Future Population and Literacy Rate Projection in India

*Ruchi Gupta1- Department of Mathematics Manav Rachna University, Faridabad, Haryana1,3&4
Hardeo Kumar Thakur2- Department of Computer Science ManavRachna University, Faridabad, Haryana2
Chhavi Baliyan3 - Department of Mathematics Manav Rachna University, Faridabad, Haryana1,3&4
Mansi Mangla4 - Department of Mathematics Manav Rachna University, Faridabad, Haryana1,3&4

Abstract:
All the nooks and crannies of India indicate the clear picture of overpopulation. India is the second most populated country after China and according to the various studies it will surpass China by 2025.Overpopulation is a problem which needs to be resolved in order to save environment and its resources. The consequences of population growth leads to rapid decrease in land areas, contamination of air, water, extinction of plant and animal species because of deforestation and loss of eco-systems etc. Many people are already aware of this situation but there is a need to spread the awareness about the consequences of overpopulation and literacy could be a better solution of this problem and as we know that the relationship between population and literacy in all over the world is contentious so this research paper is an effort to investigate the growth and discrepancy in literacy and population rates of different states in India in order to take suitable preventive measures to make India a developed country fulfilling all needs.
Keywords: Nooks and crannies, discrepancy, surpass, investigate.

1. INTRODUCTION

Illiteracy is the condition of the person in which he/she is being unable to read or write. Illiteracy is a serious issue across the globe. According to Anne-Marie Trammell, "Worldwide, 880 million adults have been labeled as illiterate, and in the United States it is estimated that almost 90 million adults are functionally illiterate, that is to say that they do not have the minimal skills needed to function in society". The current scenario of India is quite poor as compared to developed and developing countries like France,USA,and UKetc.If we want the growth of India, education plays an important role, for one or the other reason; we are lagging behind when it comes to dealing with illiteracy in India. There are some factors responsible for the issue of illiteracy in India like population, poverty, unhygienic and unhealthy environment, gender and social discrimination and low quality. Government has taken many initiatives in order to decrease the illiteracy in India. The government has come up with

these policies in order to reduce the illiteracy like free education for all and Sarv Shiksha Abhiyan. Government has initiated free education especially for rural areas and people with low income. The scheme Sarv Shisha Abhiyan was launched in 2001 and implemented then only. It focused on elementary education in rural areas. Though this scheme was quite successful in these areas and many students even enrolled in India and this scheme was running very successfully in rural and urban areas as well. Through this scheme government had the mindset that illiteracy would decrease but it was quite sad that this scheme couldn't meet the expectation of the government. The importance of education has also been mentioned in India's constitution. There are many rules and regulations in the constitution which guarantees the right to education to every citizen of our country. One of the law is education to minorities which states that their educational rights are guaranteed under some article of the constitution .According to the constitution there is a right called Free and Compulsory

Education for All which ensures that equal education opportunities are provided to every citizen of the country But in spite of all these rights and regulations we are still a country with the most illiterate population.Increasing growth of population is a major problem that our country needs to overcome.Though government and several NGO's and people of society are working together to solve this major problem of overpopulation and illiteracy in our country. Therefore, it is important to discover the literate population to get the clear picture of the situation in the country and to work on this undesirable condition of overpopulation .It is the principal objective of this brief.

2.1 LITERATURE REVIEW

Overpopulation is an issue which is something that can't be ignored and it is a condition where the population of human exceeds the capacity of our planet. Education to some extent is a solution for this undesirable condition as education can reduce the birth rates and slows population growth. Pradip Chouhan(2012)[1] conducted the study on literacy and educational attainment of scheduled castes population in Maldah District of West Bengal, India have described about the relation of literacy and education in scheduled castes. Jitendra Kumar (2014)[2] in his study called Progress of Urban Literacy in India : Focus on Metropolises indicated that gender gap is reducing in cities with millions of population. BhanuPhani Krishna Koduru & Archana Tatavarthi (2016)[3] in his study called " Effect of Population Growth Rate on Economic Development in India " highlights the consequences of population increase in economy. RipudamanSingh(2016)[4] also has contributed a lot in finding the literacy pattern of females and economic development in his study named " Female Literacy and Economic Development in India". E. Wesley F. Peterson(2017)[5] in his report entitled "The Role of Population in Economic Growth" described the correlation between population ,economic and per capita growth. Tanushree Chandra(2019)[6] in his investigation "Literacy in India: The Gender and

Age Dimension", reports the progress in literacy and a huge increase in gender equality in literacy. The objectives of these papers were focused on population of states, gender gap in population and population contribution to economy. This research paperis an attempt to predict the population and literacy of the country so that needful action could be done in order to control the population.

2.2 DATA AND SELECTION OF TOOL

A structured approach has been used to carry out this research. In order to complete this research we have collected the population and literacy data from different sources mainly Indian Budget, Census of India etc. These are:

- Source of population data[17]
- Source of literacy data[18]
- WEKA 3.8 is open source software that provides tools for data preprocessing, implementation of several Machine Learning algorithms, and visualization tools so that we can develop machine learning techniques and apply them to real-world data mining problems. WEKA has so many features like 49 data preprocessing tools,76 classifications,8 clustering algorithms and many more and with help of these tools it could have been possible to predict the data of coming years.

3. ANALYSIS

We are analyzing the population and literacy of India from the previous year data with the help of the software called WEKA (Waikato Environment for Knowledge Analysis).

3.1 POPULATION:

We have predicted the population of different states using WEKA software. As we can see there is an increase in the populationof all the states and

education is the major factor which is lagging behind .So in my opinion,education must be promoted at different levels in all the areas if we want the development of country. Population is growing enormously in our country. Every time we cross another milestone in population growth, the gap between the number of people to be educated and the volume of available resources increases.It is very sad that even after attaining freedom ,people are deprived of education and they are not getting even basic education and we are very far away from becoming a fully literate country.The following graphical representations demonstrate the steady growth of population of different states of India over years. From the figure 1.1,1.2,1.3 and 1.4, we can depict the rate of population and we can conclude that over the past years Bihar,West Bengal, Tamil Nadu and Punjab respectivelyindicate the highest population growth however Lakshadweep, Mizoram, Dadar&Nagar Haveli and Daman&Diu respectively indicates the lowest growth. From the table 1.1,1.2,1.3 and 1.4, we can analyze the growth from 1951 to 2021 with an approximate value of the population.

Table1.1 : Trends in the population of states over past years

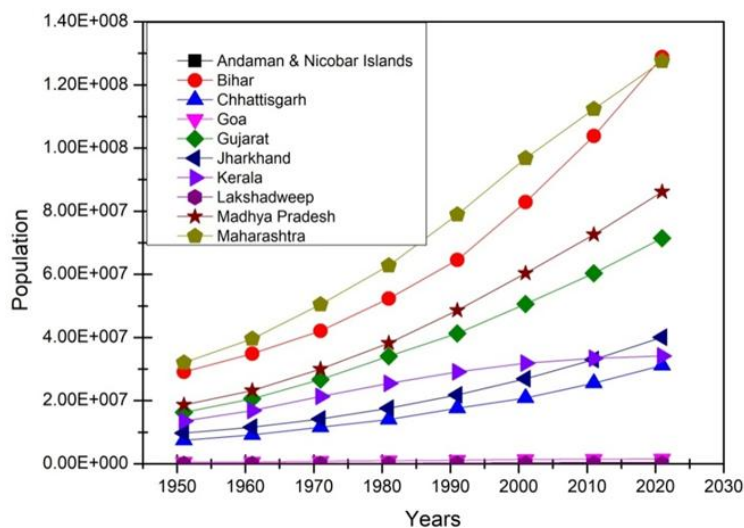| Year	1951	1961	1971	1981	1991	2001	2011	2021
Andaman & Nicobar Islands	31480	64160	115874	189496	281990	356650	379944	**386692.17**
Bihar	29085900	34841490	42126800	52303000	64531200	82879910	103804630	**128831060**
Chhattisgarh	7457700	9154330	11637800	14010110	17615600	20834530	25540196	**31134186**
Goa	547000	590875	795997	1008373	1170115	1348900	1457723	**1545063**
Gujarat	16263700	20633305	26697488	34085800	41309580	50597200	60383628	**71437367**
Jharkhand	9697300	11606504	14227493	17612000	21844550	26946070	32988134	**40088983**
Kerala	13549000	16904560	21347300	25453680	29098523	31839000	33387677	**34144575**
Lakshadweep	21000	24370	32900	40250	52820	61300	64429	**64660.073**
Madhya Pradesh	18615700	23218950	30017180	38169500	48566800	60385090	72597565	**86166576**
Maharashtra	32002500	39554900	50412240	62782820	78937190	96752500	112372972	**127514251**

Figure1.1:Trends in the population

Table1.2:Trends in the population of states over past years

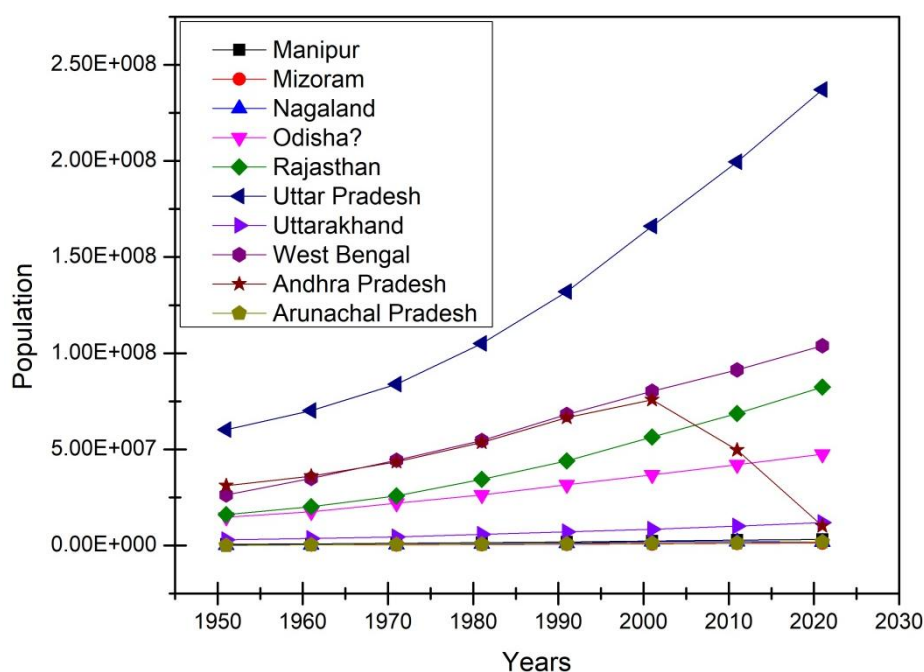| Year	1951	1961	1971	1981	1991	2001	2011	2021
Manipur	578060	780340	1073509	1421290	1837900	2294480	2721756	**3182384.8**
Mizoram	196970	266200	332190	494440	690963	889690	1091014	**1344151.2**
Nagaland	213700	369309	516110	775570	1210492	1990275	1980602	**1772985.5**
Odisha	14646100	17549500	21944625	26370270	31659740	36707900	41947358	**47525435**
Rajasthan	15971130	20156540	25765810	34361860	44005990	56473300	68621012	**82472912**
Uttar Pradesh	60274800	70144160	83849775	105113300	132062800	166053600	199581477	**237118216**
Uttarakhand	2946900	3611200	4493800	5726550	7051600	8489100	10116752	**11972032**
West Bengal	26300670	34926000	44312017	54580650	68077970	80221300	91347736	**103890013**
Andhra Pradesh	31115000	35983480	43502710	53551030	66508170	75728400	49665533	**10160719**
Arunachal Pradesh	0	337300	468885	632502	865900	1098328	1382611	**1761231.7**

Figure 1.2:Trends in the population

Table 1.3 :Trends in the population of states over past years

Year	1951	1961	1971	1981	1991	2001	2011	2021
Delhi	1744500	2659990	4066400	6220973	9421311	13851503	16753235	**19422606**
Karnataka	19402500	23587910	29299015	37135710	44977200	52734986	61130704	**70506638**
Meghalaya	606300	769990	1011699	1335819	1774778	2306540	2964007	**3740785.3**
Pondicherry	317407	369355	472836	604281	808117	974820	1244464	**1560016.7**
Tamil Nadu	30119680	33687100	41199170	48408080	55859300	62111390	72138958	**83780136**
Tripura	639984	1142282	1556342	2053058	2757205	3191880	3671032	**4265903.6**

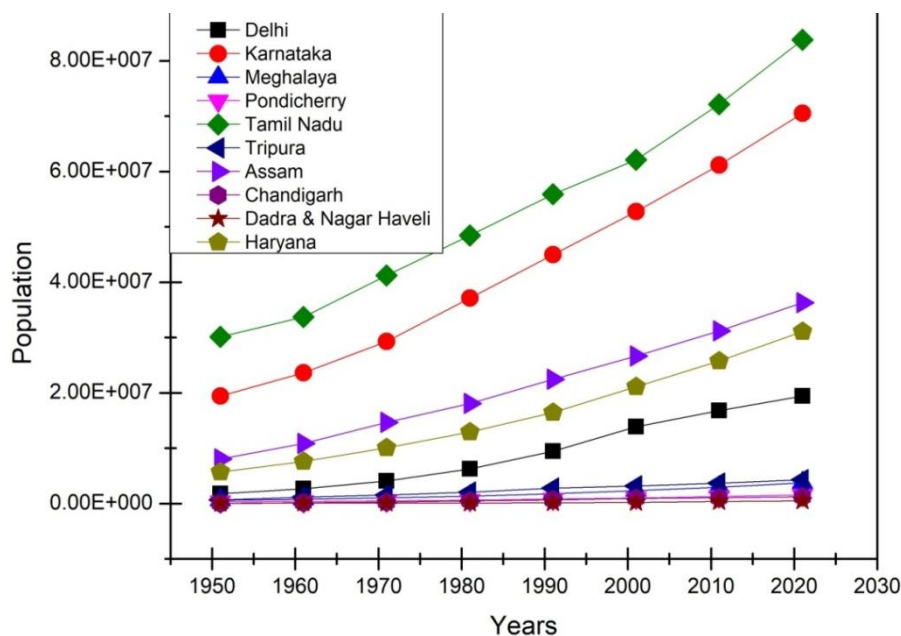| Assam	8029100	10837700	14625157	18041250	22414320	26638600	31169272	**36251288**
Chandigarh	24948	120480	257100	452960	642374	901080	1054686	**1201309.3**
Dadra & Nagar Haveli	42846	58020	74880	104300	138290	220963	342853	**492000.09**
Haryana	5674400	7591190	10036430	12922122	16464600	21083900	25753081	**31065973**

Figure 1.3:Trends in the population

Table1.4:Trends in the population of states over past years

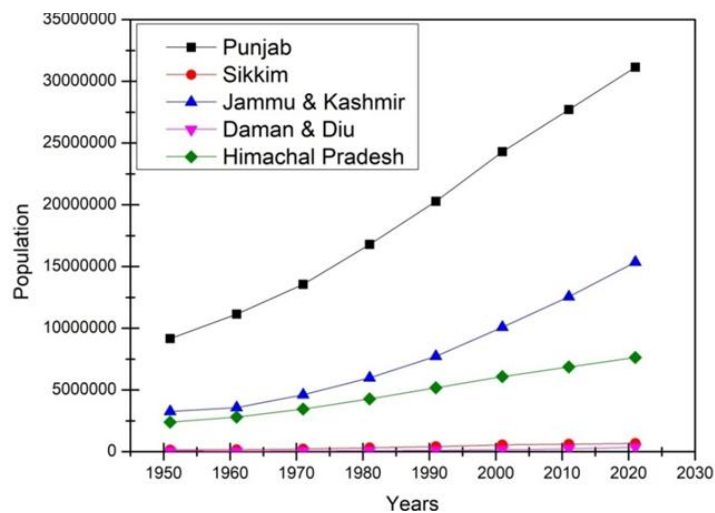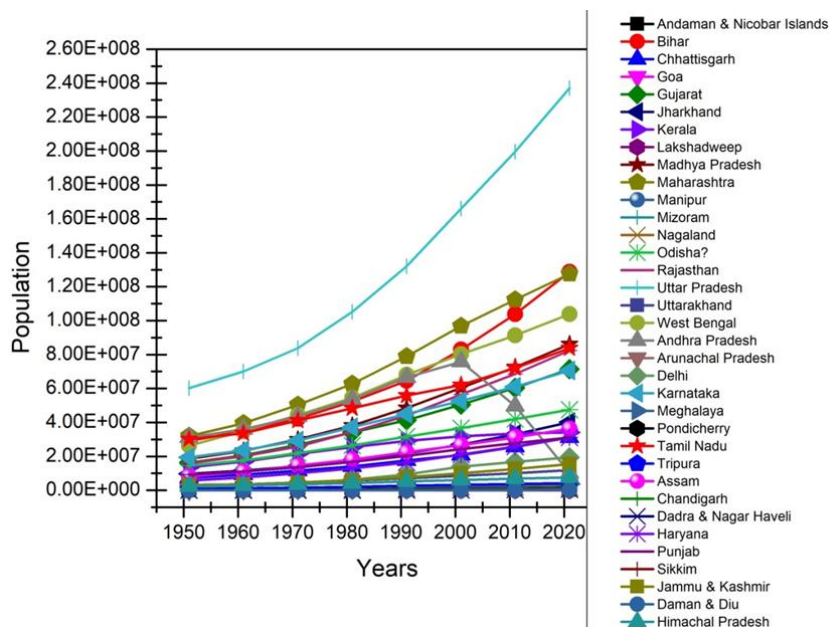| Year	1951	1961	1971	1981	1991	2001	2011	2021
Punjab	9160990	11135404	13551069	16788920	20281971	24289130	27704236	**31129074**
Sikkim	138093	162863	210205	316840	406000	541902	607688	**664829.55**
Jammu & Kashmir	3254650	3561100	4616632	5987389	7718700	10070300	12548926	**15355098**
Daman & Diu	49482	37587	63000	79842	102110	158080	242911	**343323.12**
Himachal Pradesh	2386940	2812300	3460434	4280818	5170877	6077453	6856509	**7621828**

Figure 1.4:Trends in the population

Figure1.5:Trends in population of different states over past years

3.2 LITERACY:

We have predicted the literacy in all the states and it is very good to see the slight increase in the literacy rate of India.It could have been only possible only because of the efforts put by us and the government. Government has taken many initiatives in order to decrease the illiteracy in India.The government has come up with these policies in order to reduce the illiteracy like free education for all and Sarv Shiksha Abhiyan. Government has initiated free education especially for rural areas and people with low income. The government announced mid- day meal scheme in order to increase the attendance of students. Government even ensured free uniforms and books so that their parents are motivated in order to send their children to school. All the measures taken in order to increase the literacy are successful to quite an extent and we look forward to better outcome. The following graphical representations demonstrate the steady growth of literacy of

different states of India over years. From the figures 2.1,2.2,2.3 and 2.4, we can evaluate the gradual progress of literacy of the different states and as we can see that Lakshadweep, Nagaland,Tripura and Sikkim are the states having highest literacy rates respectively and Kerala, Andhra Pradesh, Chandigarh and Himachal Pradesh respectively are the states having lowest literacy rates over the year. From the tables 2.1, 2.2 ,2.3 and 2.4, we can see the approximate values of the literate population of different states from the year 1991 to 2021.

Table2.1:Trends in the literacy of states over past years

Year	1951	1961	1971	1981	1991	2001	2011	2021
Andaman & Nicobar Islands	30.3	40.07	51.15	63.19	73.02	81.3	86.6	**97.0786**
Bihar	13.49	21.95	23.17	32.32	37.49	47	61.8	**76.5098**
Chhattisgarh	9.41	18.14	24.08	32.63	42.91	64.66	70.3	**87.3579**
Goa	23.48	35.41	51.96	65.71	75.51	82.01	88.7	**96.0683**
Gujarat	21.82	31.47	36.95	44.92	61.29	69.14	78	**91.9959**
Jharkhand	12.93	21.14	23.87	35.03	41.39	53.56	66.4	**82.4317**
Kerala	47.18	55.08	69.75	78.85	89.81	90.86	94	**102.792**
Lakshadweep	15.23	27.15	51.76	68.42	81.78	86.66	91.8	**100.1339**
Madhya Pradesh	13.16	21.41	27.27	38.63	44.67	63.74	69.3	**84.0236**
Maharashtra	27.91	35.08	45.77	57.24	64.87	76.88	82.3	**96.7961**

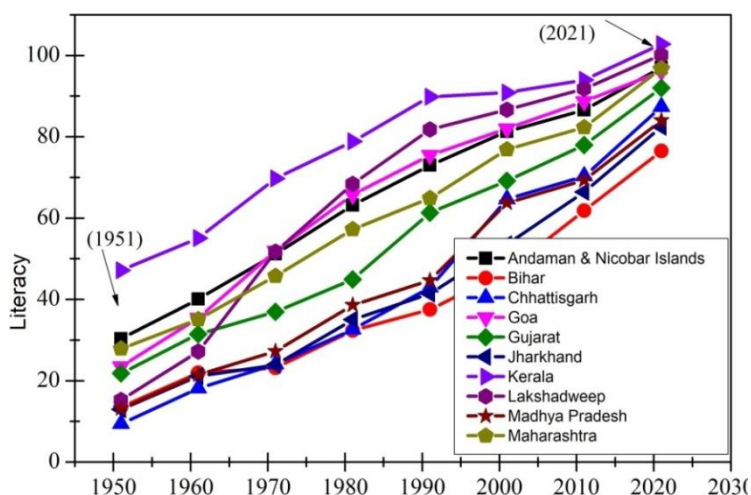Figure2.1:Trends in the literacy

Table 2.2 : Trends in the literacy of states over past years

Year	1951	1961	1971	1981	1991	2001	2011	2021
Manipur	12.57	36.04	38.47	49.66	59.89	70.53	76.9	**92.5069**
Mizoram	31.14	44.01	53.8	59.88	82.26	88.8	91.3	**106.5289**

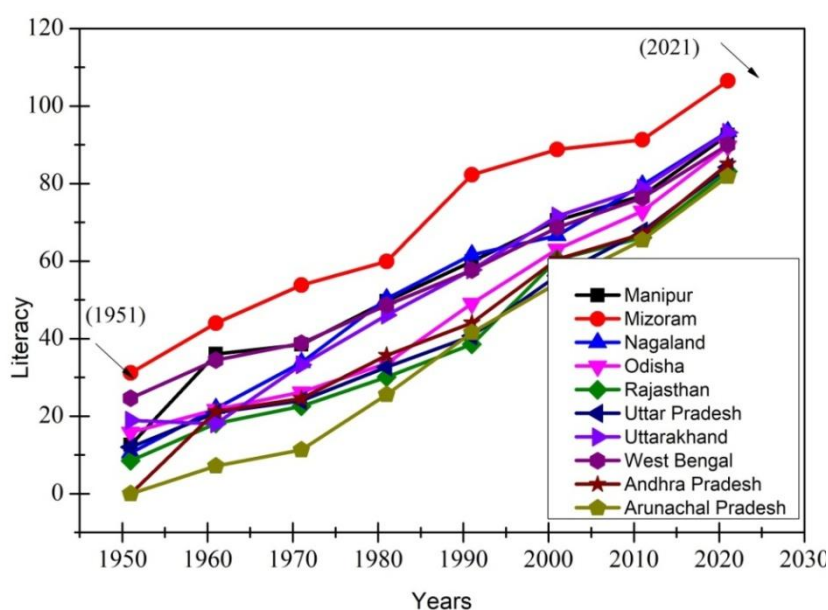|								
Nagaland	10.52	21.95	33.78	50.28	61.65	66.59	79.6	**93.3843**
Odisha	15.8	21.66	26.18	33.62	49.09	63.08	72.9	**89.6503**
Rajasthan	8.5	18.12	22.57	30.11	38.55	60.41	66.1	**83.1327**
Uttar Pradesh	12.02	20.87	23.99	32.65	40.71	56.27	67.7	**84.2055**
Uttarakhand	18.93	18.05	33.26	46.06	57.75	71.62	78.8	**93.1639**
West Bengal	24.61	34.46	38.86	48.65	57.7	68.64	76.3	**90.0558**
Andhra Pradesh	0	21.19	24.57	35.66	44.08	60.47	67	**85.1033**
Arunachal Pradesh	0	7.13	11.29	25.55	41.59	54.34	65.4	**81.84**

Figure 2.2:Trends in the literacy

Table 2.3 : Trends in the literacy of states over past years

Year	1951	1961	1971	1981	1991	2001	2011	2021
Delhi	0	61.95	65.08	71.94	75.29	81.67	86.2	**100.0349**
Karnataka	0	29.8	36.83	46.21	56.04	66.64	75.4	**92.7223**
Meghalaya	0	26.92	29.49	42.05	49.1	62.56	74.4	**91.9824**
Pondicherry	0	43.65	53.38	65.14	74.74	81.24	85.8	**99.1175**
Tamil Nadu	0	36.39	45.4	54.39	62.66	73.45	80.1	**94.5522**
Tripura	0	20.24	30.98	50.1	60.44	73.19	87.2	**103.7918**
Assam	18.53	32.95	33.94	40	52.89	63.25	72.2	**87.0963**
Chandigarh	0	0	70.43	74.8	77.81	81.94	86	**91.734**
Dadra & Nagar Haveli	0	0	18.13	32.9	40.71	57.63	76.2	**97.9507**

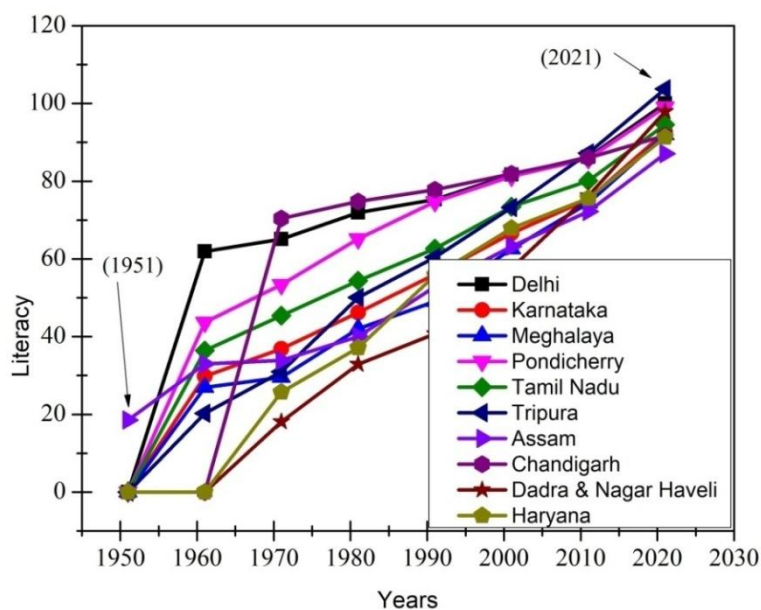| Haryana | 0 | 0 | 25.71 | 37.13 | 55.85 | 67.91 | 75.6 | **91.3277** |

Figure 2.3:Trends in the literacy

Table 2.4 : Trends in the literacy of states over past years

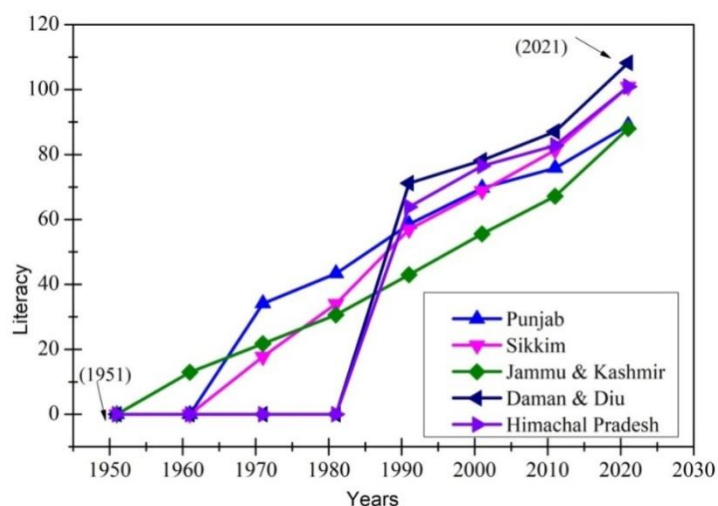| Year	1951	1961	1971	1981	1991	2001	2011	2021
Punjab	0	0	34.12	43.37	58.51	69.65	75.8	**89.0313**
Sikkim	0	0	17.74	34.05	56.94	68.81	81.4	**100.9432**
Jammu & Kashmir	0	12.95	21.71	30.64	43	55.52	67.2	**88.0487**
Daman & Diu	0	0	0	0	71.2	78.18	87.1	**108.2219**
Himachal Pradesh	0	0	0	0	63.86	76.48	82.8	**100.8796**

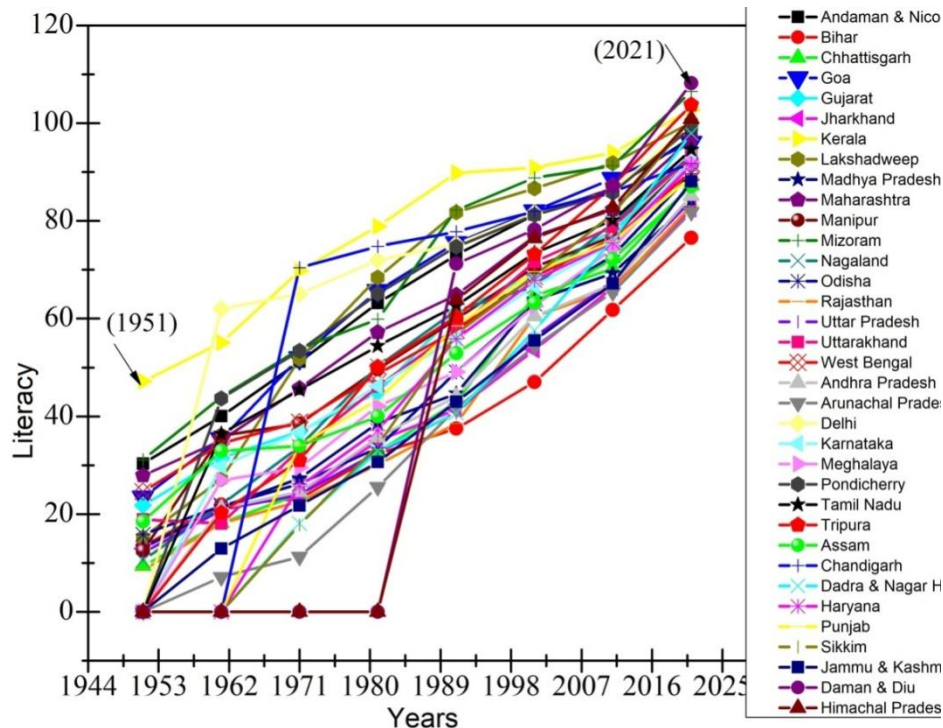Figure 2.4:Trends in the literacy

Figure2.5:Trends in population of different states over past years

4. CONCLUSION

Education is the most powerful weapon which you can use to change the world once said by Nelson Mandela.It is true that education plays a significantrole in our lives and can be used to eradicate all problems. As India is in its emerging period, literacy must be acquiring the main position on the ruling strategy as education is a power and no can refuse to this statement. This study evaluated the population and literacy of different states of India of coming year i.e.2021.The findings of this research shows that India has gained a huge amount of literate population and it will be gaining more in the coming years. Moreover, India is on a track to become fully literate country soon.As a nation, India must aim to crack all the hurdles that are on the way of illiteracy because Education helps us in many ways like it lets you fight poverty,gives you courage to speak against injustice,helps you in solving problems.Overpopulation have adverse effects like depletion of natural resources, degradation of environment and which is leading to conflicts and wars because overpopulation is straining the resources and this is the reason for fights in the developing countries. The solution to this adverse situation is education .If the masses of people are educated then it will be easier for them to understand the need to have at most one or two children.

References

1. Pradip Chouhan : A study on literacy and educational attainment of scheduled castes population in Maldah District of West Bengal, India Journal of Geography and Regional Planning 6(1), 19-30 (2013)
2. Jitendra Kumar : Progress of Urban Literacy in India : Focus on Metropolises, Indian Journal of Geography & Environment 13, 70-77 (2014)
3. BhanuPhani Krishna Koduru&ArchanaTatavarthi : Effect of Population Growth Rate on Economic Development in India (2016)

4. Ripudaman Singh : Female Literacy and Economic Development in India , Rupkatha Journal on Interdisciplinary Studies in Humanities Vol. VIII, No. 2 (2016)

5. E. Wesley F. Peterson : The Role of Population in Economic Growth, Sage Open, 1–15 (2017)

6. Tanushree Chandra : Literacy in India: The Gender and Age Dimension , ORF Issue Brief No. 322 (2019)

7. Muhammad QasimSodhar : Population Growth and Inter-Provincial Economic Disparity: Two Major Factors Behind the Underdevelopment of Pakistan,sociology of Islam 7, 148-164(2019)

8. Afzal, M. : Population Growth and Economic Development in Pakistan, The Open Demography Journal 2, 1-7 (2009)

9. Atkinson, A. B. : After Piketty The British Journal of Sociology 65, 619-638 (2014)

10. Baker, D., Delong, J. B., & Krugman, P. R. : Asset returns and economic growth. Brookings Papers on Economic Activity 1, 289-330 (2005)

11. Banerjee, R. : Population growth and endogenous technological change: Australian economic growth in the long run. Economic Record 88, 214-228 (2012)

12. Ali, S., Ali, A., & Amin, A. : The impact of population growth on economic development in Pakistan. Middle-East Journal of Scientific Research 18, 483–491 (2013)

13. hmed, Munir, &Farooq, Umar : The state of food security in Pakistan: Future challenges and coping strategies. The Pakistan Development Review 49,903–923 (2010)

14. Aghion, Philippe, Peter Howitt, and FabriceMurtin : The Relationship Between Healthand Growth: When Lucas Meets Nelson-Phelps NBER Working Paper 15813 (2010)

15. Richard P. Cincotta and Robert Engelman : Economics and Rapid Change: The Influence of Population Growth,Population Action International October 1997 (1997)

16. Samir MazidbhaiVohra : Population Growth – India's Problem,INDIAN JOURNAL OF RESEARCH,Volume : 4 , Issue : 11,65-66 (2015)

17. https://en.wikipedia.org/wiki/List_of_states_in_India_by_past_population

18. https://www.indiabudget.gov.in/budget2013-2014/es2012-13/estat1.pdf