certain categories of forests and vegetation were preserved in and around the village, such as Mahavan, Shrivan and Tapovan, (Kumar, 2008). In the ancient tradition, life was divided into 4 stages, Brahmacharya, Grihastha, Vanaprastha and Sanyasa. The first stage Brahmacharya Ashram was the first 25 years of a man's life, spent in the Ashram of a Guru, which automatically inculcated the value of conserving forest wealth and acknowledging the role of the forest as provider. The ashrams of sages developed the concept of preserving forests and wild life, as they were in the middle of the jungle. The forests were regarded as "abodes of Spiritual solace". It was for this reason that in the third stage of life, the Vanaprastha Ashram, the man along with his wife would go to the forest and live there, and in the last stage, Sanyasa Ashram one had to go to the forest and spend the rest

of his life in meditation in the forest, (Pandey & Pandey, 1991)

The forests, thus, were considered as the source of spiritual and intellectual guidance, whereby the person living in the midst of the forest, amongst the trees, birds, animals, rivers and mountains learnt the lessons of co-existence and interdependence of “all forms of life.” The Aranya Sanskriti or forest culture propagated by the Ashrams gave the basic understanding of the ecology and eco system, thus all the living beings were treated with reverence in Indian culture, inculcating the value of preserving forests and wild life, (Rawat A. S, 1991)

Repeated references to forests are found in Vedic texts compiled between 1400 and 700 BCE onwards. Vedic literature poetically depicts the natural environment, linking the sacred Himalayas, abode of the gods with the holy river Ganga, identifying the forests as the home of great sages, (Proffenberger, 2000). It was a well-established fact that trees not only give shade and foliage but also pure air, which is very important for human beings and hence revering and preserving the forest was very crucial in human life. The Indian sages had very deep knowledge of the secrets of the nature and they were aware of the fact that if the balance between nature and its surroundings is not maintained their happiness would be lost. Modern science also accepts the Indian viewpoint of preserving and maintaining the ecological balance, (Nautiyal, 1996). It is interesting to note that rather than preaching about these findings, they were interwoven in the daily lives of the common man through religion, customs etc. Tulsi, (*Ocimum sanctum*: sacred basil), a highly valuable medicinal plant, which is grown in every household in India even today, is a clear example of religion and culture used to protect, conserve and reproduce resources for human sustenance, (Kumar 2007). In their daily watering and worship women renew the relationship of the home with the cosmos and with the world process.

Plants for Medicine

The Rigveda (5000 BC) mentions 67 medicinal plants, the Yajurveda 81 species, the Atharvaveda (4500-2500 B.C.) 290 species. Charak Samhita (700 B.C.) and Sushrut Samhita (200 B.C.) had described

properties and uses of 1100 and 1270 species respectively, and some of these are still used in the classical formulations, in the Ayurvedic system of medicine, (Joy et. al. 1998)

During the Vedic period medicinal plants were of great importance. “Madhu manno Vanaspati” – sweet as honey are our plants – was sung in praise of the trees. In the later Vedic and epic period also, there is description of dense forest areas in the Gangetic region. Sugriv in the Ramayana had a well-protected forest Madhuvan and had appointed a protector Dadhimukha. In Mahabharata there is mention of forests in Indraprastha. Hastinapur was situated in Kurujangala. There were plantations known as “Oshadhivan”, Devadaruvana and Kadalivana, (Upadhyaya, 1991) The epics of Ramayana and Mahabharata refer to the beauty of forests, with description of different types of forests like the Dandakaranya, Ashok van, groves of Kadamb etc. In the Vishnupurana there is evidence of 13 important forest areas, divided into two classes 1- Kunjavarna or dense forest which can provide shelter to the elephants and 2- Kantakavan- thorny or open forests, (Upadhyaya, 1991)

Wild Life in the Vedic Age

Since the Vedas believed in the cosmic connection between all the living beings, wild life was also considered important in human life. In Hinduism there are many mythological stories, Vishnu, the Preserver has reincarnated as a Fish, as a Tortoise and a Boar, to save the world from destruction. The avatars or incarnations of Vishnu also represent the process of evolution. It is believed that life first began in water and then on the earth, animals precede humans. Hence the first avatar of Vishnu was as Fish, the second as tortoise, living both inside water and on earth, the third was as a boar, an animal, the fourth was Narsimha, part human and part animal. Many Hindu Gods and Goddesses mount on animals, such as Vishnu - Garuda, Śiva - Nandi, Ganesh - Mouse, Kartikeya - Peacock, Saraswati - Swan, Durga - Tiger. Thus, there is an important role played by the animals / birds along with Gods in religious mythology, signifying the interconnection and significance of other living beings. The Rig-Veda classifies them into three groups -sky

animals like birds, forest animals and animals in human habitation, (Rawat, A 1991, Tiwari, 2009) In India it is traditionally accepted that all living beings are interrelated and interdependent. This mind set is well understood by the fact the “Ashokan lion is our national symbol, along with the lotus, peacock is our national bird and sacred groves exist in most parts of our country,” (Upadhyaya, 1991).

Thus, there is enough evidence that conservation and preservation of forests and other living beings was a part of our tradition, culture and was deep rooted in the civilization of India. It is a wrong impression that Indians were introduced to forest conservation by the British, through Germans and water conservation was a gift of the Americans, (Pandey & Pandey, 1991).

Post Vedic Period

The Post Vedic period, though not as systematically documented as the Vedas, also had dependence on forest. The role of living beings other than humans was not undermined in the post Vedic period. With the advent of agricultural activities, the clearing of forests became a necessity. However it was due to the knowledge of importance of forests, that the concept of sacred groves, sacred corridors and a number of such other ethno-forestry practices evolved, which continued in the post Vedic period (c 1000 to 200 BC), (Kumar 2008) It was through various Religious customs, traditions, rituals and taboos that the forests, wild life and such other natural wealth was preserved, protected and regenerated in ancient India.

The manuscript of Vrksayurveda, of Parasara, is proof that development of plant science was a separate branch of knowledge, possibly during the post- Vedic period and before the beginning of the Christian era. The Vrksayurveda is a full treatise on plant science written by Parasara. It possibly dates back from the 1st century BC or 1st century AD. It is believed that Vrksayurveda forms the basis for botanical teaching preparatory to pharmaceutical studies in ancient India, an arrangement comparable to modern practice, (Rawat, Anil, 1991)

It is important to note that the culture of worshipping the natural forces, forests and wildlife did not start out of fear be it religious or social. It was an outcome of the

deep research which propagated a belief system that one must integrate human life with all other elements so that a harmonious relationship is developed between man and the universe. The Indian cosmic theory holds the bio sphere as a living organism. The ancient scholars believed that plants and trees had life almost similar to that of human beings. The Brihadaranyaka Upanishad describes a human body as that of a tree, comparing different parts of a human being with that of a tree. “Charaka and Susruta divide land into different regions according to the nature of the soil, climate and vegetation,” (Rawat Anil, 1991)

One must acknowledge the fact here that although since the Vedic age natural resources were used for all practical purposes there were no tendencies of large-scale exploitation or commercial use of the forest produce. Thus, for centuries the Indian population was self-sufficient as the demands of fuel, fodder, food, shelter and other basic requirements were fulfilled by the resources available. The self-sustainability of nature was also perpetuated due to the respect for natural forces ingrained in the Indian ethos.

With compassion and non-violence as its main foundation, Jain and Buddhist discourses are essentially along the same lines. For example, the Jain scriptural maxim 'Parasparopagraho Jivanam' (all life is bound together by the mutual support of interdependence) and Lord Mahavira simplifying the ecological truth as 'One who neglects or disregards the existence of earth, air, fire, water and vegetation disregards his own existence which is entwined with them.' And Buddha's discourse seeks it from a different yet similar perspective, 'Because the cause was there, the consequences followed; because the cause is there, effects will follow.' Thus, before the Mughal invasion the wildlife in India enjoyed protection through religious myths and social legal rules and norms, which were a part and parcel of the Indian culture and tradition.

The Arthashastra and Mauryan Empire

From the description of the Mauryan Empire in the Arthashastra of Kautilya, Indika of Megasthenese, Mudra Rakshasa of Vishakhadatta and the inscriptions of Ashoka, there is definite information about the efforts towards forest management.

Chandragupta Maurya had a forest department administered by the Kupyadhyaksha [superintendent of forest products], (Upadhyaya, 1991)

The "Arthashastra" which literally means a 'Scripture of Wealth', is a treatise on politics and economics, was written at the end of the 4th Century B.C. by Kautilya. He was also known as Chanakya and Vishnugupta. Kautilya is India's most illustrious political economist of all time and he was the mentor of Emperor Chandra Gupta Maurya. Edicts and proclamations in the Arthashastra bear ample testimony of Kautilya's perception and concern about the living creatures, both wild and domestic, and plants and vegetation. Injuring animals, domestic or wild was considered as a punishable crime. The issues concerning environmental conservation in Arthashastra may be classified as (i) Natural set-up and resources comprising land, forest, water and mineral etc. (ii) biological environment comprising animals and aquatic life, (iii) Physical environment comprising floods, droughts etc. and (iv) human society including hygiene, famines, civic responsibilities and human rights etc. There were provisions for special high posts such as director of forests, supervisor of animal slaughter, superintendents of cattle, horses, elephants and pastures. Anarchic lifestyle, indiscriminate modes of waste disposal or disregard of the consequences of careless activities were infallibly recognized. Means to avoid all these eventualities were indicated in edicts for observance by every citizen, for violation of which penalties and punishments were proclaimed and for implementation of the dictates, officials were arranged, (Sarma, 1998).

The Arthashastra gives a detailed account of the organization and management of the forest department or department looking after forest produce, thus the non-timber forest produce was used as well as managed by the state. The head was the Adhyaksha, assistant was the Kapyadhyaksha (superintendent) followed by Vanapalas (forest guards). It was their duty to ensure increase in forest productivity, pricing of products, classification of logs, timber, bamboo, medicinal plants etc. They had to maintain law and order and impose fines for any illegal activity and trading of wild life products, (Ghosh,

1993). In the Arthashastra, a superintendent of forest products (Dwivedi, 1980) was appointed to collect timber and other forest products. He was also to fix fines and compensations from those who damaged the productive forests in any way. A special superintendent was also appointed for the slaughter houses, who ensured that no one killed, trapped or caused any harm to the bison, birds, fish, elephants, horses, bulls, deer and asses, as all of these were declared to be under state protection. The violators were severely punished. The butchers were prohibited from slaughtering milch cow, calf, and bulls, (Rawat, A. S, 1991)

Often referred to as a guide to Political Science and Fundamentals of Management, Arthashastra also provides insights into assessing and enhancing the capacities of the states in managing the adverse and disastrous situations due to natural or manmade reasons. Arthashastra elaborates on the elemental features of a 'sovereign society' (Deshkar, 2010). The Arthashastra gives the legal classification of forests, naming the three main classes of forests as Reserve forests, forests donated to eminent Brahmins and forests for public use. Special areas were allocated in the forests for ascetics and the schools of Brahmins, learned in the Vedas. There were rules and regulations for preservation, hunting, using forest exploits, and collection of revenues from forests. Some forest laws mentioned in the Arthashastra are comparable to present laws.

Thus, there was proper planning and deep thinking in forest management as there were categories of forests. There was a programme of afforestation and there were 18 different forest laws. There were wild life preservation laws and game laws. There was prohibition on hunting and trapping in the reserved forests and the violators were given strict punishments. For example, one rule was to give death sentence to the elephant killer. Thus, the management of forests was a well-developed branch of management and administration in the Maurya dynasty, (Banerjee A K, 1966) It is believed that since Kautilya was the mentor of Chandragupta Maurya, the first Emperor of India, most of the provisions and systems of laws were implemented in the Maurya dynasty.

After Chandra Gupta Maurya, Emperor Ashoka adopted the practices of Arthashastra. He introduced many more policies for improvement in forest management. Most of these laws were continued by Ashoka, but in 243 B C he abolished the practice of the royal hunt. Ashoka, as a follower of Buddhism, implemented the tenet of Ahimsa. He created Abhayaranyas for wildlife preservation, where hunting and gaming was prohibited. He also emphasized on plantation of trees for the benefit of travelers and commoners. Plantation of fruit bearing and shade giving trees on travel routes was initiated by the state. Thus, Ashoka was the founder creator of 'Abhayaranya' (protected forest), which are presently also termed as National Parks and Sanctuaries, (Pandey & Pandey, 1991). To make the general public aware of his views and his State policies, Ashoka's edicts were inscribed on rocks and pillars. A total of 33 such rock edicts have been found throughout the areas of present-day Bangladesh, India, Nepal and Pakistan and represent the tangible evidence of the policies of one of the most powerful kings of Indian history. Thus, during the Gupta period (320-800 AD) forests were in abundance, they were well preserved and nurtured. In fact, many of the forest policies of the Ashoka government were continued in the Gupta period.

After the disintegration of the Mauryan Empire in the second century B.C., India was subjected to a series of invasions from its northwestern border between 200 B. C. and 300 A.D. The invaders became "Indianized" in the process of their conquest and settlement.

Records of forest wealth by the foreign writers:

When at war with Porus, Arrian from Alexander's army found out that the Indians had a rule that war ought to be waged so as to spare the productive environment and those who were responsible for its care. Even if there was an internal war amongst Indians the law was not to even touch the land workers or to devastate the land itself, (Hughes, 1991).

The Indica of Megasthenes (305 BC), who came from the Greek king of Syria as an Ambassador to the court of Chandragupta Maurya, (Sinha & Ray, Nishit, 1986) gives details of a variety of wild life, rich and fertile soil,

rich in growth and vegetation, (Singh K.N, 1978) Scylax of Caryanda, a captain of a ship from Greece was sent by the Persian emperor Darius I to explore the Indus River and the Indian Ocean beyond in about 509 BC. He described the landscape, flora and fauna along the Indus and wrote that there are high mountains on sides of Indus River, covered with virgin forests. Then there are descriptions of India in Alexander's writings. According to Diodorus Siculus Alexander has described India having 'lofty mountains that abound in trees of every variety... remarkable in their beauty and supplied with water by a multitude of rivers.' Trees like banyan, bamboo, food plants and cotton were specially mentioned. There is also description of elephants, snakes, monkeys, lions, tigers, crocodiles etc. The 4th century BC travelers have noted forests of India as place for shelter, fuel and resources for ship building. The historians have mentioned 'remote tree clad mountains,' and 'well shaded wood.' Strabo maintains that this forest was in the Himalaya foothills. The Chinese traveler Huien Tsang, who visited India during the Gupta Dynasty, 629 AD to 645 AD describes dense forests in the North West region of Kashmir and Punjab, foothills of the Himalaya, the East and South had dense forest covers, (Ghosh, 1993)

Medieval Period (1000-1700)

The medieval period began with a succession of invasions by Arabs, Ghaznavis and Ghoris from the west culminating in the establishment of the Delhi Sultanate (1206 - 1526). This period was followed with the founding of the Moghul Empire (1526-1850). As the Islamic invaders moved across India, many Hindus took refuge in more remote forested areas, clearing the land for agriculture. More elaborate feudal structures were established for revenue collection from both agricultural as well as forest reserves. As the economy expanded during this period so, too, did trade in forest products, (Priffenberger, 2000)

Wildlife in the Medieval Period

In 1271 AD, Marco Polo, a traveler from Venice came to India. In his memoirs he has written about various wildlife of India, like the elephants, rhinos, striped big cat etc. In 1526 Babur founded the Mughal Empire in India. In his memoirs Babur Nama, he has written in

detail about the wild life in India. Besides this the Aina-i-Akbari by Abul Fazal is also a great source of information on the Indian wildlife, flora and fauna during the Moghul rule in India. Jahangir in his memoirs the Tuzuk-i- Jahangiri also describes the Indian wildlife, (Rawat, Anil, 1991)

The Mughal Period

The whole process of forest preservation and forest management suffered a setback when foreigners started invading India. The wanton destruction of forests 'increased in the Mughal rule and reached its peak during the British rule.' Large scale forest clearing was done for agriculture and to prevent dacoits from taking refuge in the forests. The only forests reserved were for game hunting, (Pandey & Pandey, 1991) Under the Mughal rule peasants were encouraged to cut the forests and extend their cultivable land area as the Mughals largely depended upon the taxes collected from the agricultural produce and land revenue which was collected in cash. Thus, the larger the land holdings, the better the tax collection for the government. Many prosperous landholders undertook this task in order to extend their Zamindari rights and personal revenue base, (Singh, C, 1991)

Mughal government policies encouraged the clearing of forests as a way to establish more taxable agricultural lands. The toll that this agricultural expansion placed on forest resources is reflected in historical documents. While trees were often abundant in the cities, the countryside was widely deforested to allow the expansion of cultivated lands. "The scarcity and dearness of fuel wood was, therefore, obvious in such areas, and the poorer people were compelled to use cow dung, mixed with straw and dried in the sun." Francisco Paleasert, The Remonstrantie of Francisco Pelsaert, translated from the Dutch as Jahangir's India (1925) pp 8, (cited in Singh, C, 1991)

Parts of areas that currently form India, Nepal, Sri Lanka, and Bangladesh fell beyond the Mughal realm and were governed by local Hindu rulers or by indigenous tribal communities. In the more remote, dense forest tracts tribal people managed the forests

for hunting and gathering, as well as practicing long rotational cultivation. Trade in non-timber forest products such as resins, gums, honey, wax and medicinal herbs was an important component of the economy. Thus, during the Mughal period in the 16th & 17th century A.D. there is no special mention of attention paid to the forest preservation. The medieval rulers of India typically viewed the forest as state domain. However, for the most part, they were also cognizant of the customary rights and needs of their villagers.

Edict of Shivaji 1670 AD

In the 17th century, the Maratha king Shivaji had ordered his officers never to cut a mango and jackfruit tree for his shipyards or for any other purpose because these trees have been preserved and nurtured by the peasants for generations, (Gadgil, 1991) However our modern governments do not hesitate to cut the mango trees and give to the plywood industry at a very subsidized rate, less than what its fruit would give the farmer for years, (Gadgil & Chandran 1989)

The 1670 edict of the Maharashtrian ruler King Shivaji reflects this perspective

There are trees like teak in our Kingdom. Such of these as are needed may be cut with the permission of His Highness. What is needed over and above this should be purchased from outside. The mango and jack trees in our own kingdom are of value to the Navy. But these must never be touched. This is because these trees cannot be grown in a year or two. Our people have nurtured them like their own children over long periods. If they are cut, their sorrow would know no bounds. An end achieved by harming one person can serve only in the short run. Rather it would bring ill repute to the ruler who hurts the citizenry. Furthermore, there is grave danger in the loss of tree cover, (cited in Gadgil, M, 1991)

While much of India was cleared of forests during the medieval period, large tracts of forest remained intact, especially in upland watersheds. As timber became scarcer in the lowland agricultural plains, logs were transported from the mountains and hill tracts for use in house construction, boat building, and as a source

of quality fuel for lime kilns and iron workers. For example, timber from the hills was floated down the Chenab River to Wazirabad to supply the boat building industry. In Kashmir, lime pits eight feet in diameter required 2,000 logs and 16 days labor to properly heat one batch thoroughly.

Local use of the forests in the Himalayas also had considerable impact on tree cover. In 1824, in the Indian hill district of Almora, British visitor Bishop Heber noted that:

Great devastations are generally made in these woods, partly by the increase of population, building and agriculture, partly by the wasteful habits of travellers, who cut down multitudes of young trees to make temporary huts, and for fuel, while the cattle and goats which browse on the mountains prevent a great part of the seedlings from rising. Unless some precautions are taken, the inhabited parts of Kemaon will soon be wretchedly bare of wood, and the country, already too arid, will not only lose its beauty, but its small space of fertility. [8] M.A. Laird (ed.) Bishop Heber in Northern India, (Cambridge, 1971) (cited in Singh, C, 1991)

Historical analysis indicates that there was a rapid increase in timber extractions from the Himalayas to the plains of South Asia between the seventeenth century and the early decades of the nineteenth century. In Kirkpatrick's account of his trip to Nepal in 1793 there are frequent references to "wood-dealers" and "wood-merchants" and he notes that logs from the Terai plain are already being shipped to Calcutta. Revenues from timber from a single Terai district were the second largest source of income for the Nepal Government in 1809, (Singh, 1991)

The development of the railway system resulted in large scale felling and deforestation, literally looting the forest wealth of India.

Conclusion

In conclusion I would like to say that it is well established that as far as conservation and the environment are concerned, Indian civilization had achieved the sophistication and advancement which

the west is trying to propagate in the 21st century. Our sages and scholars had identified the fact that we are a universe in which everything is interconnected and interdependent. They understood the value of forest wealth and propagated responsible use of forest wealth. The concept of wild life sanctuaries, national parks and reserve forests were well known in ancient India. Unfortunately, the credit is given to British for introducing the concept of wildlife conservation.

The forest wealth was well preserved and the trend of protecting forests and responsible use of forests was known in pre-historic India, it continued during the Vedic period, Mauryan period, till little before the Moghul rule. During the Moghul rule, nothing of significance was done to protect the forest wealth. However, it was the British administration which introduced the commercial use of forest, resulting in large scale deforestation. The extent of exploitation of natural and human resource, during the British rule and its impact is well summed up by Davis, in one sentence, ie, 'If the history of British rule in India were to be condensed into a single fact, it is this; there was no increase in India's per capita income from 1757 -1947', (Davis, 2000). It is unfortunate that the legacy of the British exploitative forest policies continued to some extent in independent India also. It is of prime importance that we should value, nurture, protect and preserve the natural wealth and reconnect with our ancient wisdom and knowledge.

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Ethics, Myths and Sculptures - A Case study of Śiva Sculptures of Kambatthadi Mandapa

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Abstract :

Known in annals of historical sources from the earliest times the city of Madurai the capital city of the Pandyan kings has played a pivotal role in the historical and cultural life of the period. In the Sangam Literature Madurai is called Koodal, Naanmaada. However, the most important aspect of this city is the majestic Madurai Meenakshi temple. The temple which is dedicated to Goddesses Meenakshi and Lord Sundāreshwarar is a treasure house of sculptures and mandapa which reflects unique and distinctive architecture.

The Kambatthadi Mandapa built by Krishna Virappa Nayakar (1572- 1595 CE), is famous for depicting the twenty five forms of Lord Śiva. It will not be a wrong observation, to state that, Art, in our country, has a vital and a vibrant presence/impact, along with being a tangible manifestation of a thought, which believed in holistic and all-round integration. My paper, by studying the stories/mythological stories behind the sculptures, will reflect on the Rasa-anubhiti which was to trigger Madhura Bhakti in the seekers. In the larger context through the stories the aspect of Purusharthas was also emphasized.

Keywords : Śiva, Madurai, Meenakshi, Myths, Purana.

Before the deliberation on the tenets of Indian aesthetical tradition and its interface with the arts is studied, it is also necessary to document the larger context that triggered the very genesis of Art itself. The birth of the artistic creativity in our subcontinent is in fact a very tangible reflection of the integral and holistic thought process of inclusivity and respect. This idea has shaped the cohesive and very vibrant aspect of our Ancient, but living culture. The rich resources of Literary and Archaeological sources in our subcontinent enshrines a sublime thought and that it, that it has not been created to address emotions at a very superficial level. There was nothing in the space of socio-political or religious paradigms, that was taken for granted or carried out in a haphazard way. There was a systematic, logical and purposive idea behind every creation- thought, word and deed.

One reason for this deep deliberative thought was due to the sublime impact of geography. As S. Radha Krishnan says "Fate called India to a spot where nature was free with her gifts and every prospect was pleasing. When we do not need to waste our energies

on problems of life and earth, exploiting nature and controlling the forces of the world, we begin to think of the higher life and how to live more perfectly in spirit. The pleasure of understanding is one of the purest available to man, and the passion of the Indian, for it, burns in the bright flame of the mind."ⁱ

There was a consistent quest, a search to find out the cause of all causes and its relevance in our lives. There was a synthetic vision to understand the innate essence of creation. "Ātmānaṃ Viddhi" 'आत्मनम् विधी' becomes the bedrock of the studies.

The creations of art, both in the Static and Dynamic modes, are a visible result of this enquiry. "Vitality, stability and immortality are got by any civilization due to its works of art as they lend a sense of coherence and stability in the constant flux of things. Human passions, desires, ideas and fantasies, with all their ebbs and flows, suddenly find a vivid condensed and patterned form of expression that flashes out as something enthralling, significant and permanent amidst the disruptions and conflicts of daily life."ⁱⁱⁱ

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Among the various sites in India the city of Madurai which is one of the oldest cities in South India reflects this blend has enjoyed a continuous history which could be traced back to pre-historic times. Politically Madurai was the capital of a single dynasty – the Pandyas. One classic example that reflects this blend is the classic Madurai Meenakshi temple. In the Puranam known as Halasya Mahatyam or Thirūvilaiyadal narrates the sixty-four Leelas performed by Lord Śiva.

According to the legend, Śiva as Sundareswarar is said to have married Goddess Meenakshi the daughter of a Pandyan king. The Meenakshi temple was constructed in 1370 CE by the king Thirumalai Nayakar. This temple has many Mandapams or corridors like the famous Kilikatti Mandapam, Kambatthadi Mandapam, the thousand pillar Mandapam and the Pudu Mandapam.

The Kambatthadi Mandapam is also known as Kodikkamba Mandapam, Sundareswarar Mandapam or Dhvajasthamba Mandapam. This Mandapam is very creative as it has the large group of iconographic sculptures on exceptionally high ceiling. According to Thiruppani Vivaram this Kambatthadi Mandapam was built by Krishna Virappa Nayakar -1572-1595 CE.ⁱⁱ

The Madurai Meenakshi temple is a classic example that shows how contemplation, imagination and intuition, combine to create the artistic creations, so that man can be in sync with nature and its cosmic rhythm. So, art finds an expression when this stability in relation to the environment is reached. This takes the seeker to a reflective level that results in creations that stir the depths of the inner-being and trigger a new journey, which is beyond the trammels of the monotony of life and existence. Every Ancient civilization developed certain norms that enabled them to reach an equilibrium and peace, amidst the chaos and confusion created by the pace of historical progression.

However, in this discourse it is Lord Śiva who plays a very significant and a seminal role. In the earliest references the deity known as Rudra became Shiva.

“The genesis of the God Rudra or later known as Śiva, is difficult to spell out.” Rudra was the red god of storms and lightning and Rudra became associated with fire or Agni. Śiva’s antiquity went back to the Vedic times where the main source of his power was yoga or meditation. Śiva was the bringer of fertility and was the auspicious. The personification of Lord Śiva signifies his various forms and the genesis of the same is documented in the earliest literary sources Taittirīya Samhita, Yajurveda, Vāyu purana.

Among the various vibrant sculptures in the Madurai Meenakshi Temple the sculpture of Nataraja depicts very evocatively the essence of Śiva or Nataraja being seminal to the genesis of Rasa. This brings us to the understanding of Rasā. Rasā has been described in the Upaniṣads as the ultimate emotion for which the entire mankind exists, lives and strives. Ānanda आनंद (bliss) is the nature of this rasā. This Ānanda is the basic essence of the human life.^{iv} Rasā, is imbued in the experience of the connoisseur in the essence of a poem or a dramatic performance which imparts aesthetic delight. The entire experience is liberating and connects with the cosmic rhythm and is described as Ālaūkika. It makes us better human beings and makes us strive for Loka Maṅgala. The nature and the process of the attainment of the Rasāvāda has, been analyzed by Bharata Muni and their erudite commentators. Nāṭyaśāstra has been described by Muni Bharata as the Śārvāvarṇikā Pañcama Veda सर्ववर्णिका पंचमा वेद - A compendium of knowledge for all people.

One of the most important deities in this context who celebrates the essence of art is Lord Śiva. The Nataraja sculpture in this mandapa is a reflection that captures the genesis of Natya which is evident when one studies the genesis of Nāṭya itself, documented in the Nāṭyaśāstra .

Chapter 1 of the Nāṭyaśāstra, deals with the origin of Drama. The conclusions that one can infer

The individual who discerns this knowledge is *Muni*

Bharata on the very sincere query of the much disciplined *Atreya Muni*. *Bharata*, who was the master of the dramatic art, speaks about the genesis of

तेषां तद् वचनं श्रुत्वा मुनीनां भरतो मुनिः
प्रत्युवाच ततो वाक्यं नाट्यवेदकथा प्रति
भवद्भिः शुचिभिर्भूत्वा तथा वहितमानसैः
श्रुयता नाट्यवेदस्य सम्भवो ब्रह्मनिर्मितः

1. After the *Kṛtayūga* which was the golden age and was ruled by *Svayambhūva Manu* came the *Tṛetayūga* which began with the rule of *Vaivāsvata Manu*. At this time people became addicted to sensual pleasures, and hence became a victim of jealousy, anger and greed and so found their happiness mixed with sorrow.
2. *Indra*, then approached *Brahma* and said that they wanted a diversion which must be audible and visible and this *Veda*, should be accessible to all *Varnas* as the existing *Veda*'s could not be listened to by *Śūdras*.
3. Through his yogic powers, *Lord Brahmā* created the fifth *Veda* on the *Nāṭya* with the semi historical tales *itihāsa* which would help in the enhancement of *Dharma* and *Arthā*. It contained good counsel and collection of traditional maxims which would give guidance to people of the future in all their actions.
4. For creating this *Veda*, the recitative *Pathya* पठया he took from the *R̥gveda* ऋग्वेदा, *Song Sāmaveda* सामवेदा, *Abhināya* अभिनया–*Yajurveda* यजुर्वेद and *Rasa* from the *Atharvāveda* अथर्ववेद. Thus the *Nāṭyaveda* नाट्यवेद, became a subsidiary *Veda* and was, also called as *Vedopāveda* वेदोपवेद.^{viii}

Lord Brahma then, tells *Indra* that, semi historical tales have been composed by him based on the *Purāṇas* and *Itivṛtta* which had to be passed on to gods who are skillful, learned and bold in speech and keen to work.^{ix}

सर्वशास्त्रार्थसम्पन्नं सर्वशिल्पप्रदर्शकम् नाट्यवेद पञ्चम वेद
सेतिहासं करोम्यहम्
एषां संकल्प भगवान् सर्ववेदानुस्मरन् नाट्यवेद ततश्चक्र
चतुर्वेदासम्भवम्
जग्राह पाठयमृगवेद सामभ्यो गीतमेव च यजुर्वेदादभिनयान्
रसानाथर्वणादपि

5. The first play that was staged was, during the banner festival-*Indradhvaja* festival. Here, *Indra*'s victory, over the *Asūras* - *Asūra Parājaya*, was the play. However, this production angered the *Asūras*, as it portrayed them in a bad light. *Virūpaksha* together with the *Daiṭyas* and the *Vighnas* felt, this was not fair as *Brahma* was the common progenitor and he is supposed to accept all aspects of creation with him not displaying any partiality.
6. It is at this point that *Lord Brahma*, documents the reason for the creation of the *NāṭyaVeda*. He says it was for all *Bhāvanukīrtana* भवनुक्तिर्तना of the three worlds. In production, there are references to duty, to games to money, peace, laughter, fighting, lovemaking, and sometimes even to killing people. It also teaches patience, to those who go against duty, chastises who are ill bred and unruly, gives courage to cowards, energy to heroic persons, enlightens and gives wisdom to the learned. In verse 113, *Bharata Muni*, says that it will relate to actions of men good, bad and indifferent and will also give them courage and amusement. *Bharata* states, which give a kaleidoscopic view of the various situations that human being, goes through and from this various lesson that, can be drawn. The themes of the *Nāṭya* are taken out from narratives from history, Legends, *Vedas* and *Śāstras* and are presented in an enjoyable way.

ईश्वराणा विलासश्च स्थाय्यं दुखार्दितस्य च अर्थोपजीविनामर्थो
 धृतिरूद्विन्नाचेतसाम्, नानाभावोपसंपन्नं
 नानावस्थान्तरात्मरात्मकम् लोकवृत्तानुकरणनाट्यमेतन्मया कृत्म्
 उत्तमाधममध्यानां नरणा कर्मसंश्रयम्
 हितोपदशजननंधृत्तिकीडासुखादिकृत एतद्रसेषु भावेषु
 सर्वकर्मक्रियासु च सर्वोपदशजननं नाट्योभेतभदविष्यति
 दुखार्तानां श्रमार्तानां शोकार्तानां तपस्विनाम्बिश्रामजननं
 लोकनाट्यमेतद्भदविष्यति^x

The creation of the Nāṭya Veda, in itself was to help individuals to understand the innate essence and purpose of their existence. Through the various stories and depictions, they were able to relate to the trials and tribulations of the characters and comprehend their situation in a better manner. Also, the essence of the thought process of the Nāṭya Veda, was to have an understanding of the Vedic thought which laid the foundation for its genesis.

Vedas are called as Anādī, Aparūshya, Amnāya and Nigama.^{xii} The Vedas classified into Saṃhitās, Brāhmaṇas, Arāṇyakas and Upaniṣads represents an entire phase in this quest to find the ultimatium. Every aspect of nature has a visual presence and they are clothed in the garb of mighty, wise, invincible, omniscient, righteous, truthful, and benevolent and are prayed to, for material prosperity. This led to the discourse in, Polytheism, Monotheism, Henotheism and Monoism. At the same time the deities are said to have a single quality Ekāṃsat or Ekam tad एकमतद. Ekāṃsadviprābahuddhāvadaṅti एकमसतविप्रबहुदवंती and Anidavatamsvādhyāya tad ekum अनीधवतम् स्वध्यावतत् एकम्, the very popular Mahāvākyas. Swami Dayananda says that all Vedic mantras deal with the realization of god and this is reflected, in each Veda through the philosophical, musical or sacrificial attempts. It is an urge of the seekers to understand the quintessential feature the Why, What and How of existence.^{xiv}

The sculptures in the Khambattadi mandapa reflects and triggers an essence of Rasanubhuti despite it

being static. While deliberating on the concept of Aesthetics-can it be said the Rasa रस - Anubhuti is Ātmā Anubhūti. During the fleeting moments the Rasika identifies himself with the portrayal to such an extent that he is oblivious to her own presence. This experience is called the aesthetic experience which, Ananda Coomaraswamy opines. 1) There is an Aesthetic intuition on the part of the original artiste 2.) There is an internal expression of this intuition 3.) The indication of this by external signs for the purpose of communication the - technical activity 4.) And, then, the resulting stimulation of the critic or the equivalent of an aesthetic experience is a rasa or flavor. He highlights the derivative adjective called Rasavant having the Rasa applied to a work of art, the derivative substantive Rasika - the one who enjoys rasa and finally the Rasasvadana the tasting of the rasa or aesthetic contemplation.^{xv}

Rasanishpattih is a combination of the above factors. According to Dr. Nagendra the word Rasa, in the sense, of aesthetic delight came to be used as aesthetic delight in 5 BC.^{xvi} The characterization engrosses him such that he forgets his individuality. Muni Bharata gives the analogy of enjoyment of food by a person whose mind is free from the other thoughts and thus is centered in the act of eating, relishes the flavors while eating, so also the spectator whose mind is engrossed in the spectacle relishes the latent permanent states aroused by the presentation of the various emotions with the help of Ahāraya, Sāttvikas and Angika Abhinaya. Rasa hence is the relish of the Sthāyibhāva experienced by the spectator.^{xvii} The permanent moods are Rati, Hāsa, Śoka, Krodha, Utsāha, Bhaya, Jugupsā and Vismaya. One can say that Bhāva is the concrete situation and condition for a period of time of some occurrence and rasa is the aesthetic experience of that happening or condition. Every Bhāva, has its rasa. When a Bhāva is predominant in a man's mind and occupies the mind, it is Sthayi Bhāva. Sthayi Bhāvahas Sanchari Bhāvas which are constantly moving about. If Sthāyi Bhāva is the ocean then Sañchāri Bhāvas are the waves. Anu Bhāva are the consequents or deliberate actions. However, it is in chapter seven that Bharata Muni explains the psychological states.

An enquiry into why the *Bhāvas* are so called, Bharata Muni says it is because they pervade- *Bhāvayanti*. Through the various forms of *Abhiñaya* they infuse the meaning of the play into the spectators. (*Bhāvayanti भावयन्ती* - infuse) The root *Bhāvaya* means to pervade.^{xviii}

The combination of these factors merges to create a state of mind which has to be experienced.

Keeping these parameters Arts in our country attempts to transport the individual to these states. That is why fine arts in our country is a *Sādhanā* or *tapas*. In India art is always a path to understand reality. It is spiritual in outlook, idealistic in expression and sublime in interpretation. The interface between *Īshwara* and Art is the tangible portrayal which is the *Saguṇatattva* or *Īshwara*. This becomes the stable, narrative through the depictions. Through this process the artiste tries to bring Godhood close to us. Hence one can say “Art turned inward is Religion and religion turned outward is Art.”^{xix} The artistic creations, gives permanence to ephemeral object.

The *Purāṇas* also support the idea of *dharma* and to release the individuals from *Avidyā*. They say customary good *Saḍacāra* produces merit. *Jatidharma*, *Desadharmā*, *Kuladharmā*, *Svagotradharma*, *Svadharmā*, *Paradharmā* also should not be violated. All the stories center on the thought that happiness arises not from the gratification of desires. The true essence comes from truthfulness, kindness calmness and harmlessness - *satyamdayātathasantirahimsādharmasyavayah सत्यमदयतथाशांति अहिंसाधर्मव्यवहा and sarvalokahita सर्वलोकहीत*. In the *Agneyapurāṇa अग्नेय*, *Satya*, *Saucha*, *Tapas Svādhyāya* and *Īśvarapujāna* are important.^{xx}

The sculptures of Lord *Śiva* in the *Khambattadi Mandapa* have stories that reflect various episodes from the *Paurnāic literature*. What constitutes the essence of the stories is what is called myth. “Myth is an idea, mythology vehicle of that idea. Stories, symbols and rituals are essentially languages—that

are heard, seen and performed. They constitute the truths of the culture. It influences behaviors and communications and conditions thought and feelings.^{xxi} The stories are centric around various shades of human emotion and explain explicitly the circumstances that an individual is faced with. His challenges, conflicts, emotional upheavals, doubts, agonies, sorrow and happiness find infinite references depicted through well thought out situations in the stories. It is woven so vividly that one can associate with the situations very quickly. Through the dynamics of the character, one sees the cause and effect syndrome which in itself becomes a learning experience. It is this connect or relation that changes perspective. Another, interesting dimension also is that the stories are like a step to motivate the individual to capture the eternal within the transitory and not just get caught in the vast fleeting moments. It is to identify with the all-pervading anchor, with the innate essence, that draws the pattern of existence. It is here that the beauty of Indian thought comes in across all portrayal, the identity or the stable north was to blend with the absolute to move in the universal cosmic rhythm.

The creations in the space of sculptures and dance in essence are a reflection of these episodes which uphold these ideologies. Sculpture, also like architecture goes beyond the apparent. Prof. G B Deglurkar says, in the case of temple architecture it says was born from the ethos or the truly Indian concept of a divinity in a spiritualized body. Ancient seers had considered the human body a reflection of the abode of god. The *Sthāpati* is always attempting to create a structure that would facilitate this connect in a physical and tangible form. There was a consistent desire to concretize this prevailing idea or notion. According to *Mayamata*, the temple contains the whole manifestation in which he is called as the *Uprush*. The *prāsāda* or the temple consists of the *Garbagriha*, an *Antrala*, *Maṇḍapa*, a *Mukhamandapa*, where each aspect has a metaphysical significance. The *Agni Purāṇa*, *Hayasirapancaratra* and *Silparatna* describe the various parts of the temple along with the corresponding aspect of the human body. They describe *Kalasa* as the hair, *Amalaka*- the head, the *Kanṭha* the throat, the *Sukanasa* the nose, the *Vedi* the

shoulders-skandha, the Janghathe shanks and the image or the Pratimā is the jiva itself. This way temple is also called as Prāsāda.^{xxii}

The sculptural tradition reflects the same ideology where cosmos and reality merge in the life of stories of the heroes and the heroines blending seamlessly with semi - human creatures like the Nagas, Śārdulas, Kimpurshas, Apsaras, Aṣṭadīkṣpālas where the stories of the rich literature is beautifully etched on the stones. Sculpture due to its medium reveals the fluidity of expressions. "Indian sculpture, metaphysical and cosmic in its feeling and passion, is characterized by its monumentality and massiveness, rather than naturalistic modeling, by its geometric rhythm, rather than minute, picturesque decoration."^{xxiii}

Regarding Indian Sculpture Sri Aurobindo says, due to the close connection between the religious, philosophical and aesthetic mind of people, the sculptural art of India reflected in the visible form what the Upaniṣads spoke about. The gods of our sculptures are cosmic beings' embodiments of some great spiritual power, spiritual idea and action, with inmost psychic significance. The human form is a vehicle of this soul and every aspect of their creation signifies the metaphysical aspect.

The genesis of Indian sculpture was the result of deep metaphysical thinking and meditation. To take one example of the statue of Nataraja - what a marvelous genius and skill in the treatment of the cosmic movement, the success with which the posture of every limb is made to bring out the rhythm and of the significance, the rapturous intensity and the abandon of the movement itself and yet the just restraint in the intensity of the motion.^{xxiv} The dance of Shiva represents his five activities pancakritya, shrishti, sthiti, samhara, tiro Bhāva, anugraha.^{xxv} The essential significance according to Ananda Coomaraswamy is threefold. Firstly, it is the image of his rhythmic play as the source of all movement within the cosmos which is represented by the arch. Secondly, the purpose of dance is to release the countless souls of men from the snare of illusion. Thirdly the place of the dance,

Chidambaram, the center of the universe is within the heart.^{xxvi} He further says in his essay; about what, Śiva actually destroys in an analogy. The destruction is actually, the fetters that bind us and, the burning ground is, where the ego is destroyed. It signifies the state where illusion and deeds are burnt away. His name hence is also, Sudalaiyadi. In the Unmai Vilakkam verses- 32, 37, 39, it is said that the supreme intelligence dances in the soul for the purpose of removing the sins. By these means, our father scatters the darkness of illusion (Māyā), burns the thread of causality (karma,) stamps down evil Mala, Avidyā, showers grace and lovingly plunges the soul in the ocean of bliss (Ānanda) they never see rebirths, those who behold this dance.^{xxvii}

To draw a parallel and to understand the implications of the myths the stories of Śiva in the Kambhattadi Mandapa of the Madurai Meenakshi temple can be studied. This Mandapa is famous for depicting the 25 forms of lord Śiva. As it is situated in front of the main sanctum it has only the famous Śiva sculptures. The very famous Meenakshi Sundareshwarar marriage is a very famous creation. This sculpture is done as late as 1870, during the time of Thirumalai Nayakar days.

The famous sculptures are:-

1. **Kalyanasundarar / Meenakshisundareshwarar कल्याणसुंदर/मीनाक्षीसुंदर (Figure 1)** - This sculpture is a very elaborate depiction of a classic Wedding ritual. This sculpture is used very popularly as a sign of wedding. It depicts an amalgamation of poise and grace, the role of a brother in this case who is Lord Vishnu is also depicted. Meenakshi who was the warrior princess reflects very beautifully an emblem of shyness during her wedding. One can say this is one of the most popular depiction of Śiva and Parvati. The sculpture depicts the union of Śiva and Shakti. It portrays Śiva and Shakti where Lord Śiva standing on the right, holding to Meenakshi's hand. In the Śiva Purana it is said "Śiva grasped the lotus like hand of Parvati in his hand repeating the Vedic mantras. Lord

Śiva was very delighted.”² Vishnu is in the left pouring the water out of the pot. The sculpture captures the demure expression of goddess Meenakshi as a bride. The sculpture also depicts the role of brother, who is Lord Vishnu.^{xxvii}

2. **Tripurantakar त्रिपुरनकर (Figure 2)** - This story captures the episode of the burning of the three cities. There are many sculptures in India that highlight the story of Tripurantaka murthy. This Sculpture shows Lord Śiva driving a chariot where his right foot is seen resting on a part of the chariot and the left leg is planted in front. All the devas take on different roles where Brahma is the charioteer, Vishnu is the arrow, Agni its barb, Yama its feather, the Vedas make the bow and Savitri its bow string. The vigor and expression capture the tenacity of this story which has been described at great length in Shiva purana. The three Asuras were Tarakaksa, Vidyunmalli and Kamalksha. They performed sacrifices and obtained a boon from Lord Brahma to build three castles which were made up of Copper on Earth, Silver in the sky and the third of Gold. These three Asuras were the sons of Asura Taraka. They ardently prayed to Lord Shiva to grant them the architect Visvakarma to make a city for them that cannot even be broken by gods. They said that “We will join together at mid-day at the time of Abhijit when the moon shall be in constellation Pusya, when the dark clouds Puskara and Avarta shower in plenty without being visible in the firmament with supporting clouds, at the end of thousand years. These cities shall never join otherwise.” To further protect themselves they said that it was only Lord Śiva who could destroy the cities with a single arrow when the three cities are in alignment. This boon made the Asuras very proud and they launched havoc in the world. However, the story goes that Lord Śiva destroyed the three cities in a fraction of a second when they were aligned.^{xxx} In this form he is called as Tripurantakarmurthi.
3. **Sukhasanar सुहसनर (Figure 3)** - This sculpture depicts Lord Śiva and Devi Parvati as Dampati. This also shows the importance of marriage and the equality of women in ancient india. Shiva Parvati are always considered to be an Ideal couple. While Śiva’s front hands are in the Abhaya and Varada pose his back hand is seen to be holding the Aksharamala and a Trident is also called Trishluam. They are depicted in a comfortable pose. In the right hand parvati holds a flower and the left hand is placed on the pedestal.
4. **Kalasangharar कलासमहार (Figure 4)** - This sculpture depicts the story of Kalari who is the vanquisher of death. The legend tells us about a sonless sage Mrikandu who gets a boon that he could get a large number of useless sons or only son who is very intelligent but would die at the age of sixteen. When Markendeya, the son, learnt of his fate he went on a pilgrimage to worship Lord Śiva in the Tirukkadayur temple. However, when Kala Yama comes to bind him with his noose Śiva in anger burst out of the linga and punishes Yama. Śiva then blesses Markendeya that he would be a youth of sixteen forever. In the pillar Śiva in his back right hand holds the axe. Śiva’s right leg is placed on the peetham (pedestal) while the left leg is placed on the neck of Yama. Markandeya clinging to the Lingam, is sculptured on the face.
5. **Nataraja नटराज (Figure 5)** - In the spotless sky the yogis saw him dancing whose Maya is all here and who activates the universe. This celestial dance was seen by the yogis and sages. This is the Tandava dance of Śiva as Kala Mahakala from his flowing hair the rivers will flow again into existence, the rays of the sun and moon will be seen again for what they are. Another dance is the dance of bliss - Ananda Tandava.^{xxvi} Śiva in this sculpture has a Jatamakutam. The back-left hand carries Agni and the front left hand in the Gajahastam. The front right hand is in the Abhayam pose and the back-right hand holds the

Damaru. The right leg is placed on Apasmaram (and rests on the head of the cobra. Goddess Parvathi stands on the left. Below him is the Nandhi with four hands. On each side of the Nandhi are the sages Viyaghrphadar and Patanjali.

6. **Chandrashekarar चंद्रशेखर (Figure 6)** - The story behind this sculpture is when Daksha gave his twenty-seven daughters- birth stars in marriage to the moon. But, when the other wives of Chandra saw that he was more attached to Rohini they became very jealous and complained to their father, Daksha. Daksha then cursed Chandra that he will wane from his full glow. As a result, Chandra began to reduce and became a crescent. Wanting to save himself Chandra prayed ardently to Lord Shiva to protect him. Śiva's then took Chandra and placed him on his crown thus saving him from further waning. This way the moon became a symbol of cyclical time. In this sculpture as Shiva is seen with Parvathi, she is known as Umasahita Chandrasekarar. Śiva's front hands are in the Abhaya and the Varadha pose while the back hands hold the axe and the deer. The lord is fully decorated with ornaments.
- 7 **Umamaheswarar उमामहेश्वर (Figure 7)** - Goddess Uma as a part of Śiva is called Uma Maheswara. They represent the form of creation where Uma becomes Shakti and Śiva becomes the Purusha.
8. **Lingodbavar लिंगोभवर (Figure 7)** - This sculpture depicts the fight between Lord Vishnu and Lord Brahma. The story is documented in the Vidyasvarasamhita of the Siva purana. The story was composed to set an example on how pride has its natural fall. "What is the column of fire that has risen up? It is beyond the range of the senses. We have to find out its top and bottom. "Saying this while Vishnu assumed the form of a boar and

went in search of the root Brahma in the form of a swan went up in search of the top. In his desire to win Brahma lied and this was supported by the Ketaki flower who testified to what Brahma spoke. But Vishnu conceded defeat and said "It is out of ignorance and delusion about you whose body is without a beginning or an end that we indulged in this quest prompted by our own desire. Hence O, sympathetic being, forgive us for our fault. In fact, it is but another form of your divine sport." Here, it has been documented that Hari henceforth will be separated from the Lord. "Hereafter you will be separate from me having separate a temple, installation of idols, festivals and worship."^{xxxiii}

9. **Chakradharamurthy चक्रधरामूर्ती (Figure 8)**

This sculpture depicts the story of Lord Vishnu offering one thousand flowers to Śiva. However, when one flower fell short, he offered his own lotus eyes to Śiva. Pleased with his devotion Śiva blessed him with a chakra. The sculpture depicts his back hand holding the axe and the deer while his right hand is in the Anugraha pose presenting the disc or the Chakra. Lord Vishnu is seen in the standing position to the left of Lord Śiva receiving the chakra. Devi Uma is also seen seated to the left of Śiva.

10. **Ardhananari अर्धनारि^{xxxvi} (Figure 9)** - The blend of half male and the half female also called, the Ardhanarisvara form of Śiva, is symbolical of equality. The concept is comparable to the Samkhya doctrine of the Purusha and Prakruti. It is believed that this union produces the different units of the universe. The story has been deliberated in the Satarudrasamhita of the Linga purana. This excellent form of Lord Śiva which is half female and half male bestows auspiciousness upon the good as has been told.^{xxxvii}

kastūrikākūṅkumacarcitāyāi citārajaḥ puñjavīcārcitāyā,
kṛtasmarāyāi vikṛtasmarāyā namaḥ śivāyāi ca namaḥ śivāyā^{xxxviii}

11 Harihara हरिहार (Figure 9) - This represents the composite image of Lord Śiva and Vishnu which is also called as Shankara Narayana. The iconographic significance of the representations is very clear. In this depiction of Lord Śiva the right arm is in Abhaya pose and his back arm holds the axe. While Vishnu is depicted conch in the left back and gada or the mace on the front left arm. The representations of Harihara are mentioned in the Matsyapurana, Vishnudharmottarapurana and in the Agmic texts.^{xxxiv}

12. Gajasamharar गजसंहार (Figure 10) - The story behind this sculpture is that Lord Śiva is said to have killed the demon Gajasura who was the elephant demon and then wore the skin. While the two back hands hold the hide of the elephant the other three right hands hold the parasu, the trident and arrow. The three left hands hold the deer, skull, and the bow. The left leg rests on the elephant's head while the right leg instead of being bent is thrown forward to rest on the elephant's hide. Rishis are shown in the act of adoration at the base of this form. This story is also recounted in the Śiva Purana which says that the intensity of the Asura's penance was so intense that it scorched the Devas. Pleased by his tapasya, Brahma granted Gajasura the boon which then made him so haughty that he tortured all righteous people. To teach this arrogant Asura a lesson Lord Shiva fought with him. "When the trident pierced his body, the Daitya Gajasura thought he was raised up like an umbrella. Defeated and realizing the power of Śiva, he then sang the glory of Śiva."^{xlv} Gajasura also told him that from that day Śiva's name should also be Krttivasas- the one clad in elephant hide.^{xlvi}

13. Bikshantana भिक्षांधर (Figure 11) - A popular representation of Lord Śiva in many South Indian temples. In this the form Lord Śiva is shown as a supreme Mendicant. The story behind

this sculpture is that Brahma had four heads and the fifth head was cut off by Śiva and kept it in his hand to prevent it from burning the earth and drying up the ocean. The severed head of Brahma was held in Śiva's hand and clung to it. the head became his skull and served Śiva as his begging bowl.^{xlvii}

14. Veerabhadrar विराभाधर (Figure 11) - Daksha story - This portrayal of Lord Śiva celebrates the vigorous form. This form of Śiva is associated with Sati. "Then Rudra the destroyer of the world, plucked out a cluster of his matted hair and struck the top of the mountain. O celestial sage from the first half of that cluster of matted hair, rose up the powerful Virabhadra." The Rudra Samhita has a detailed description of the march of Veerabhadra and his vigorous activities.^{xlviii}

15. KirathaArjunar किरथा अजुर्ना^{xlix} (Figure 12) - This is a story from the Mahabharata. There is a detailed description of the manner in which the great Pandava warrior Arjuna received the Pasupata Astra. The Pandava warrior is shown with his bow and arrow. This story has been explained explicitly in the play Kiratarjuneyam by Bhairavi. The story celebrates the power of Lord Shiva.

16. Kamadhahanar कामधहानर - Also called as Kama Dhahana murthi, this sculpture symbolizes the victory over lust by Lord Śiva. The Śiva purana it is said that the enchanting influence of spring is spread everywhere around ṣadhi-prastha, the penance grove of Lord Śiva. The fragrant flowers of Mango and Asoka trees causes the display of emotions of love. On seeing the untimely display of spring Kama decides to influence his thoughts with the Kama baan. But a great flame of fire that sprang from the third eye of the infuriated Śiva destroys Kama.^{xxxii} This episode is the forerunner to the birth of Kartikeya or Kumara.

17. RavanaAnugraha - रावण अनुग्रह This story depicts how Śiva mitigates the pride of the Asura Ravana. Anger and agitation are seen in the representation of Ravana while poise and a sense of calm is seen Śiva. His arms are placed as if he wants to uproot it.

18. Ekapadar एकापदर - Śiva is depicted in this sculpture with a single leg. This sculpture of Śiva standing on one leg shows that Lord Śiva was a Yogi par excellence. This concept may be associated with Vedic Aja Ekapada.^{xxxiv}

19. Rishbharudar रिशभरूद्र - This sculpture presents a perfect symbol of poise and grace. Śiva and Parvati are seated on Nandi who is also portrayed with strength and confidence. The placements of their feet are symmetric and graceful. This sculpture once again celebrates the equality of Śiva and Parvati.^{xxxv}

20. Dakshinamurthy दक्षिणमूर्ति^{xliii} - Here Lord Shiva is a teacher par excellence. Śiva is considered to be master of Yoga, Veda, Jnana and expounder of Śāstras. This sculpture, Lord Śiva is found facing the south while teaching yoga to his seekers who were renowned Rishis.

mauna-vyākhyā-prakaṭita-parabrahma-tattvaṃ yuvānaṃ
varṣiṣṭhānte-vasadṛṣi-gaṇaiḥ āvṛtaṃ brahma-niṣṭhaiḥ,
ācāryendraṃ kara-kalita-cinmudraṃ-ānanda-rūpaṃ
svātmāramaṃ mudita-vadanaṃ dakṣiṇāmūrtim-īde.^{xliiv}

This Dakṣiṇāmūrti sholka explains the concept of humility towards the Guru and the importance of education in Ancient India.

21. Jalandhara Vadha Murthi जलनधारा वधा मुर्ति
This depicts the fight between Lord Śiva and Indra. Where Indra threw his Vajra his weapon on Śiva. The Vajra was broken into pieces. As Śiva's eyes watered his name was

kept as Jalandhara by Lord Brahma."^{xli} "This boy will become the emperor of the Asuras. He will conquer even Visnu. He cannot be slain by anyone except by lord Śiva". The battle between Śiva and Jalandhara is explained in the Śiva Purana.^{xlii}

22. Somaskandar सोमास्कंदर - In this sculpture Lord Śiva and Goddess Parvati are seated in the Sukhasana pose with Skanda standing in between them. Shiva holds the axe and the deer. The front right hand is in the Abhaya pose and the left hand is in Simhakatna pose. Goddess Parvati holds a flower in her right hand and her left hand rests on the pedestal. Lord Skanda is seen to be holding a flower in each hand.. The entire picture represents extreme serenity and the importance that is given to Kula or family.

23. CandesaAnugraharmurthi संदेश अनुग्रहमूर्ति
This story is narrated in the Periya puranam. In this carving Śiva is shown to be tying a garland around his bhaktas Chandesa's head who stood as a great example of devotion and surrender. It was a classic example of complete bhakti.

The sculptures are a vibrant example of the tangible aspect of getting the stories of the Śiva and Lingapurāṇa into a tangible space. They also act as an example to annihilate the concept of Avidyā. They also act as a classic example to construct the aspect of the socio, political, religious and ecological implications. It was also to impress upon the individual the concept of Purushārthas पुरुषार्थज which are Dharma, Artha, Kāma and Moksha. This creates citasuddhi, by removing Vasanas and helping the individual to follow Indriyanigrahana . It also helps in disciplining the inner self by controlling the Dosa, Rāga , Dvesha , Moha, Krodha, Asuyā malice. It also helps the individual to understand the difference between Good deeds- Sukrutam and Dushkrutam - Bad deeds. There is also eradicating of sins (Kilbisha) through tapas.

Endnote

ⁱ S. Radhakrishnan, *Indian Philosophy*, Vol 1, (Oxford University Press, 2008), p 26.

ⁱⁱ Radhakamal Mukherji, *The Destiny of Civilization*, (New Delhi, Asia Publishing House, 1964), p 121.

ⁱⁱⁱ D Devakunjari, *Madurai through the ages*, (Arulmigu meenkashi sundaeswarar thirukkkoil. Madurai - 2010) pp 234 235

^{iv} Radhavallabh Tripathi, *Ultimate In Ancient Indian Thought and Discipline*, (Bombay, Department of Sanskrit, University of Bombay, p 73.

^v Manomohan Ghosh, *Nāṭyaśāstra नाट्यशास्त्र*, (Varanasi, Chowkhamba Krishnadas Academy Oriental Publishers, 2012), p 4. Chapter one, verse 2-5

तेषा तद् वचनं श्रुत्वा मुनीनां भरतो मुनिः
प्रत्युवाच ततो वाक्यं नाट्यवेदकथा प्रति
भवद्भिः शुचिभिर्भूत्वा तथा वहितमानसैः
श्रुयता नाट्यवेदस्य सम्भवो ब्रह्मनिर्मितः

^{vi} Ibid, verse 7-12, p 5.

^{vii} Ibid, verse 14-15, p 6.

^{viii} Ibid, verse 17-18

^{ix} Ibid, verse 19-20,

^x Ibid, verse 101- 103,

^{xi} Manmohan Ghosh, *The Nāṭyaśāstra नाट्यशास्त्र*, (Varanasi, Chowkhamba Krishnadas Academy Oriental Publishers, 2012), p p 10, 11.

ईश्वराणा वलिसश्रुच स्रथैर्य दुखार्दतिस्य च
अर्थोपजीवनामर्थो धृतरिद्वनिगचेतसाम, नानाभावोपसंपन्नं
नानावस्थान्तरात्मकम् लोकवृत्तानुकरण
नाट्यमेतन्मया कृतम् उत्तमाधममध्यानां नराणा
कर्मसंश्रयम् हतोपदेशजननं धृतरिडासुखादकृत एतदरसेषु
भावेषु सर्वकर्मकरयिसु च
सर्वोपदेशजननं नाट्यभेदवर्षियत दुखार्तानां श्रमार्तानां
शोकार्तानां तपस्वनिम्बशिरामजननं लोके
नाट्यमेतद्भवषियति

^{xii} Jadunath Sinha, *The Foundation of Hinduism*, (Varanasi, Pilgrims Publishing, 2007), pp

^{xiii} Dayananda Saraswathi, *Ultimate in Ancient Indian Thought and Discipline*, (Bombay, Department of Sanskrit, University of Mumbai), p 1, 2.

^{xiv} Ananda Commaraswamy, *The Dance of Shiva*, (New Delhi, Munshiram Manoharlal Publishing house, 1982), pp 52-53.

^{xv} G H Tarlekar, *Studies in the Nāṭyaśāstra नाट्यशास्त्र*, (Delhi, Motilal Baharsidass Publishers, 1975), pp 34,35.

^{xvii} Ibid, p 36.

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Appendix

Photos of the sculptures have been taken by the author.



Tripurantakar त्रिपुरनकर (Figure 2)



Kalyanasundarar कल्याणसुंदर (Figure 1)



Sukhasanar सुहसनर (Figure 3)



Kalasangharar कलासमहार (Figure 4)



Chandrasekarar चंद्रशेखर (Figure 6)



Nataraja नटराज (Figure 5)



Umamaheswarar उमामहेश्वर - Right side
Lingodbavar लिंगोभवर - Left side
(Figure 7)



Chakradharamurthy चक्रधरामूर्ति Figure 8



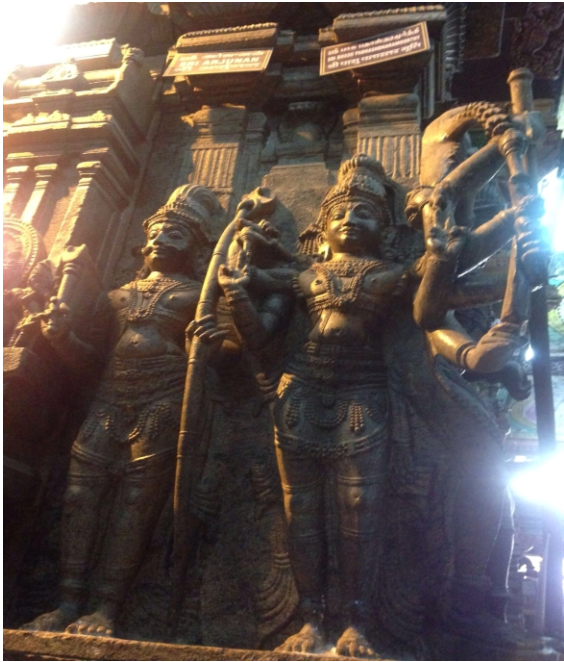
Gajasamharar गजसंहार Figure 10



Ardhananari अर्धनारि (Figure 9) in the same panel as Hari Hara. (Left side is Harihara while the Right is Ardhanarieshwara



Bikshantana भिक्षांधर – on Right side Veerabhadra विराभाधर - on Left side (Figure 11)



KirtaArjuna किरथा अजुर्ना (Figure 12)



Nandhi playing the MRIDANG under the sculpture of Lord Natraja



Lord Śiva in the Urdhava Tandava Pose