DROPOUT RATE ANALYSIS

Analysing indicators affecting dropout of students in school education in India

The Team

Ashes Das

Biplab Mahato

Keshab Dey

Satirtha Ghosal

Sobhan Bose

Som Mondal

Index

Introduction

The Indian school Education System is one of the largest in the world with nearly 14.89 lakh schools, more than 95 lakh teachers and nearly 26.52 Crore students of pre-primary to higher secondary level from varied socio-economic backgrounds. The system strives to maintain standards and uniformity across the country while giving ample scope for the country's diverse culture and heritage to grow and flourish.

Dropout students are a severe problem in higher education in many countries. Student dropout has a tremendous negative impact not only on individuals but also on universities and socioeconomic. Consequently, preventing educational dropouts is a considerable challenge for HE's institutions. Therefore, knowing the factors influencing student dropout is an essential first step in preventing students from dropping out.

Dropout is a critical indicator of an educational system's quality because it demonstrates the persistence of significant failures in direction, transition, adaptation, and student promotion. Dropouts negatively impact individuals, universities, and socioeconomic status and involves physical and psychological loss at the individual level. From an academic perspective, dropout students indicate a red signal to the education system to provide convenient services for students; and the socioeconomic level, the dropout student's effect can never be overlooked because graduates provide notable influences with both returns to education and the real economic growth. Therefore, preventing student dropout is a big challenge for the nation.

Literature Review

The initial step in preventing student dropouts is comprehending the contributing factors. The reason for student dropouts at higher education is very complex and influenced by several variables.

Ortiz-Lozano et al., in their report, observed the factors influencing student dropouts in Spain based on sociodemographic and academic variables. The reason for choosing this variable is not clearly explained, but the research results show that this variable has a significant effect.

Zalizah Awang Long, Mohammad Faimuddin Mohd Noor did an extensive study on the dropout rates of many countries, such as Spain, United States, Germany, as well as Indonesia and published a report title “Factors Influencing Dropout Students in Higher Education”. on their report, many factors influence student dropouts in university education. Often the reason is a combination of several factors. The results show why students dropout due to relationships with study programs or universities, socioeconomic factors, student performance, academic self-concept, and intention to dropout. The study, as stated by the authors, has several shortcomings that must be discussed and recommended for further research. The study uses a combination of qualitative and quantitative methods. A qualitative approach is used to look for variables that affect dropout students, and a quantitative approach is used to validate the finding variables and classify the factors. The limitation of this research is that it is still done indirectly in the interview stage of dropout students. Researchers suggest that in further research, the interviews should be conducted directly. Another limitation of the stakeholder validation process is only using a questionnaire.

Abstract

A proper step to finding out why students' dropout of school is to seek information directly from dropout students. However, this is very difficult because of unavailability of verified data from surveys in this regard.

This is why we focused on designing a new approach of finding the cause of student dropout. We explored various aggregate data of the period 2021-2022 from the population and grouped them as states and union territories. This gave a more clear and concise idea of the status of population as per various indicators like Literacy Rate, Per Capita Income, Gender Parity Index, Human Development Index collected from Census 2011 and other verified sources and different school infrastructure data collected from UDISE+ database. We collected data on a total of 15 indicators separated primarily by gender and level of education and spread across 35 states and union territories.

The next step involved analysing the collected data and drawing conclusions as to which indicators affect dropout ratio significantly. This was done by selecting the indicators that seem to affect dropout in students more than the others by using Pearson's Correlation Coefficient. For further analysis, we used some statistical analysis methods and took help of various graphs and plots to compare the collected data.

Region-Wise Data for Dropout Ratio

Dropout Ratio

The dropout rates in Indian schools remain a pressing issue, as highlighted by the UDISE+ 2021-22 data, with a significant number of students leaving school prematurely, especially at the secondary level. Gender disparities exist, with boys more likely to drop out than girls across all levels of education. Efforts to address dropout rates, especially at the secondary level, are crucial for improving the effectiveness of the education system in India. Policymakers and educators must implement targeted interventions to ensure all students have access to quality education and can complete their schooling, paving the way for a brighter future for the nation.

The UDISE+ 2021-22 data on dropout rates in schools in India reveals that the overall dropout rate is 1.5 percent, with the highest rate at the secondary level (9-10) at 12.6 percent. The data also shows that the dropout rate is higher for girls than boys at all levels of education. Boys are more likely to drop out of school than girls in primary, upper primary,

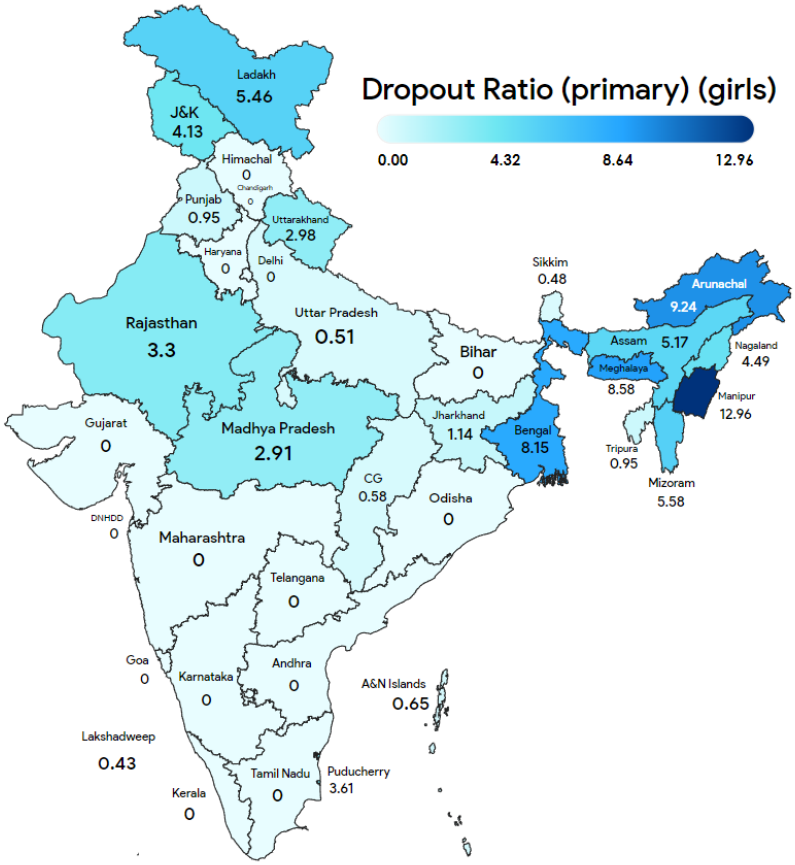
Primary Dropout Ratio

The average annual dropout rate for primary school students in India is 1.5 percent, with a slightly higher rate for boys at 1.6 percent compared to girls at 1.4 percent. This indicates a relatively low dropout ratio at the primary level, highlighting the importance of early education retention efforts.

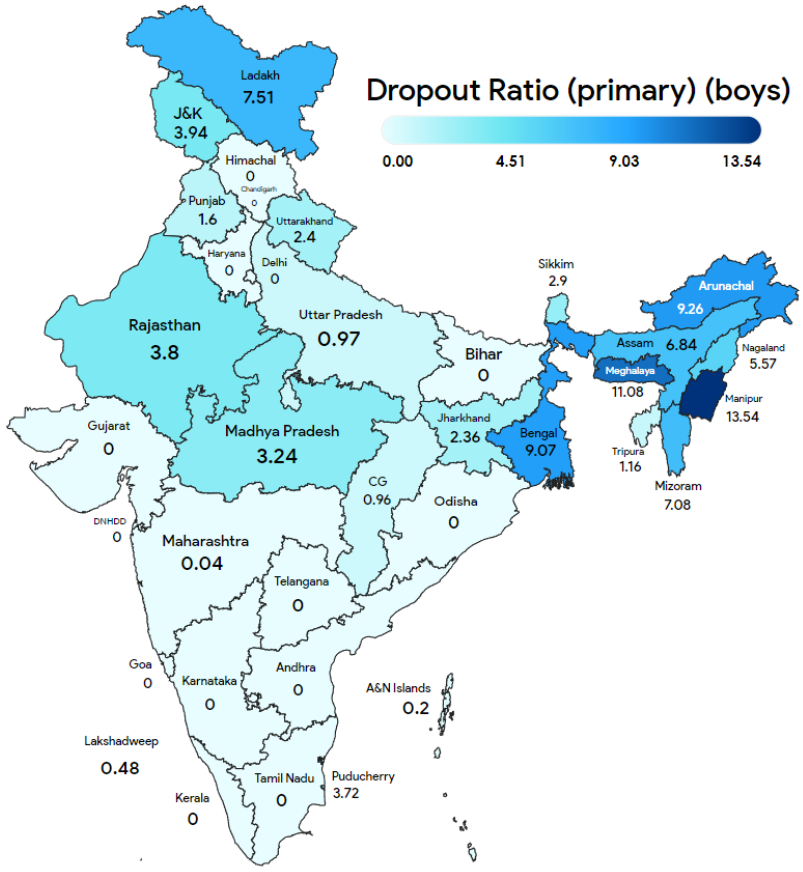
Table: Region-wise Primary Dropout Ratio (Girls, Boys, Overall)

States/Union Territory	Dropout Ratio (Primary)		
	Girls	Boys	Overall
Andaman & Nicobar Islands	0.65	0.2	0.43
Andhra Pradesh	0	0	0.00
Arunachal Pradesh	9.24	9.26	9.25
Assam	5.17	6.84	6.01
Bihar	0	0	0.00
Chandigarh	0	0	0.00
Chhattisgarh	0.58	0.96	0.77
Dadra & Nagar Haveli and Daman & Diu	0	0	0.00
Delhi	0	0	0.00
Goa	0	0	0.00
Gujarat	0	0	0.00
Haryana	0	0	0.00
Himachal Pradesh	0	0	0.00
Jammu & Kashmir	4.13	3.94	4.04
Jharkhand	1.14	2.36	1.75
Karnataka	0	0	0.00
Kerala	0	0	0.00
Ladakh	5.46	7.51	6.49
Lakshadweep	0.43	0.48	0.46
Madhya Pradesh	2.91	3.24	3.08
Maharashtra	0	0.04	0.02
Manipur	12.96	13.54	13.25
Meghalaya	8.58	11.08	9.83
Mizoram	5.58	7.08	6.33
Nagaland	4.49	5.57	5.03
Odisha	0	0	0.00
Puducherry	3.61	3.72	3.67
Punjab	0.95	1.6	1.28
Rajasthan	3.3	3.8	3.55
Sikkim	0.48	2.9	1.69
Tamil Nadu	0	0	0.00
Telangana	0	0	0.00
Tripura	0.95	1.16	1.06
Uttarakhand	0.51	0.97	0.74
Uttar Pradesh	2.98	2.4	2.69
West Bengal	8.15	9.07	8.61

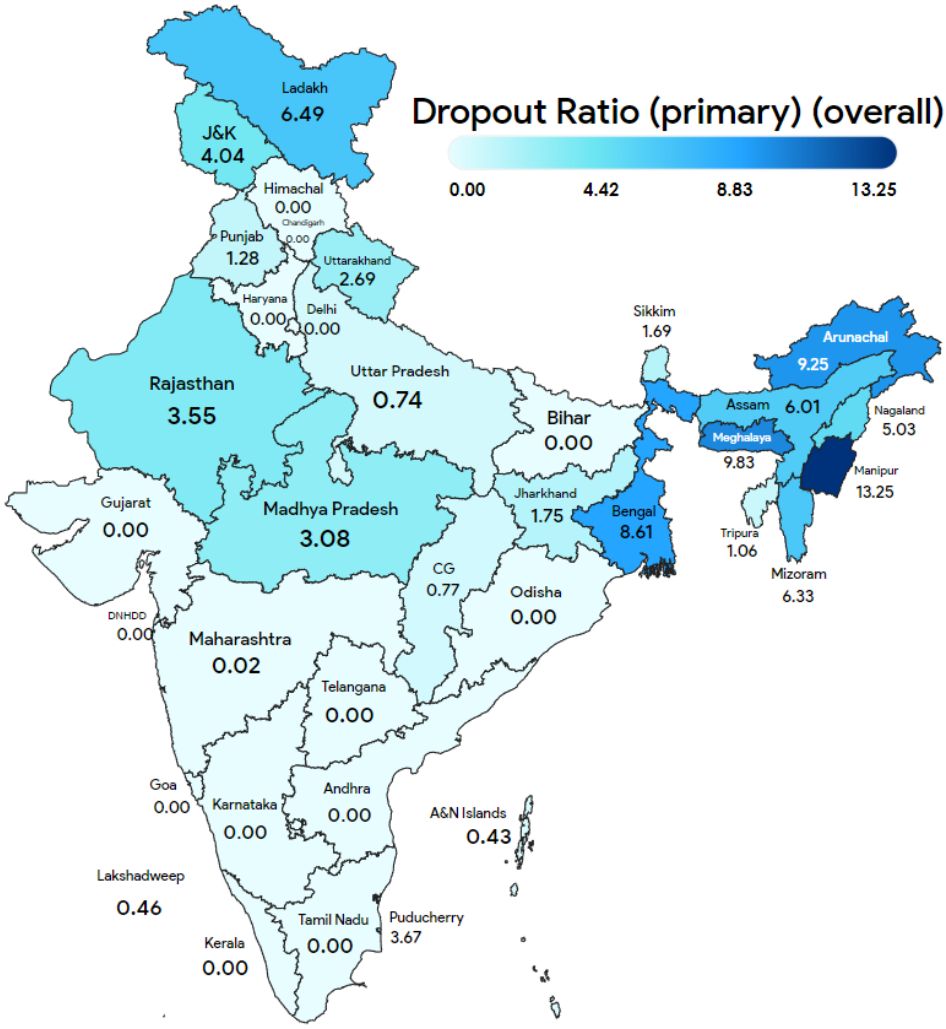
Primary Dropout Ratio (Girls) Heat Map of India:



Primary Dropout Ratio (Boys) Heat Map of India:



Primary Dropout Ratio (Overall) Heat Map of India:



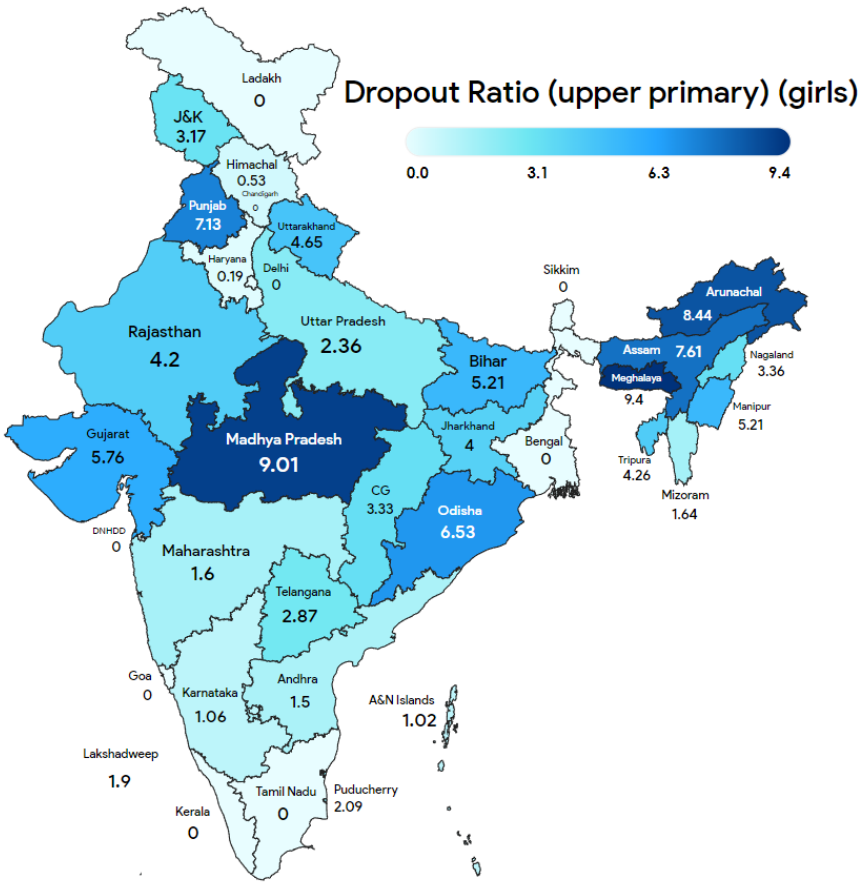
Upper-Primary Dropout Ratio

The average annual dropout rate for upper primary students (Classes 6-8) in India is 3 percent, with a slightly higher rate for boys at 2.7 percent compared to girls at 3.3 percent. This indicates a need for targeted interventions to address dropout rates at the upper primary level and ensure continued education for all students.

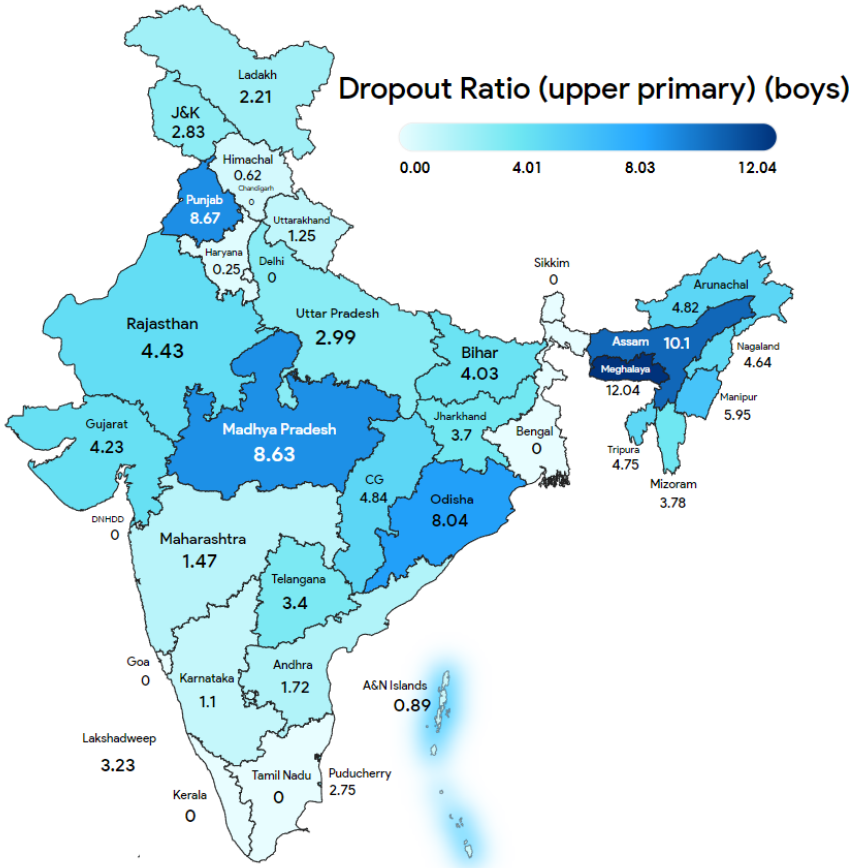
Table: Region-wise Upper-Primary Dropout Ratio

States/Union Territory	Dropout Ratio (Upper-Primary)		
	Girls	Boys	Overall
Andaman & Nicobar Islands	1.02	0.89	0.96
Andhra Pradesh	1.5	1.72	1.61
Arunachal Pradesh	8.44	4.82	6.63
Assam	7.61	10.1	8.86
Bihar	5.21	4.03	4.62
Chandigarh	0	0	0.00
Chhattisgarh	3.33	4.84	4.09
Dadra & Nagar Haveli and Daman & Diu	0	0	0.00
Delhi	0	0	0.00
Goa	0	0	0.00
Gujarat	5.76	4.23	5.00
Haryana	0.19	0.25	0.22
Himachal Pradesh	0.53	0.62	0.58
Jammu & Kashmir	3.17	2.83	3.00
Jharkhand	4	3.7	3.85
Karnataka	1.06	1.1	1.08
Kerala	0	0	0.00
Ladakh	0	2.21	1.11
Lakshadweep	1.9	3.23	2.57
Madhya Pradesh	9.01	8.63	8.82
Maharashtra	1.6	1.47	1.54
Manipur	5.21	5.95	5.58
Meghalaya	9.4	12.04	10.72
Mizoram	1.64	3.78	2.71
Nagaland	3.36	4.64	4.00
Odisha	6.53	8.04	7.29
Puducherry	2.09	2.75	2.42
Punjab	7.13	8.67	7.90
Rajasthan	4.2	4.43	4.32
Sikkim	0	0	0.00
Tamil Nadu	0	0	0.00
Telangana	2.87	3.4	3.14
Tripura	4.26	4.75	4.51
Uttarakhand	2.36	2.99	2.68
Uttar Pradesh	4.65	1.25	2.95
West Bengal	0	0	0.00

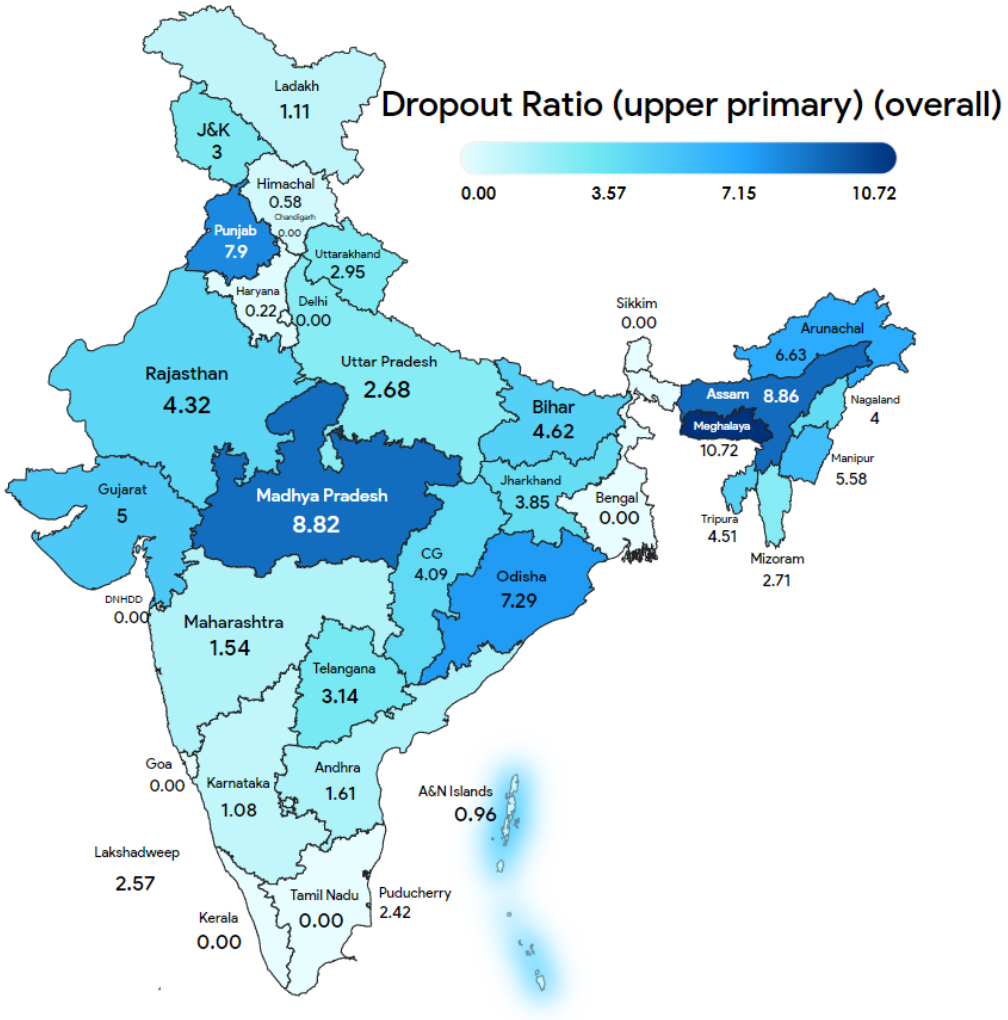
Upper-Primary Dropout Ratio (Girls) Heat Map of India:



Upper-Primary Dropout Ratio (Boys) Heat Map of India:



Upper-Primary Dropout Ratio (Overall) Heat Map of India:



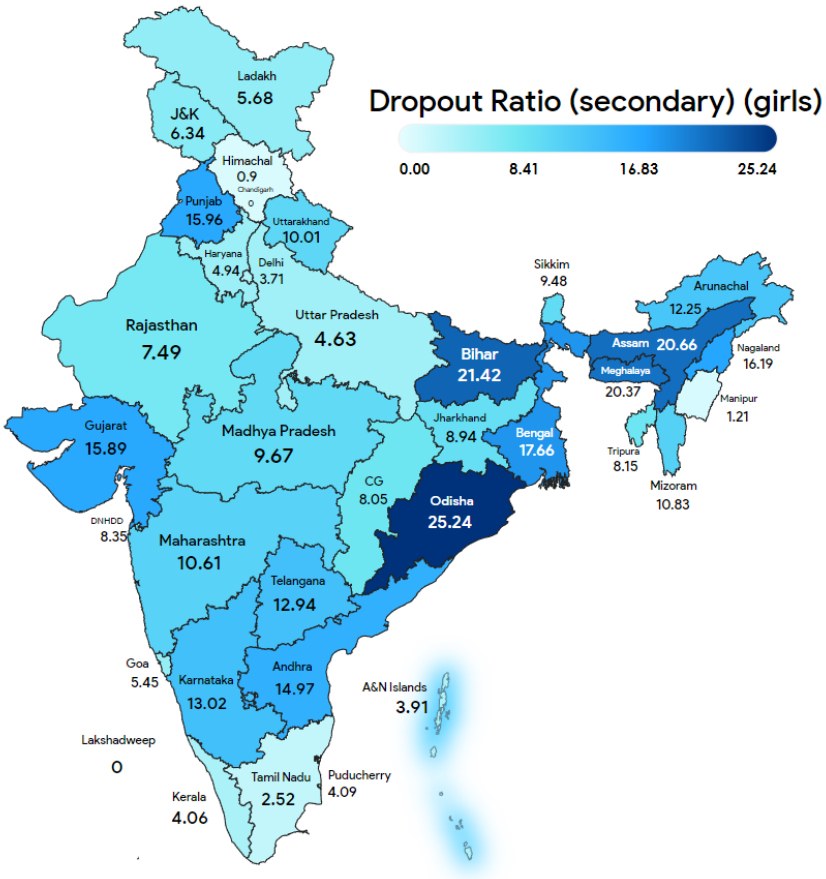
Secondary Dropout Ratio

The UDISE+ 2021-22 data reveals that the dropout rate for secondary school students (Classes 9-10) in India is significantly higher at 12.6 percent, with boys having a slightly higher dropout rate of 13 percent compared to girls at 12.3 percent. This highlights the need for targeted interventions to address dropout rates at the secondary level and ensure continued education for all students.

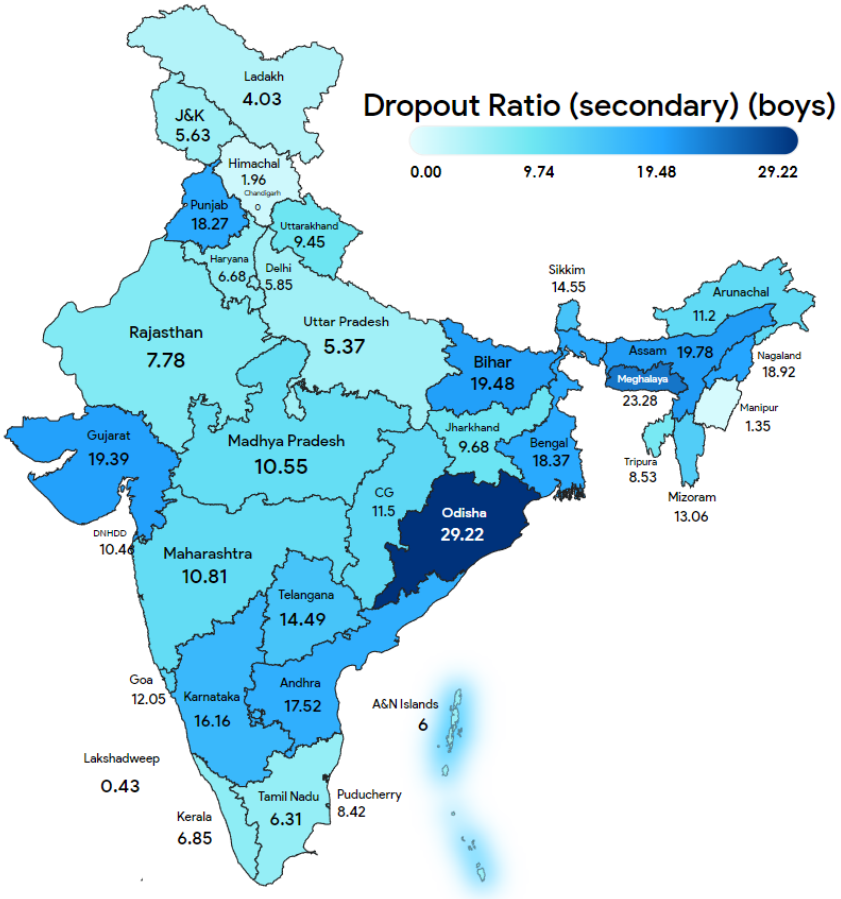
Table: Region-wise Secondary Dropout Ratio

States/Union Territory	Dropout Ratio (Secondary)		
	Girls	Boys	Overall
Andaman & Nicobar Islands	3.91	6	4.96
Andhra Pradesh	14.97	17.52	16.25
Arunachal Pradesh	12.25	11.2	11.73
Assam	20.66	19.78	20.22
Bihar	21.42	19.48	20.45
Chandigarh	0	0	0.00
Chhattisgarh	8.05	11.5	9.78
Dadra & Nagar Haveli and Daman & Diu	8.35	10.46	9.41
Delhi	3.71	5.85	4.78
Goa	5.45	12.05	8.75
Gujarat	15.89	19.39	17.64
Haryana	4.94	6.68	5.81
Himachal Pradesh	0.9	1.96	1.43
Jammu & Kashmir	6.34	5.63	5.99
Jharkhand	8.94	9.68	9.31
Karnataka	13.02	16.16	14.59
Kerala	4.06	6.85	5.46
Ladakh	5.68	4.03	4.86
Lakshadweep	0	0.43	0.22
Madhya Pradesh	9.67	10.55	10.11
Maharashtra	10.61	10.81	10.71
Manipur	1.21	1.35	1.28
Meghalaya	20.37	23.28	21.83
Mizoram	10.83	13.06	11.95
Nagaland	16.19	18.92	17.56
Odisha	25.24	29.22	27.23
Puducherry	4.09	8.42	6.26
Punjab	15.96	18.27	17.12
Rajasthan	7.49	7.78	7.64
Sikkim	9.48	14.55	12.02
Tamil Nadu	2.52	6.31	4.42
Telangana	12.94	14.49	13.72
Tripura	8.15	8.53	8.34
Uttarakhand	4.63	5.37	5.00
Uttar Pradesh	10.01	9.45	9.73
West Bengal	17.66	18.37	18.02

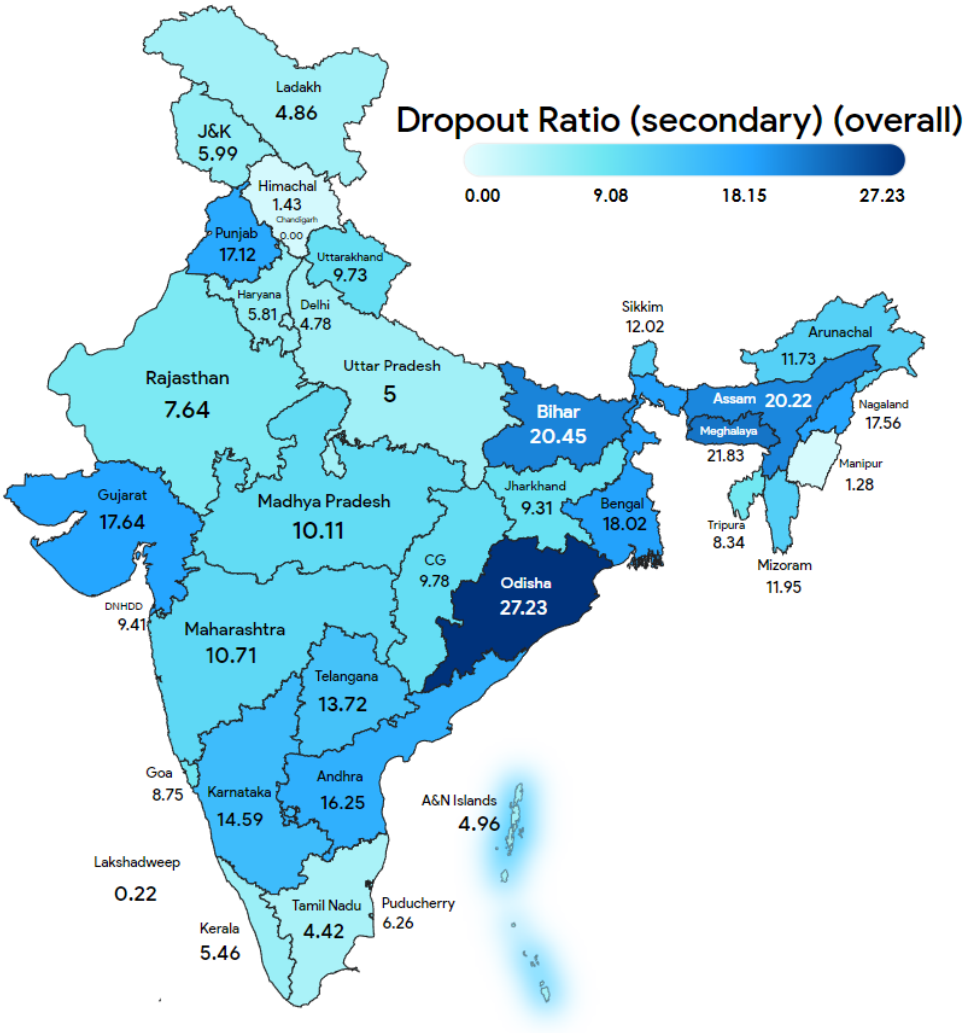
Secondary Dropout Ratio (Girls) Heat Map of India:



Secondary Dropout Ratio (Boys) Heat Map of India:



Secondary Dropout Ratio (Girls) Heat Map of India:



Verdict:

The UDISE+ 2021-22 data on dropout rates in schools in India highlights a concerning trend of higher dropout rates at the secondary level compared to primary and upper primary levels. Girls consistently have higher dropout rates than boys across all levels of education, indicating a gender disparity in educational retention. While the overall dropout rate has decreased to 1.5 percent, there are still significant challenges to address, especially in states like Meghalaya with alarmingly high dropout rates. Efforts must be made to understand the root causes of dropout and implement targeted interventions to ensure education for all students, ultimately contributing to a more equitable and thriving educational landscape in India. Addressing dropout rates is crucial for building a prosperous and empowered society through inclusive education initiatives.

INDICATORS AFFECTING DROPOUT RATIO IN SCHOOL EDUCATION IN INDIA

Literacy Rate

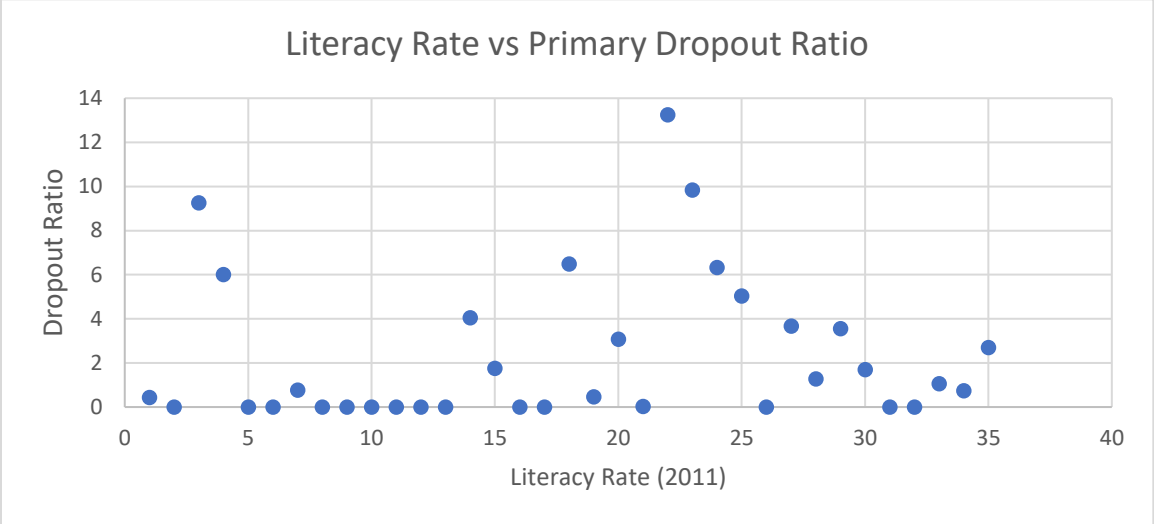
Literacy in India is a key for social-economic progress. The 2011 census, indicated a 2001–2011 literacy growth of 97.2%, which is slower than the growth seen during the previous decade. An old analytical 1990 study estimated that it would take until 2060 for India to achieve universal literacy at then-current rate of progress. India's literacy rate is at 75%. Kerala has achieved a literacy rate of 93%. Bihar is the least literate state in India, with a literacy of 61.8%.

Table: Region-wise Literacy Rate and Overall Dropout

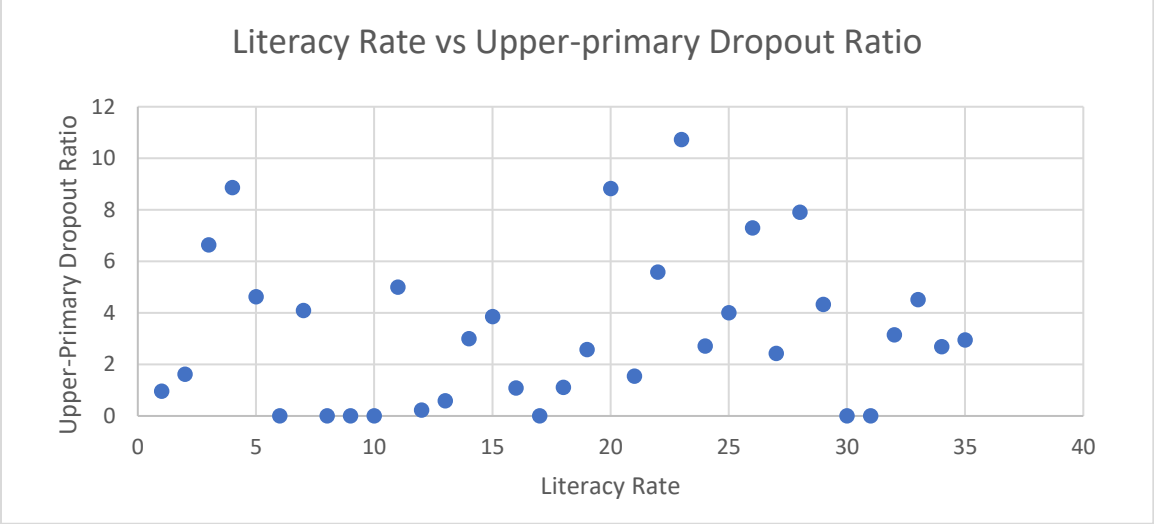
States/Union Territory	Literacy Rate (2011)	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	86.63	0.43	0.96	4.96
Andhra Pradesh	67.02	0.00	1.61	16.25
Arunachal Pradesh	65.39	9.25	6.63	11.73
Assam	72.19	6.01	8.86	20.22
Bihar	86.05	0.00	4.62	20.45
Chandigarh	75	0.00	0.00	0.00
Chhattisgarh	70.28	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	81.67	0.00	0.00	9.41
Delhi	86.21	0.00	0.00	4.78
Goa	88.7	0.00	0.00	8.75
Gujarat	78.03	0.00	5.00	17.64
Haryana	75.55	0.00	0.22	5.81
Himachal Pradesh	82.8	0.00	0.58	1.43
Jammu & Kashmir	67.16	4.04	3.00	5.99
Jharkhand	66.41	1.75	3.85	9.31
Karnataka	75.37	0.00	1.08	14.59
Kerala	94	0.00	0.00	5.46

Ladakh	NA	6.49	1.11	4.86
Lakshadweep	91.85	0.46	2.57	0.22
Madhya Pradesh	69.32	3.08	8.82	10.11
Maharashtra	82.34	0.02	1.54	10.71
Manipur	76.9	13.25	5.58	1.28
Meghalaya	74.43	9.83	10.72	21.83
Mizoram	91.33	6.33	2.71	11.95
Nagaland	79.55	5.03	4.00	17.56
Odisha	72.87	0.00	7.29	27.23
Puducherry	85.85	3.67	2.42	6.26
Punjab	75.84	1.28	7.90	17.12
Rajasthan	66.11	3.55	4.32	7.64
Sikkim	81.42	1.69	0.00	12.02
Tamil Nadu	82.9	0.00	0.00	4.42
Telangana	72.8	0.00	3.14	13.72
Tripura	87.75	1.06	4.51	8.34
Uttarakhand	87.6	0.74	2.68	5.00
Uttar Pradesh	73	2.69	2.95	9.73
West Bengal	85	8.61	0.00	18.02

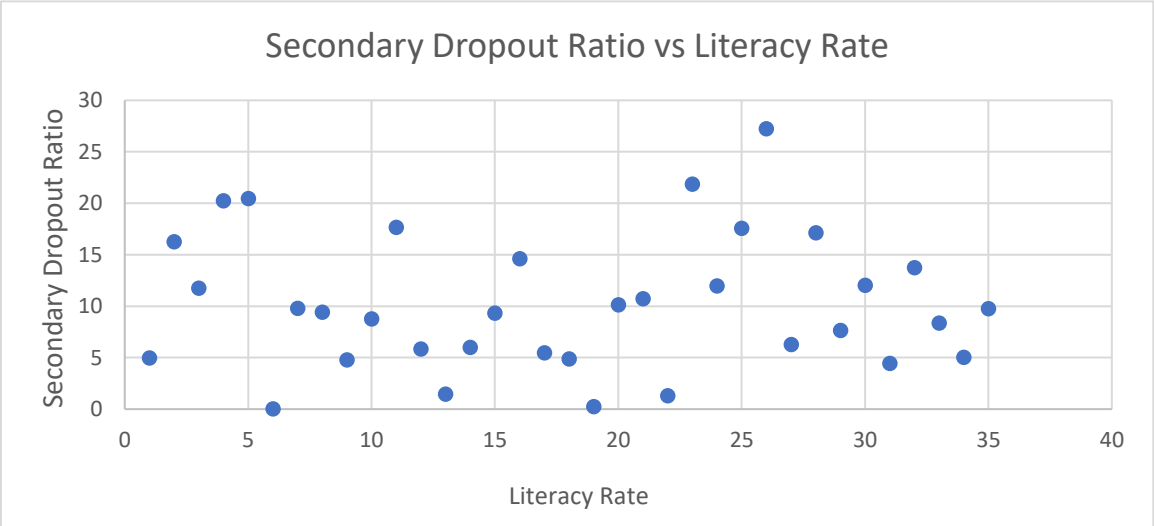
Graph: Literacy Rate vs Primary Dropout Ratio



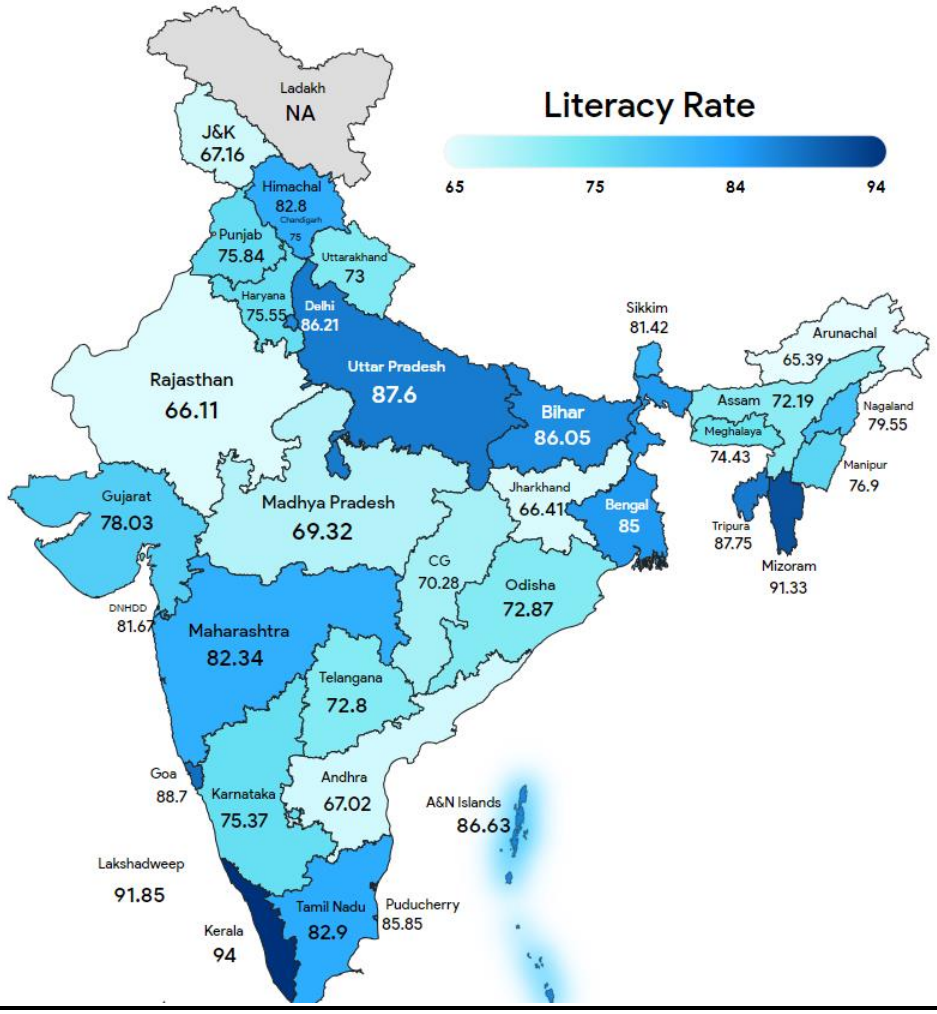
Graph: Literacy Rate vs Upper-Primary Dropout Ratio



Graph: Literacy Rate vs Primary Dropout Ratio



Literacy Rate Heat Map of India:



Verdict:

Our analysis has shown a relationship between Literacy Rates in states and UTs, more so in Upper Primary than in Primary and Secondary standards. The relationship is a negative one, which means that a higher literacy rate results in fewer dropouts. The effect of this is more evident in the case of female dropouts in the Upper Primary standard. This can be due to the introduction of more complex subjects that rely heavily on critical thinking skills and understanding.

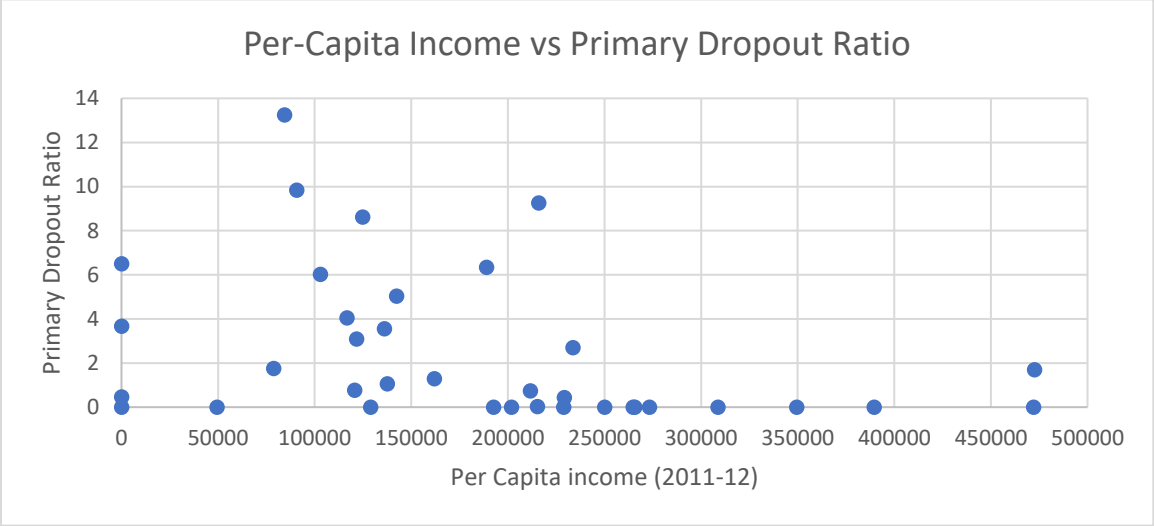
Per Capita Income

Per capita income (PCI) or average income measures the average income earned per person in a given area in a specified year. In many countries, per capita income is determined using regular population surveys, such as the American Community Survey.
Income in India discusses the financial state in India. As an overview, India's per capita net national income or NNI was around 9.97 lakh rupees in 2022. The per-capita income is a crude indicator of the prosperity of a country. In contrast, the gross national income at constant prices stood at over 128 trillion rupees.

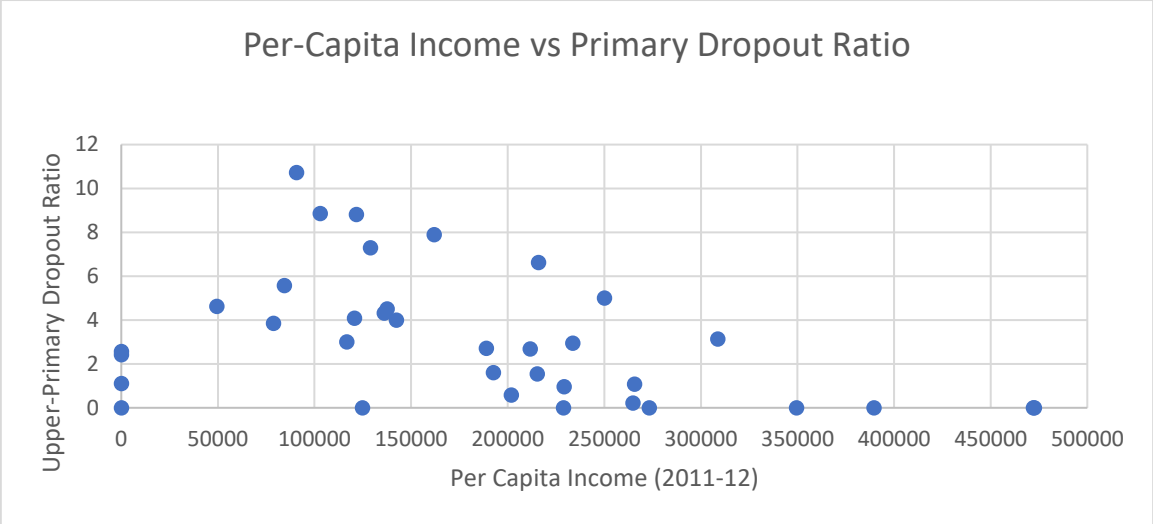
Table: Region-wise Per Capita income and Overall Dropout Ratio

States/Union Territory	Per Capita Income (2011-12)	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	229080	0.43	0.96	4.96
Andhra Pradesh	192587	0.00	1.61	16.25
Arunachal Pradesh	215897	9.25	6.63	11.73
Assam	102965	6.01	8.86	20.22
Bihar	49470	0.00	4.62	20.45
Chandigarh	349373	0.00	0.00	0.00
Chhattisgarh	120704	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	NA	0.00	0.00	9.41
Delhi	389529	0.00	0.00	4.78
Goa	472070	0.00	0.00	8.75
Gujarat	250100	0.00	5.00	17.64
Haryana	264835	0.00	0.22	5.81
Himachal Pradesh	201854	0.00	0.58	1.43
Jammu & Kashmir	116619	4.04	3.00	5.99
Jharkhand	78660	1.75	3.85	9.31
Karnataka	265623	0.00	1.08	14.59
Kerala	228767	0.00	0.00	5.46
Ladakh	NA	6.49	1.11	4.86
Lakshadweep	NA	0.46	2.57	0.22
Madhya Pradesh	121594	3.08	8.82	10.11
Maharashtra	215233	0.02	1.54	10.71
Manipur	84345	13.25	5.58	1.28
Meghalaya	90638	9.83	10.72	21.83
Mizoram	188839	6.33	2.71	11.95
Nagaland	142363	5.03	4.00	17.56
Odisha	128873	0.00	7.29	27.23
Puducherry	NA	3.67	2.42	6.26
Punjab	161888	1.28	7.90	17.12
Rajasthan	135962	3.55	4.32	7.64
Sikkim	472543	1.69	0.00	12.02
Tamil Nadu	273288	0.00	0.00	4.42
Telangana	308732	0.00	3.14	13.72
Tripura	137472	1.06	4.51	8.34
Uttarakhand	211657	0.74	2.68	5.00
Uttar Pradesh	233565	2.69	2.95	9.73
West Bengal	124798	8.61	0.00	18.02

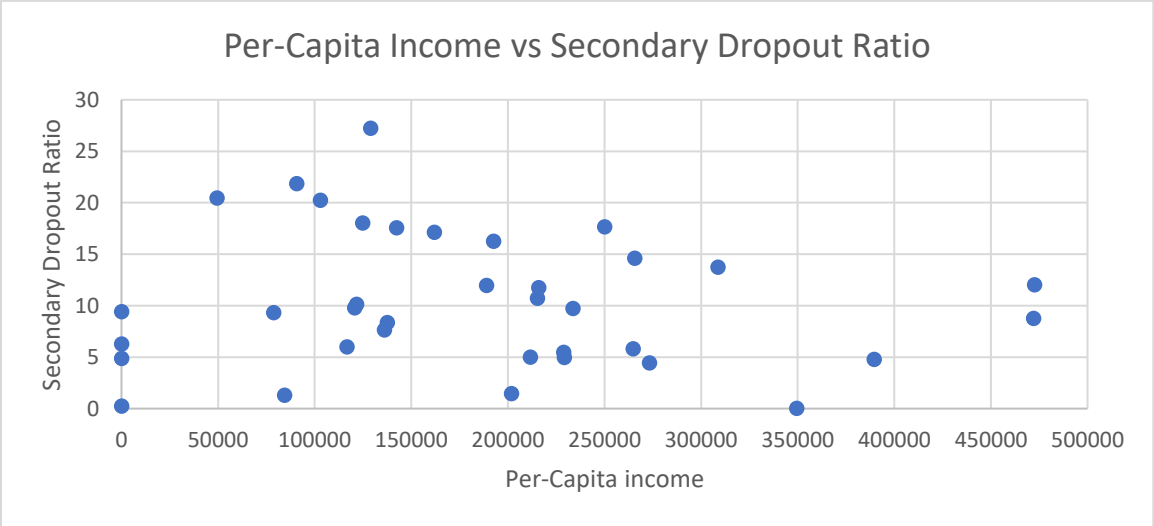
Graph: Per Capita Income vs Primary Dropout Ratio



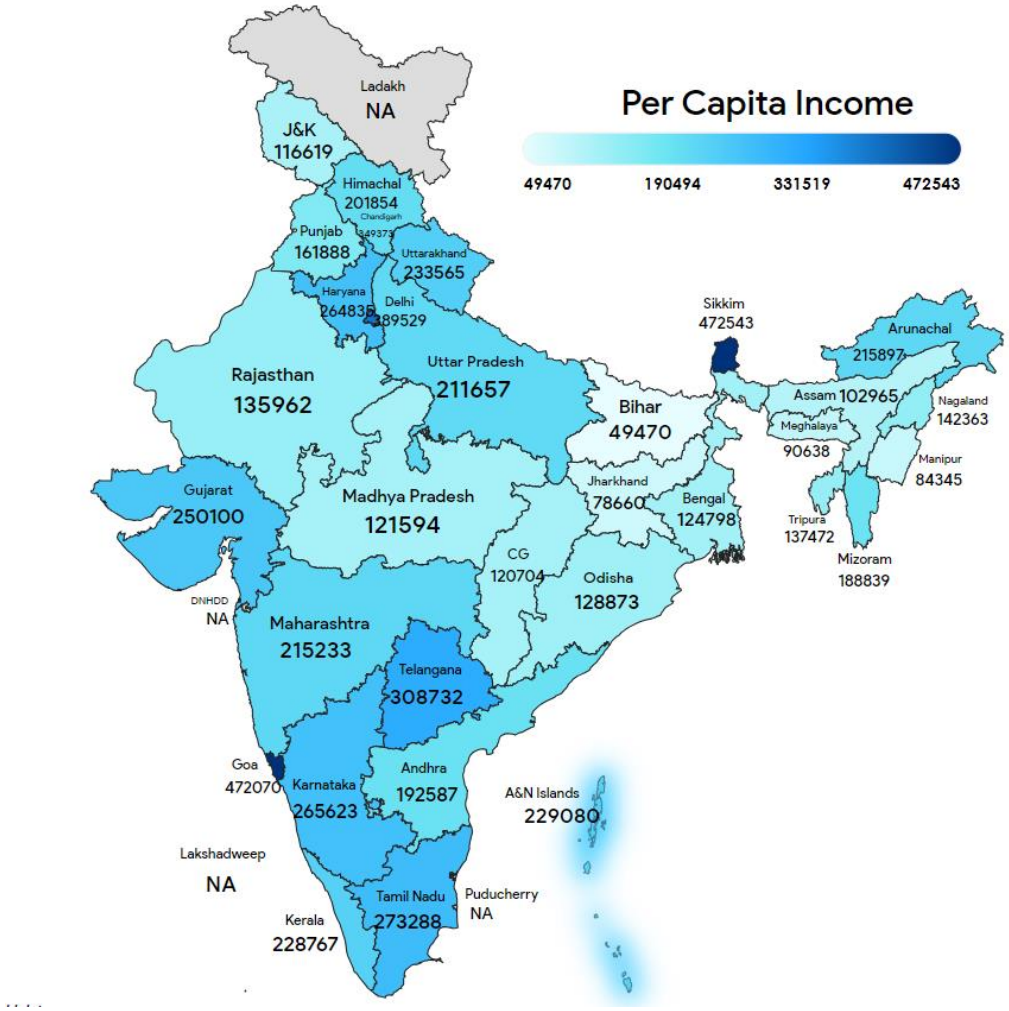
Graph: Per Capita Income vs Upper-Primary Dropout Ratio



Graph: Per Capita Income vs Secondary Dropout Ratio



Per Capita Income Heat Map of India:



Verdict:

Per Capita Income of a state heavily affects the Dropout Ratio across all standards. It is very clear that there is a potential decrease in dropout rates across a state when the per capita income is low. States with higher per capita income often have more resources to invest in their schools. Higher per capita income often translates to higher family income. This can give families the resources to afford after-school programs, tutors, and educational materials that can help students stay on track. In higher-income states, there might be a stronger emphasis on college education. This can motivate students to stay in school and see education as a path to a better future.

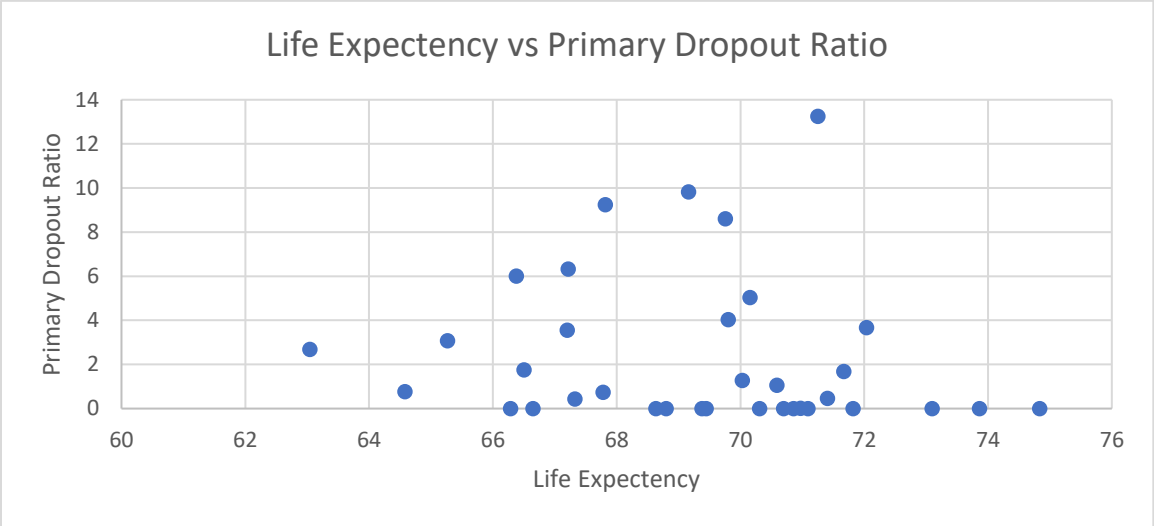
Life Expectancy

Human life expectancy is a statistical measure of the estimate of the average remaining years of life at a given age. Life expectancy in India was 25.4 in the year 1800, and over the course of the next 220 years, it has increased to almost 70. From 1920 onwards, India's life expectancy has consistently increased and currently stands at 67.24, but it is still below the global average of 73.4.

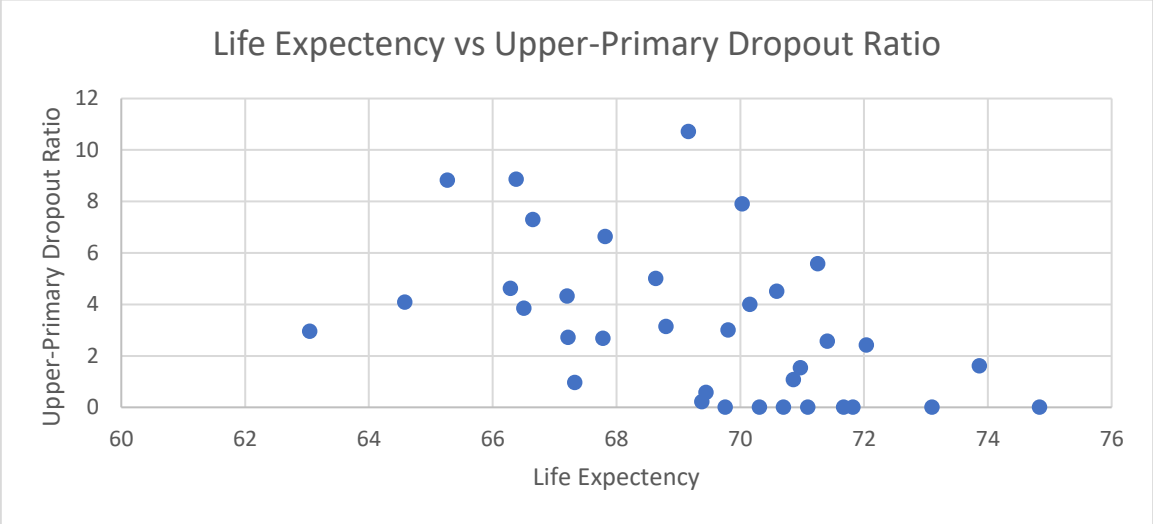
Table: Region-wise Life Expectancy and Overall Dropout Ratio

States/Union Territory	Life Expectancy	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	67.325	0.43	0.96	4.96
Andhra Pradesh	73.86	0.00	1.61	16.25
Arunachal Pradesh	67.815	9.25	6.63	11.73
Assam	66.375	6.01	8.86	20.22
Bihar	66.285	0.00	4.62	20.45
Chandigarh	71.09	0.00	0.00	0.00
Chhattisgarh	64.58	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	70.31	0.00	0.00	9.41
Delhi	70.695	0.00	0.00	4.78
Goa	73.095	0.00	0.00	8.75
Gujarat	68.63	0.00	5.00	17.64
Haryana	69.375	0.00	0.22	5.81
Himachal Pradesh	69.445	0.00	0.58	1.43
Jammu & Kashmir	69.8	4.04	3.00	5.99
Jharkhand	66.5	1.75	3.85	9.31
Karnataka	70.855	0.00	1.08	14.59
Kerala	74.835	0.00	0.00	5.46
Ladakh	0	6.49	1.11	4.86
Lakshadweep	71.405	0.46	2.57	0.22
Madhya Pradesh	65.265	3.08	8.82	10.11
Maharashtra	70.97	0.02	1.54	10.71
Manipur	71.25	13.25	5.58	1.28
Meghalaya	69.16	9.83	10.72	21.83
Mizoram	67.215	6.33	2.71	11.95
Nagaland	70.15	5.03	4.00	17.56
Odisha	66.645	0.00	7.29	27.23
Puducherry	72.035	3.67	2.42	6.26
Punjab	70.03	1.28	7.90	17.12
Rajasthan	67.2	3.55	4.32	7.64
Sikkim	71.665	1.69	0.00	12.02
Tamil Nadu	71.82	0.00	0.00	4.42
Telangana	68.795	0.00	3.14	13.72
Tripura	70.585	1.06	4.51	8.34
Uttarakhand	67.78	0.74	2.68	5.00
Uttar Pradesh	63.04	2.69	2.95	9.73
West Bengal	69.755	8.61	0.00	18.02

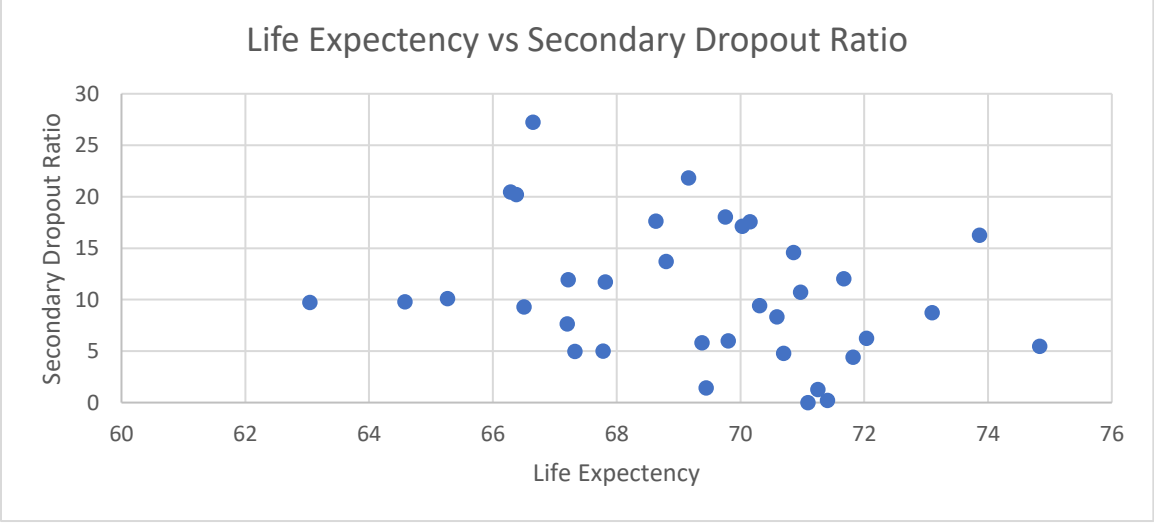
Graph: Life Expectancy vs Primary Dropout Ratio



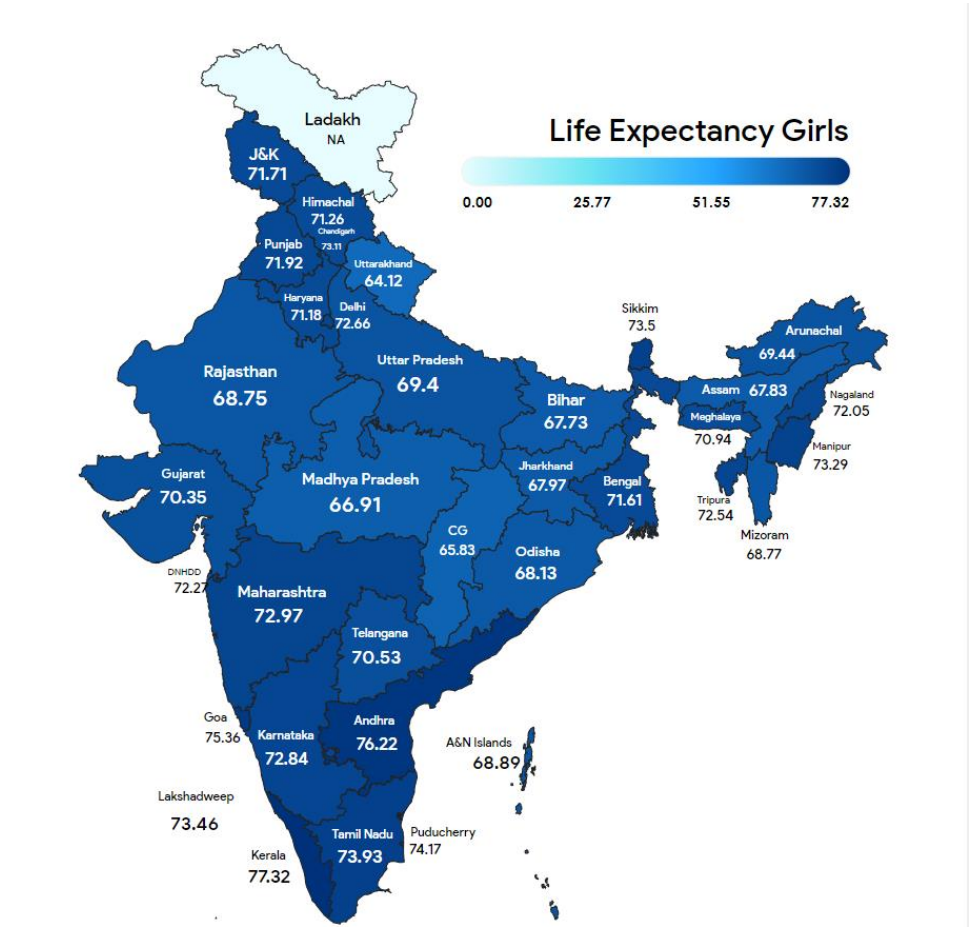
Graph: Life Expectancy vs Upper-Primary Dropout Ratio:



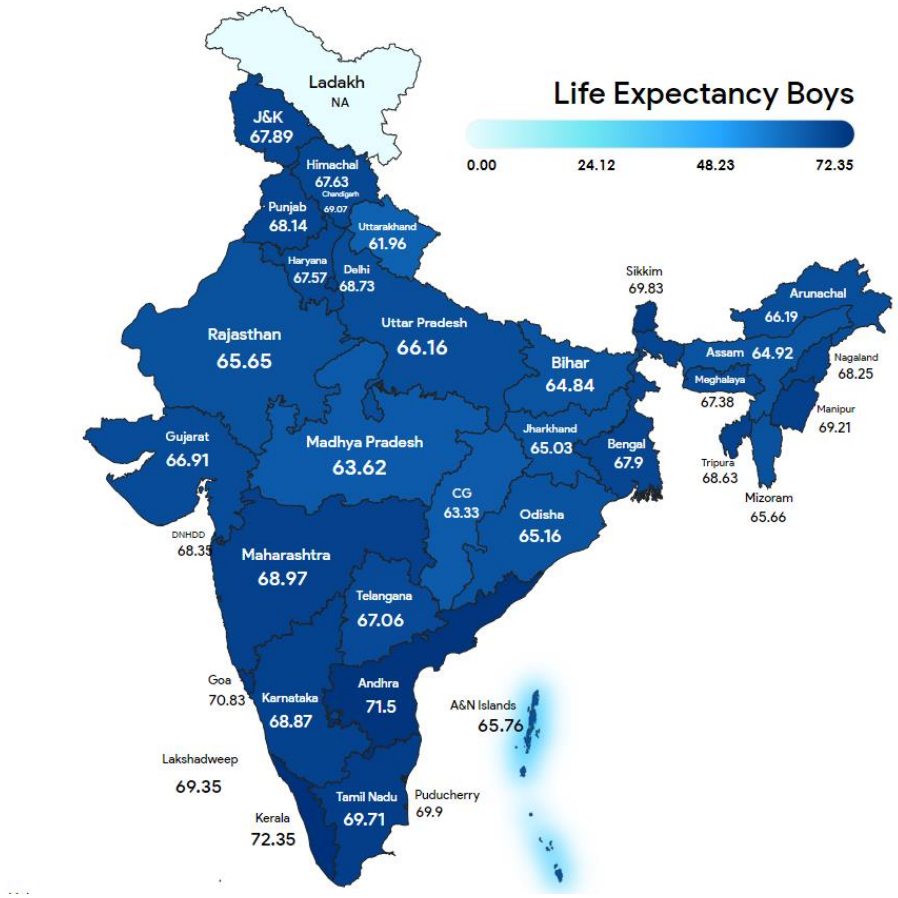
Graph: Life Expectancy vs Secondary Dropout Ratio



Life Expectancy (Female) Heat Map of India:



Life Expectancy (Male) Heat Map of India:



Verdict:

The connection between life expectancy in a state and dropout rates isn't as direct as some of the other factors. It seems to affect dropout rates across the Upper Primary standards but it might not directly influence dropout decisions in primary or secondary standards. Students at the primary and secondary standard likely aren't considering long-term factors like life expectancy when deciding to leave school. Their decisions are more likely influenced by immediate concerns and opportunities.

Human Development Index

The HDI is the geometric mean of normalized indices for each of three dimensions. The health dimension is assessed by life expectancy at birth, the education dimension is measured by mean of years of schooling for adults aged 25 years and more and expected years of schooling for children of school entering age.

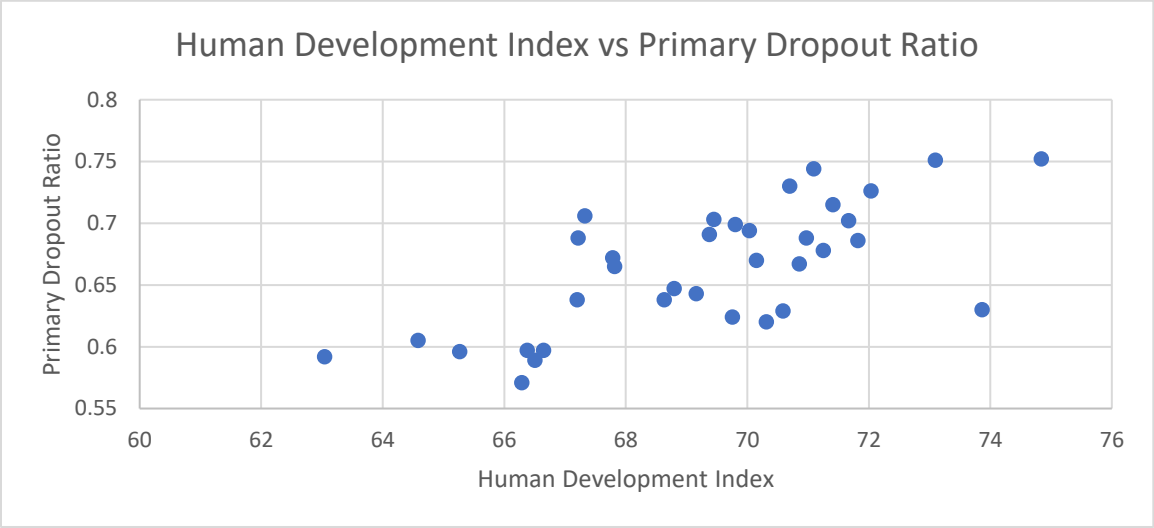
According to the 2023-24 United Nations Development Programme (UNDP) Human Development Report, India ranked 134 out of 193 countries and territories in 2022, with an HDI value of 0.644. This is an increase from 2021, when India ranked 135 and had an HDI value of 0.633. The 2022 HDI value places India in the medium human development category.

Table: Region-wise human Development Index and Overall Dropout Ratio

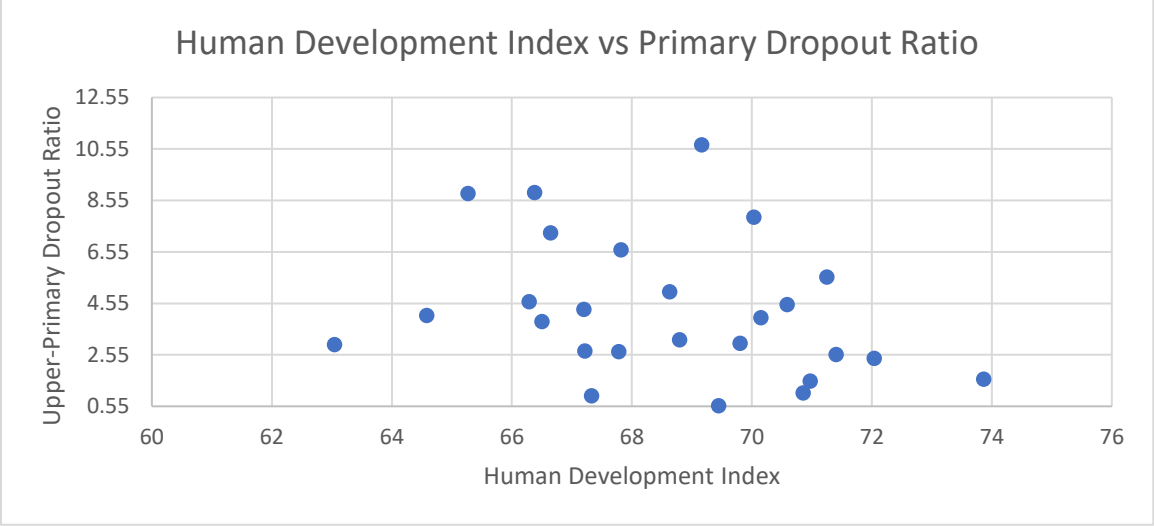
States/Union Territory	Human Development Index	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	0.706	0.43	0.96	4.96
Andhra Pradesh	0.63	0.00	1.61	16.25
Arunachal Pradesh	0.665	9.25	6.63	11.73
Assam	0.597	6.01	8.86	20.22
Bihar	0.571	0.00	4.62	20.45
Chandigarh	0.744	0.00	0.00	0.00
Chhattisgarh	0.605	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	0.62	0.00	0.00	9.41
Delhi	0.73	0.00	0.00	4.78
Goa	0.751	0.00	0.00	8.75
Gujarat	0.638	0.00	5.00	17.64
Haryana	0.691	0.00	0.22	5.81
Himachal Pradesh	0.703	0.00	0.58	1.43
Jammu & Kashmir	0.699	4.04	3.00	5.99
Jharkhand	0.589	1.75	3.85	9.31
Karnataka	0.667	0.00	1.08	14.59
Kerala	0.752	0.00	0.00	5.46
Ladakh	NA	6.49	1.11	4.86
Lakshadweep	0.715	0.46	2.57	0.22
Madhya Pradesh	0.596	3.08	8.82	10.11
Maharashtra	0.688	0.02	1.54	10.71
Manipur	0.678	13.25	5.58	1.28
Meghalaya	0.643	9.83	10.72	21.83
Mizoram	0.688	6.33	2.71	11.95
Nagaland	0.67	5.03	4.00	17.56
Odisha	0.597	0.00	7.29	27.23
Puducherry	0.726	3.67	2.42	6.26
Punjab	0.694	1.28	7.90	17.12
Rajasthan	0.638	3.55	4.32	7.64
Sikkim	0.702	1.69	0.00	12.02

Tamil Nadu	0.686	0.00	0.00	4.42
Telangana	0.647	0.00	3.14	13.72
Tripura	0.629	1.06	4.51	8.34
Uttarakhand	0.672	0.74	2.68	5.00
Uttar Pradesh	0.592	2.69	2.95	9.73
West Bengal	0.624	8.61	0.00	18.02

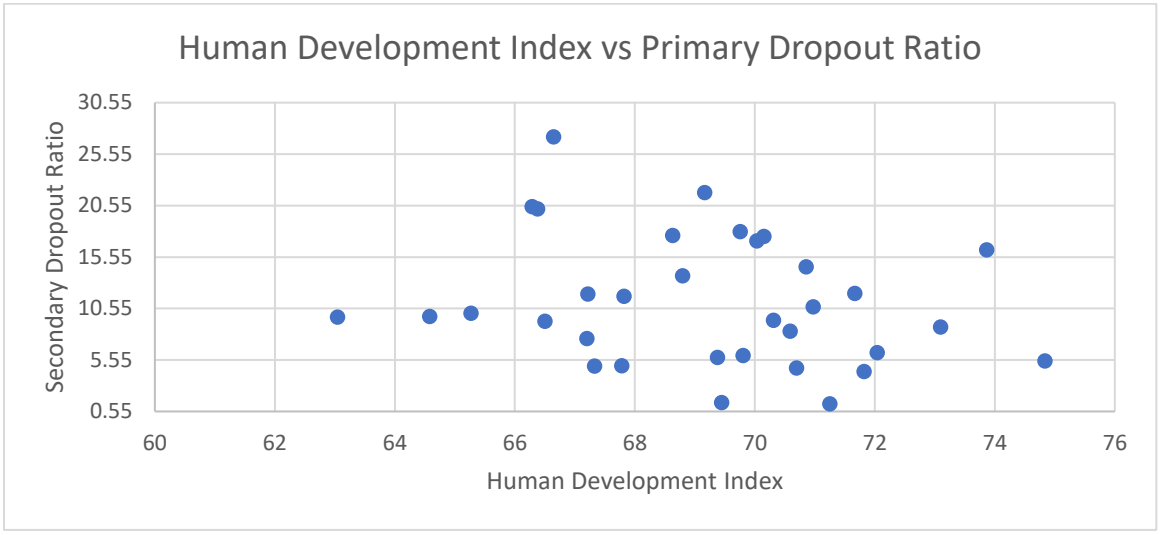
Graph: Human Development Index vs Primary Dropout Ratio



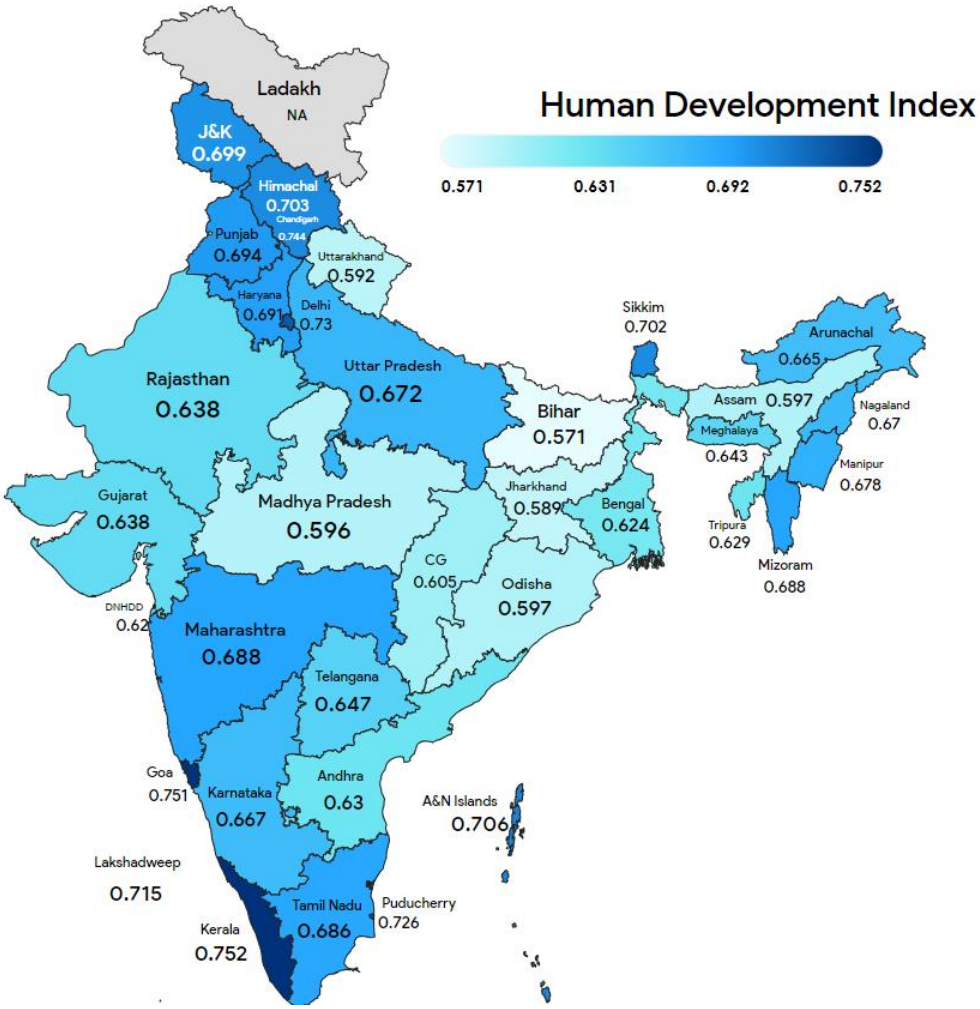
Graph: Human Development Index vs Upper-Primary Dropout Ratio



Graph: Human Development Index vs Secondary Dropout Ratio



Human Development Index Heat Map of India:



Verdict:

The Human Development Index (HDI) is a metric developed by the United Nations Development Programme (UNDP) to gauge the overall well-being of a country or state. It considers three key aspects of human development – Life Expectancy, Per Capita Income and Literacy Rate. Our analysis shows that there is a high dependency of HDI on Dropout Ratio of a state. A state with a high HDI is likely to have a more educated and healthy population. This can create a cycle where education is valued, leading to lower dropout rates, which in turn contributes to a more skilled workforce and a stronger economy. This reinforces the focus on human development, potentially leading to an even higher HDI in the future.

Gender Parity Index

Released by UNESCO, the Gender Parity Index (GPI) is a socioeconomic index usually designed to measure the relative access to education of males and females. It is used by international organizations, particularly in measuring the progress of developing countries. For example, some UNESCO documents consider gender parity in literacy.

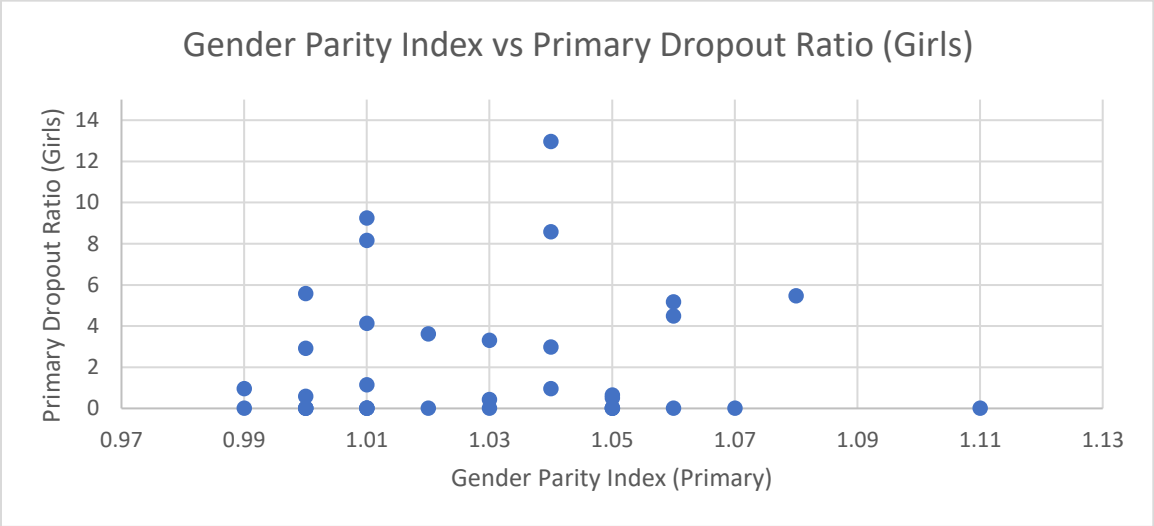
According to Statista, India's gender parity index (GPI) in 2020–2022 was 1.03 at the primary level, which is the highest across all school levels. A GPI between 0.97 and 1.03 indicates parity between genders, while a GPI below 0.97 indicates a disparity in favour of males, and a GPI above 1.03 indicates a disparity in favour of females

Table: Region-wise Gender Parity Index and Overall Dropout Ratio

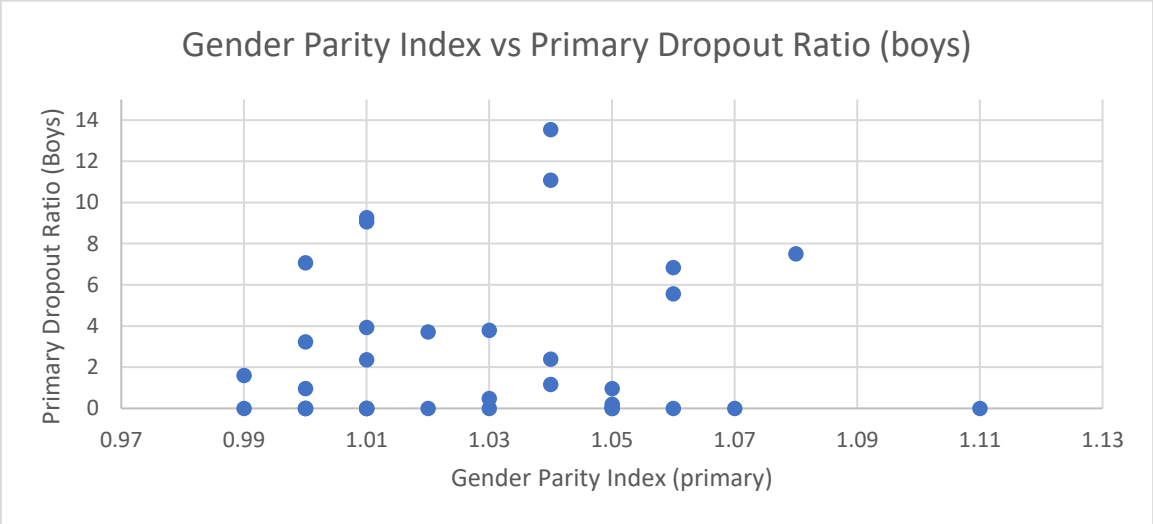
States/Union Territory	Gender Parity Index			Dropout Ratio (Overall)		
	Primary	Upper-Primary	Secondary	Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	1.05	1.02	1.12	0.43	0.96	4.96
Andhra Pradesh	1	0.95	0.98	0.00	1.61	16.25
Arunachal Pradesh	1.01	1.07	1.05	9.25	6.63	11.73
Assam	1.06	1.1	1.2	6.01	8.86	20.22
Bihar	1.03	1.03	1.06	0.00	4.62	20.45
Chandigarh	1.11	1.13	1.12	0.00	0.00	0.00
Chhattisgarh	1	1	1.08	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	1.05	1.04	1.1	0.00	0.00	9.41
Delhi	1.07	1.03	1.02	0.00	0.00	4.78
Goa	1.05	1.03	1.06	0.00	0.00	8.75
Gujarat	1.06	1	0.94	0.00	5.00	17.64
Haryana	1.01	0.99	0.97	0.00	0.22	5.81
Himachal Pradesh	1.01	1.03	1.01	0.00	0.58	1.43
Jammu & Kashmir	1.01	1.07	1.02	4.04	3.00	5.99
Jharkhand	1.01	1.02	1.06	1.75	3.85	9.31
Karnataka	1	0.99	1	0.00	1.08	14.59
Kerala	0.99	0.99	0.99	0.00	0.00	5.46
Ladakh	1.08	1.21	1.16	6.49	1.11	4.86
Lakshadweep	1.03	0.82	0.96	0.46	2.57	0.22
Madhya Pradesh	1	0.98	0.96	3.08	8.82	10.11
Maharashtra	1.05	0.98	0.98	0.02	1.54	10.71
Manipur	1.04	1.05	1.04	13.25	5.58	1.28
Meghalaya	1.04	1.16	1.24	9.83	10.72	21.83
Mizoram	1	1.02	1.1	6.33	2.71	11.95
Nagaland	1.06	1.1	1.16	5.03	4.00	17.56
Odisha	1	1	1.01	0.00	7.29	27.23
Puducherry	1.02	1.02	1.08	3.67	2.42	6.26
Punjab	0.99	1.02	1.01	1.28	7.90	17.12
Rajasthan	1.03	0.96	0.92	3.55	4.32	7.64
Sikkim	0.94	1.01	1.07	1.69	0.00	12.02
Tamil Nadu	1.02	0.99	1	0.00	0.00	4.42

Telangana	1.01	0.98	1.01	0.00	3.14	13.72
Tripura	1.04	1.04	1.08	1.06	4.51	8.34
Uttarakhand	1.05	1.02	1.02	0.74	2.68	5.00
Uttar Pradesh	1.04	1.02	0.92	2.69	2.95	9.73
West Bengal	1.01	1.02	1.12	8.61	0.00	18.02

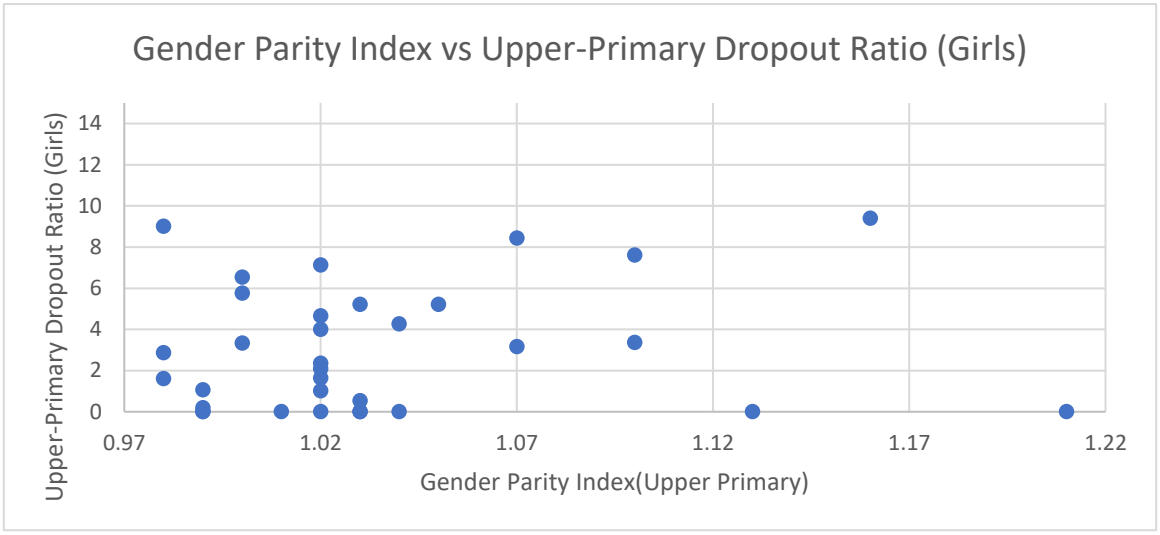
Graph: Gender Parity Index vs Primary Dropout Ratio (Girls)



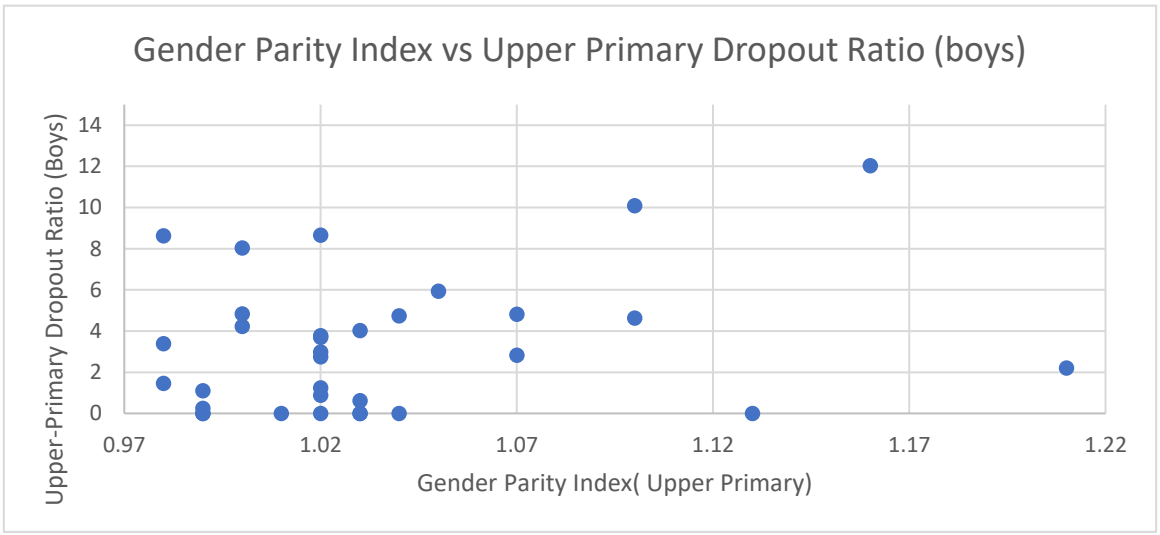
Graph: Gender Parity Index vs Primary Dropout Ratio (Boys)



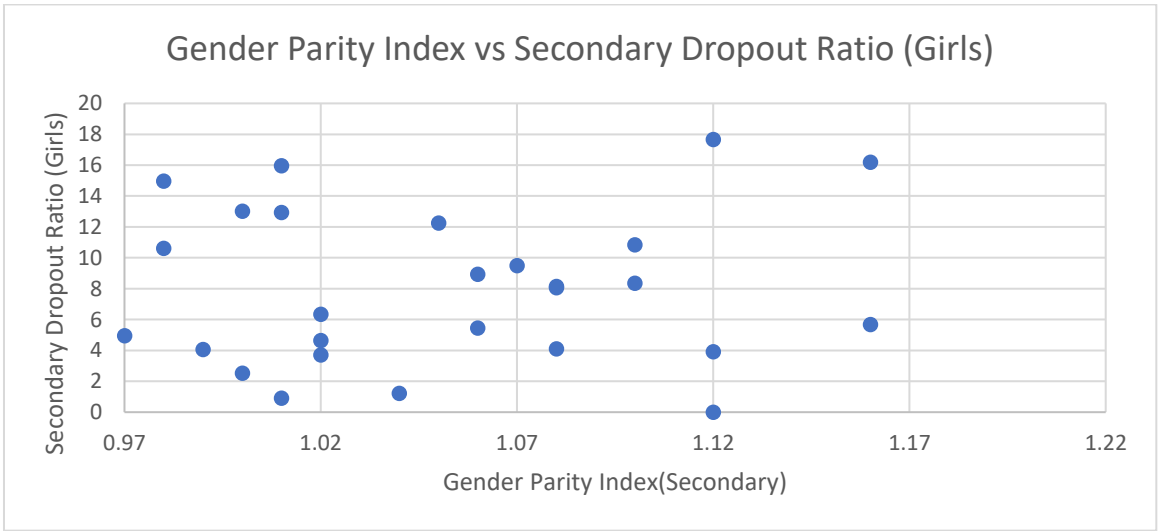
Graph: Gender Parity Index vs Upper-Primary Dropout Ratio (Girls)



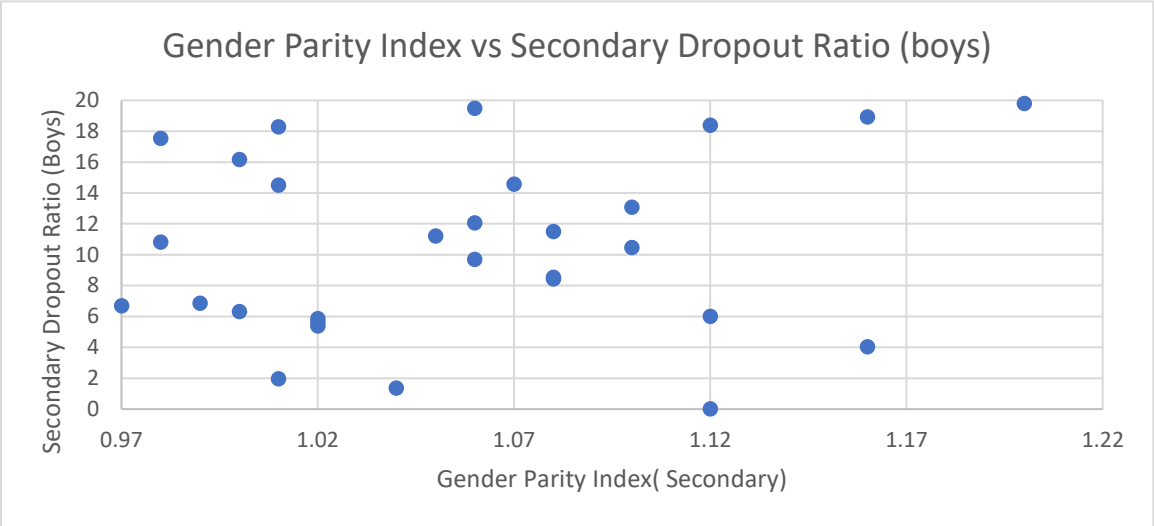
Graph: Gender Parity Index vs Upper-Primary Dropout Ratio (Boys)



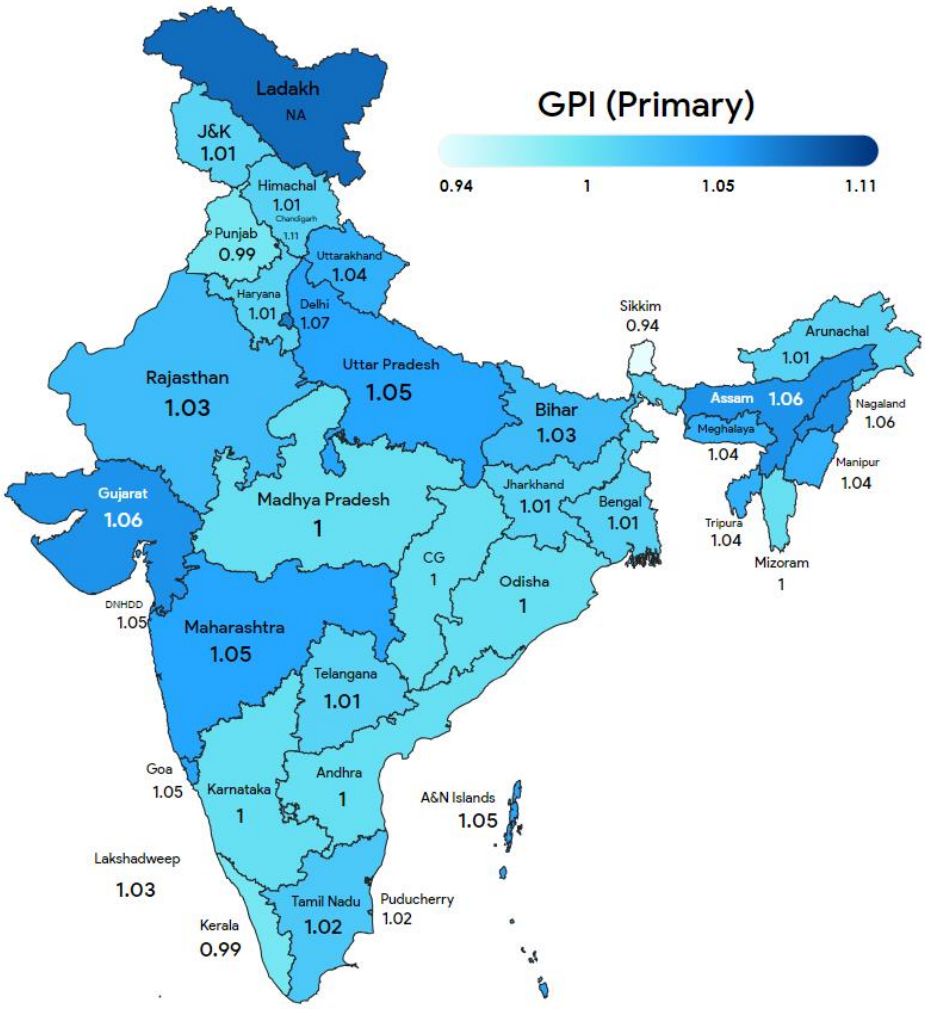
Graph: Gender Parity Index vs Secondary Dropout Ratio (Girls)



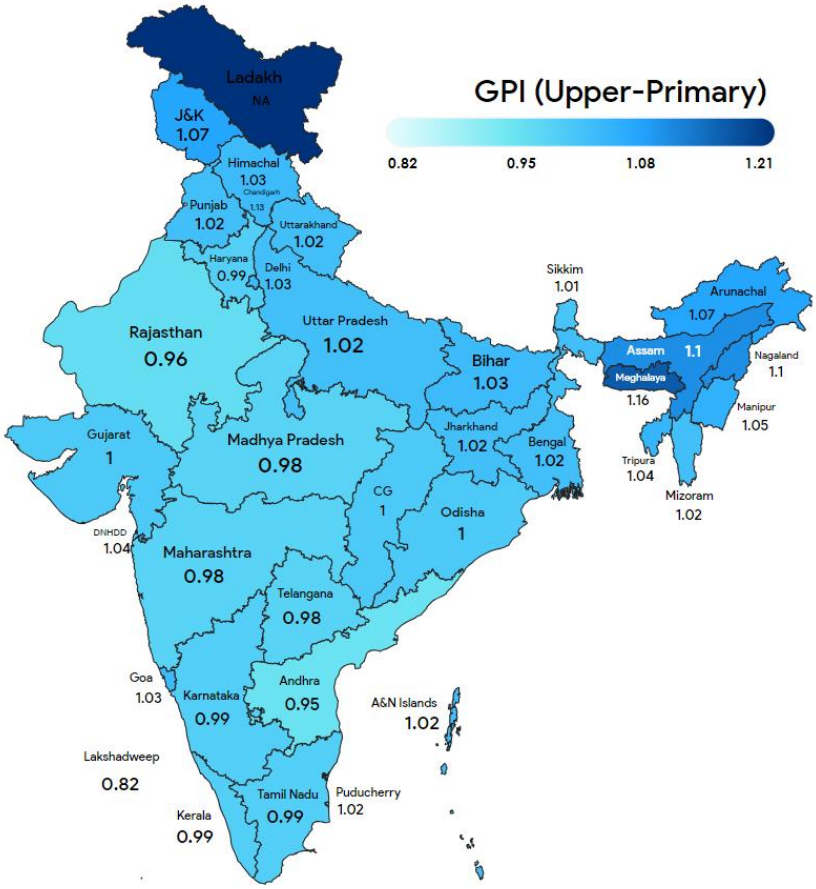
Graph: Gender Parity Index vs Secondary Dropout Ratio (Boys)



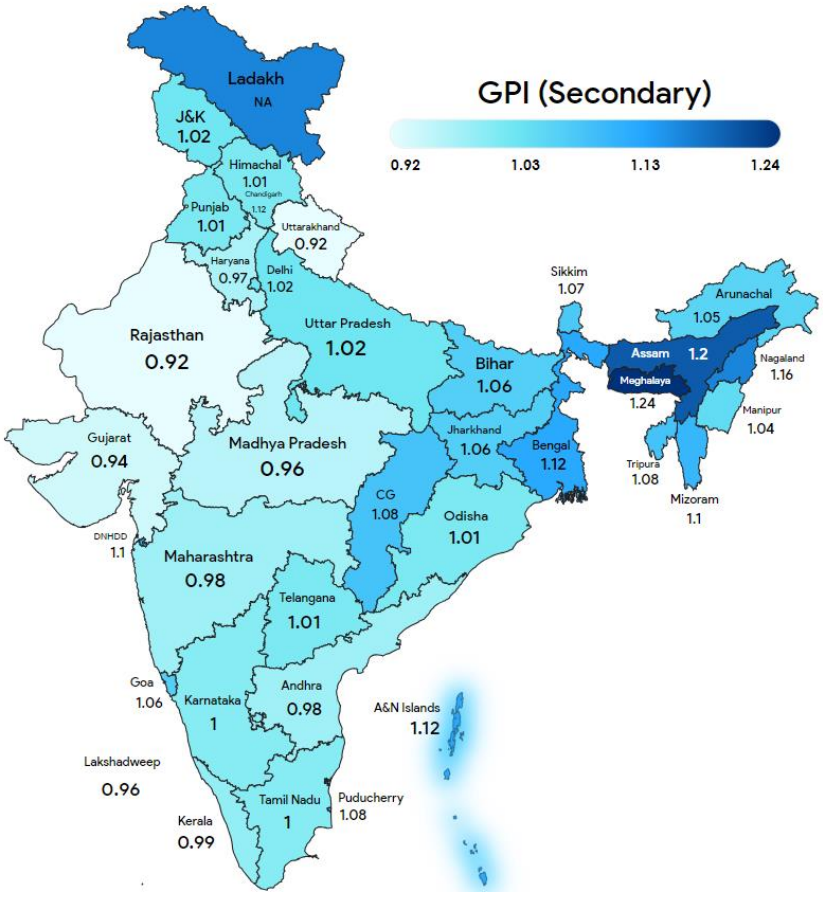
Gender Parity Index (Primary) Heat Map of India:



Gender Parity Index (Upper-Primary) Heat Map of India:



Gender Parity Index (Secondary) Heat Map of India:



Verdict:

The Gender Parity Index (GPI) is a statistical tool used to measure how equal the access to education is for girls and boys in a particular area. The relation between GPI and Dropout rates is quite complex. A GPI of less than 1 should result in higher female dropout rates while a GPI of greater than 1 should result in higher male dropouts. But India has a more balanced GPI in almost every states.

Unemployment Rate

Unemployment is measured by the unemployment rate, which is the number of people who are unemployed as a percentage of the labour force. This indicator is measured in numbers of unemployed people as a percentage of the labour force and it is seasonally adjusted.

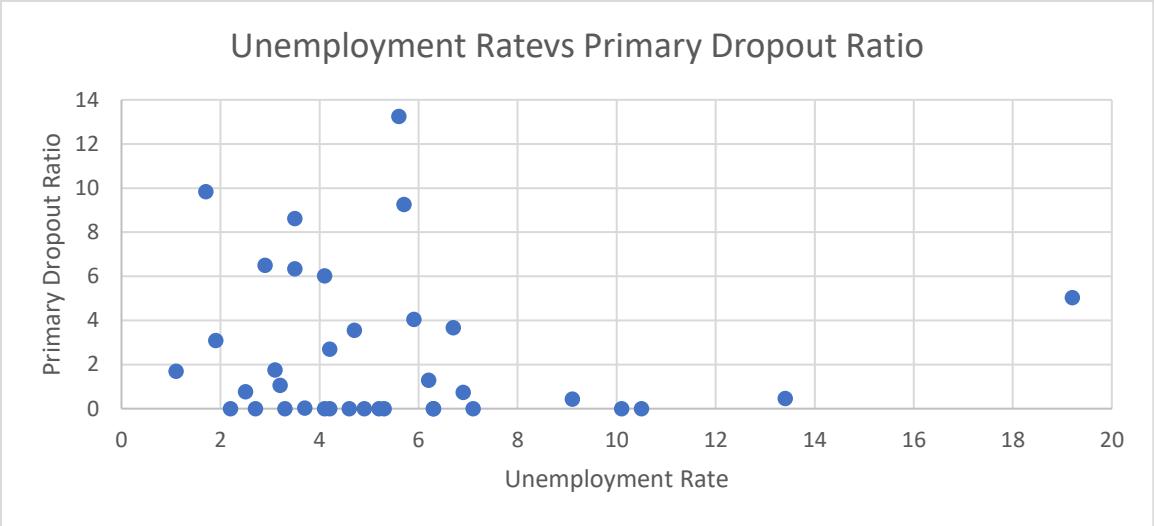
In the October to December period last year, unemployment in India's youth aged 20 to 24 years rose to 44.49%, from 43.65% in the previous quarter. Unemployment among 25- to 29-year-olds rose to 14.33% during the same period from 13.35% in the prior quarter, according to the Centre for Monitoring Indian Economy.

Table: Region-wise Unemployment Rate and Overall Dropout Ratio

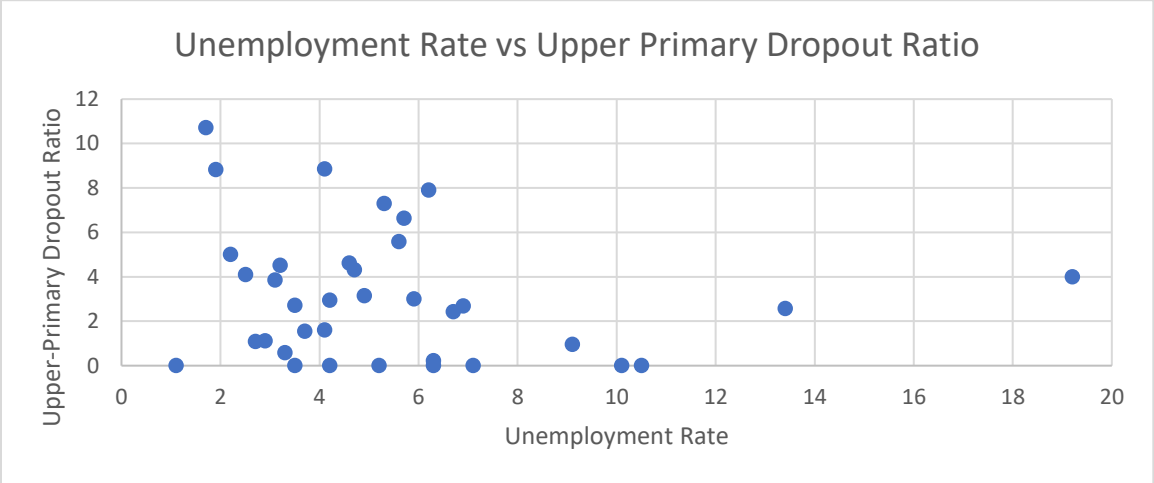
States/Union Territory	Unemployment Rate	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	9.1	0.43	0.96	4.96
Andhra Pradesh	4.1	0.00	1.61	16.25
Arunachal Pradesh	5.7	9.25	6.63	11.73
Assam	4.1	6.01	8.86	20.22
Bihar	4.6	0.00	4.62	20.45
Chandigarh	7.1	0.00	0.00	0.00
Chhattisgarh	2.5	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	4.2	0.00	0.00	9.41
Delhi	6.3	0.00	0.00	4.78
Goa	10.5	0.00	0.00	8.75
Gujarat	2.2	0.00	5.00	17.64
Haryana	6.3	0.00	0.22	5.81
Himachal Pradesh	3.3	0.00	0.58	1.43
Jammu & Kashmir	5.9	4.04	3.00	5.99
Jharkhand	3.1	1.75	3.85	9.31
Karnataka	2.7	0.00	1.08	14.59
Kerala	10.1	0.00	0.00	5.46
Ladakh	2.9	6.49	1.11	4.86
Lakshadweep	13.4	0.46	2.57	0.22
Madhya Pradesh	1.9	3.08	8.82	10.11
Maharashtra	3.7	0.02	1.54	10.71
Manipur	5.6	13.25	5.58	1.28
Meghalaya	1.7	9.83	10.72	21.83
Mizoram	3.5	6.33	2.71	11.95
Nagaland	19.2	5.03	4.00	17.56
Odisha	5.3	0.00	7.29	27.23
Puducherry	6.7	3.67	2.42	6.26
Punjab	6.2	1.28	7.90	17.12
Rajasthan	4.7	3.55	4.32	7.64
Sikkim	1.1	1.69	0.00	12.02
Tamil Nadu	5.2	0.00	0.00	4.42
Telangana	4.9	0.00	3.14	13.72

Tripura	3.2	1.06	4.51	8.34
Uttarakhand	6.9	0.74	2.68	5.00
Uttar Pradesh	4.2	2.69	2.95	9.73
West Bengal	3.5	8.61	0.00	18.02

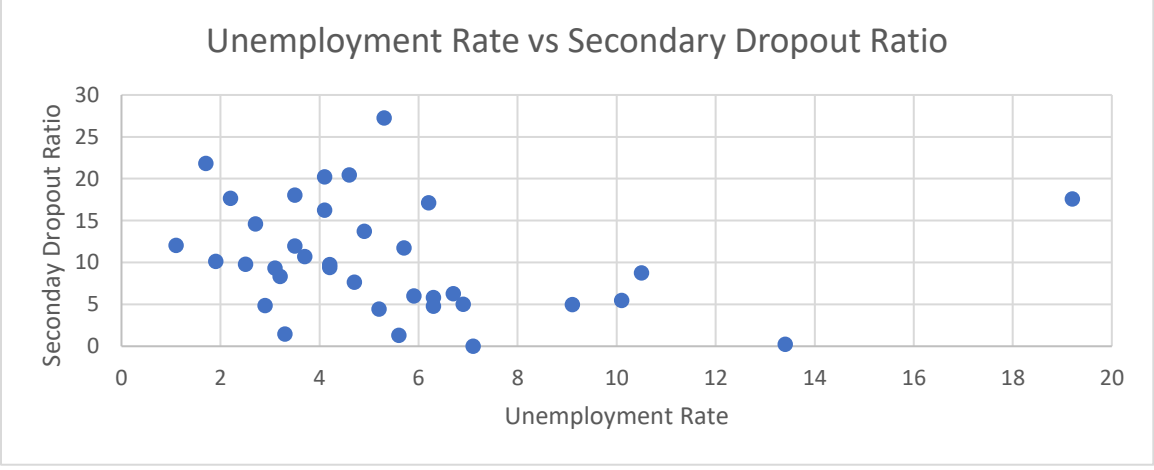
Graph: Unemployment Rate vs Primary Dropout Ratio



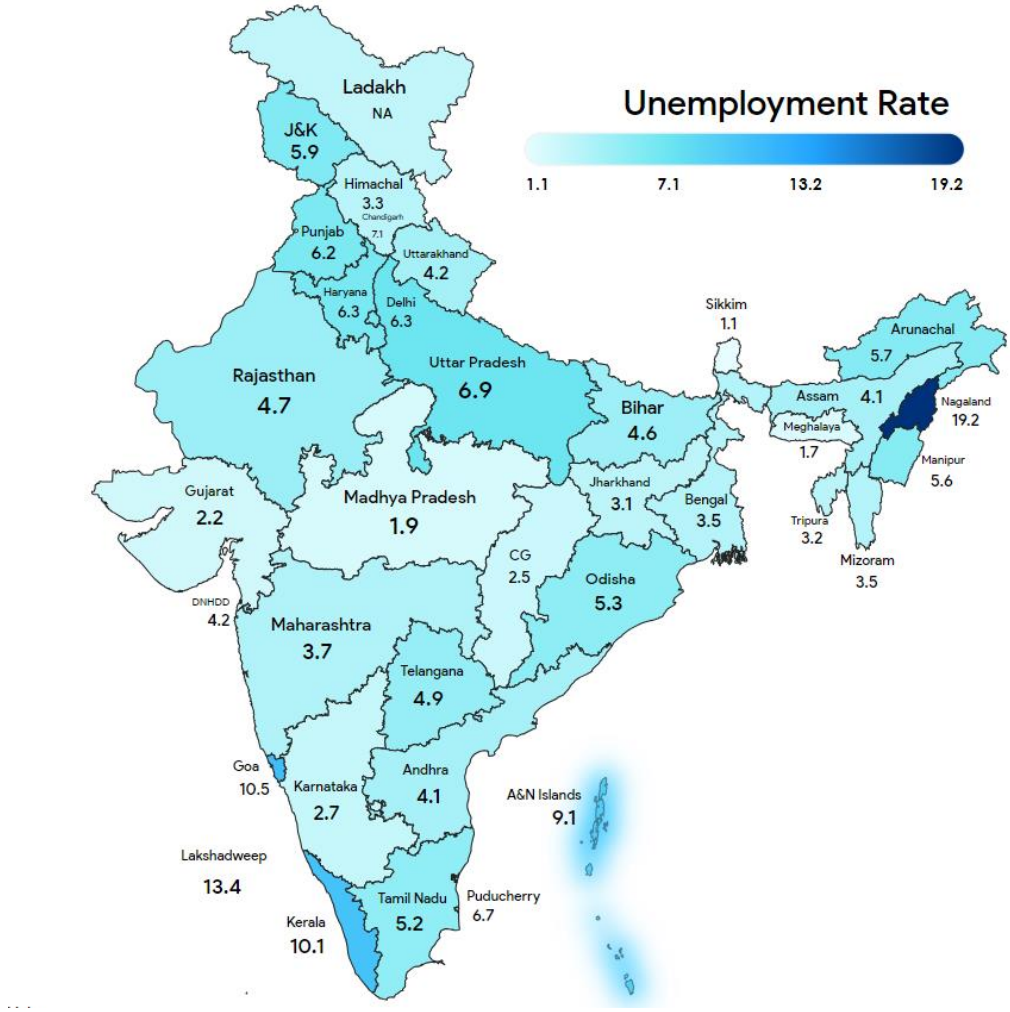
Graph: Unemployment Rate vs Upper-Primary Dropout Ratio



Graph: Unemployment Rate vs Upper-Primary Dropout Ratio



Unemployment Rate Heat Map of India:



Verdict:

Unemployment Rate affects dropout rate negatively, with it's effects visible only at the secondary standard. States with high unemployment might be forced to cut education budgets. During periods of high unemployment, families might face financial hardship. High unemployment rates can create a sense of hopelessness, especially among the students of secondary standards, who might dropout to help their family with odd jobs.

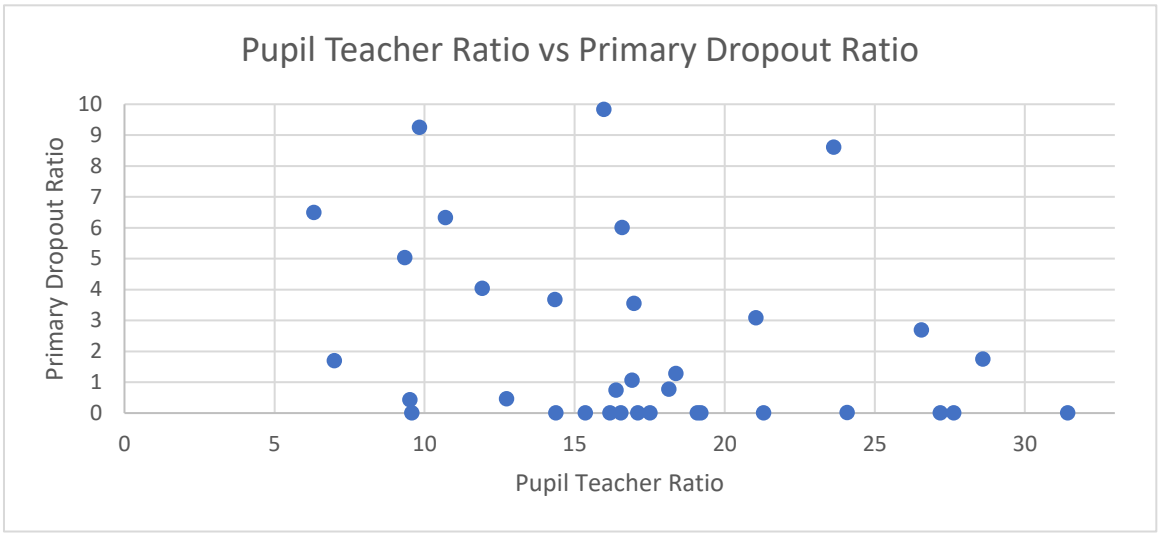
Pupil-Teacher Ratio

Pupil-Teacher Ratio is the number of students who attend a school or university divided by the number of teachers in the institution. For example, a student-teacher ratio of 10:1 indicates that there are 10 students for every teacher. According to the Education in India page on Wikipedia, the official pupil-teacher ratio for primary education in the public school system in India is 35:1.

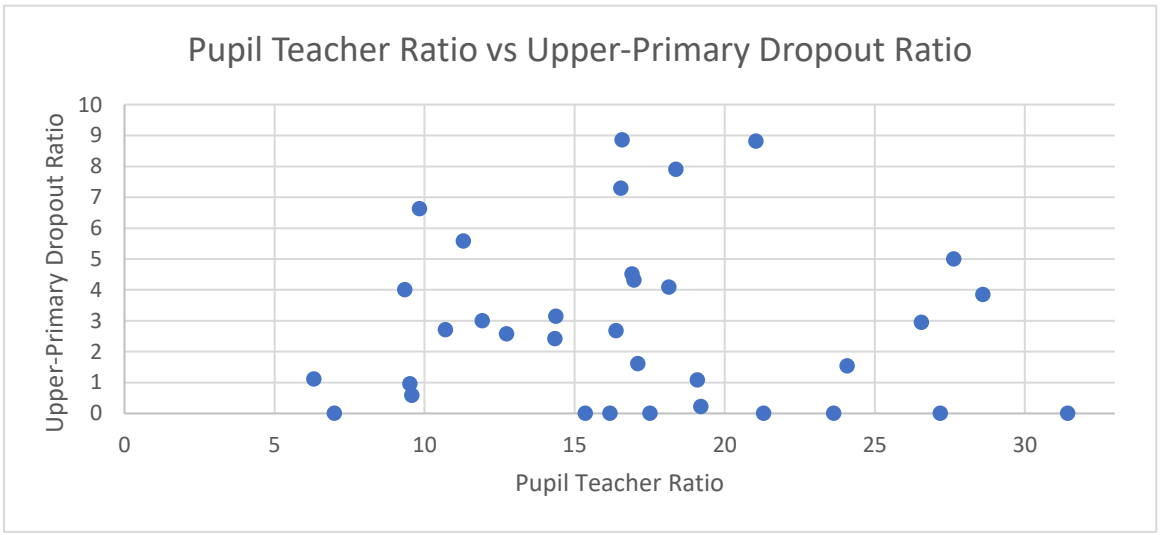
Table: Region-wise Pupil Techer Ratio and Overall Dropout Ratio

States/Union Territory	Pupil Teacher Ratio	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	9.1	0.43	0.96	4.96
Andhra Pradesh	4.1	0.00	1.61	16.25
Arunachal Pradesh	5.7	9.25	6.63	11.73
Assam	4.1	6.01	8.86	20.22
Bihar	4.6	0.00	4.62	20.45
Chandigarh	7.1	0.00	0.00	0.00
Chhattisgarh	2.5	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	4.2	0.00	0.00	9.41
Delhi	6.3	0.00	0.00	4.78
Goa	10.5	0.00	0.00	8.75
Gujarat	2.2	0.00	5.00	17.64
Haryana	6.3	0.00	0.22	5.81
Himachal Pradesh	3.3	0.00	0.58	1.43
Jammu & Kashmir	5.9	4.04	3.00	5.99
Jharkhand	3.1	1.75	3.85	9.31
Karnataka	2.7	0.00	1.08	14.59
Kerala	10.1	0.00	0.00	5.46
Ladakh	2.9	6.49	1.11	4.86
Lakshadweep	13.4	0.46	2.57	0.22
Madhya Pradesh	1.9	3.08	8.82	10.11
Maharashtra	3.7	0.02	1.54	10.71
Manipur	5.6	13.25	5.58	1.28
Meghalaya	1.7	9.83	10.72	21.83
Mizoram	3.5	6.33	2.71	11.95
Nagaland	19.2	5.03	4.00	17.56
Odisha	5.3	0.00	7.29	27.23
Puducherry	6.7	3.67	2.42	6.26
Punjab	6.2	1.28	7.90	17.12
Rajasthan	4.7	3.55	4.32	7.64
Sikkim	1.1	1.69	0.00	12.02
Tamil Nadu	5.2	0.00	0.00	4.42
Telangana	4.9	0.00	3.14	13.72
Tripura	3.2	1.06	4.51	8.34
Uttarakhand	6.9	0.74	2.68	5.00
Uttar Pradesh	4.2	2.69	2.95	9.73
West Bengal	3.5	8.61	0.00	18.02

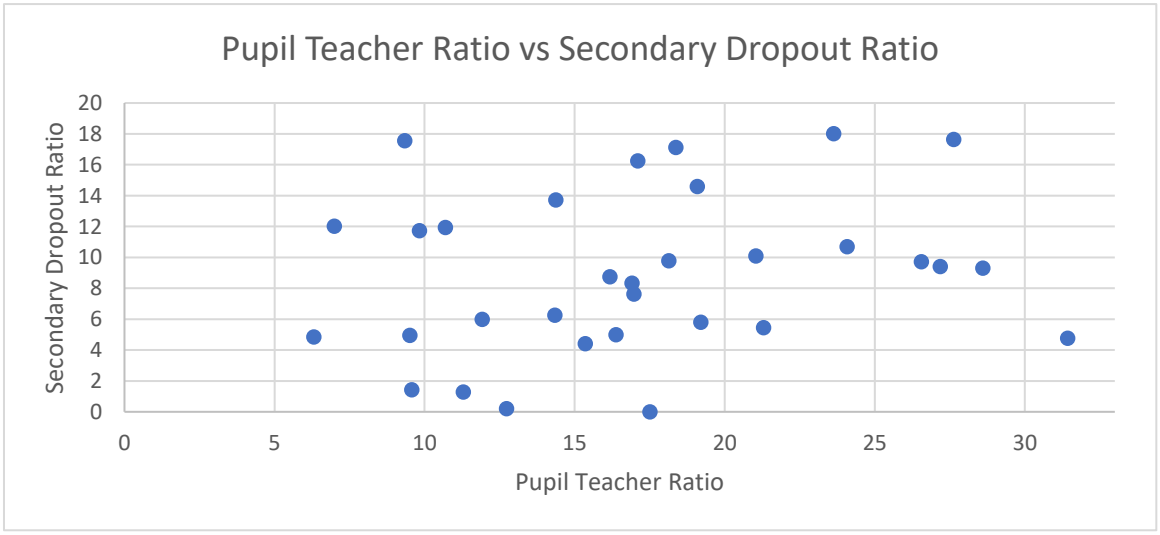
Graph: Pupil Teacher Ratio vs Primary Dropout Ratio



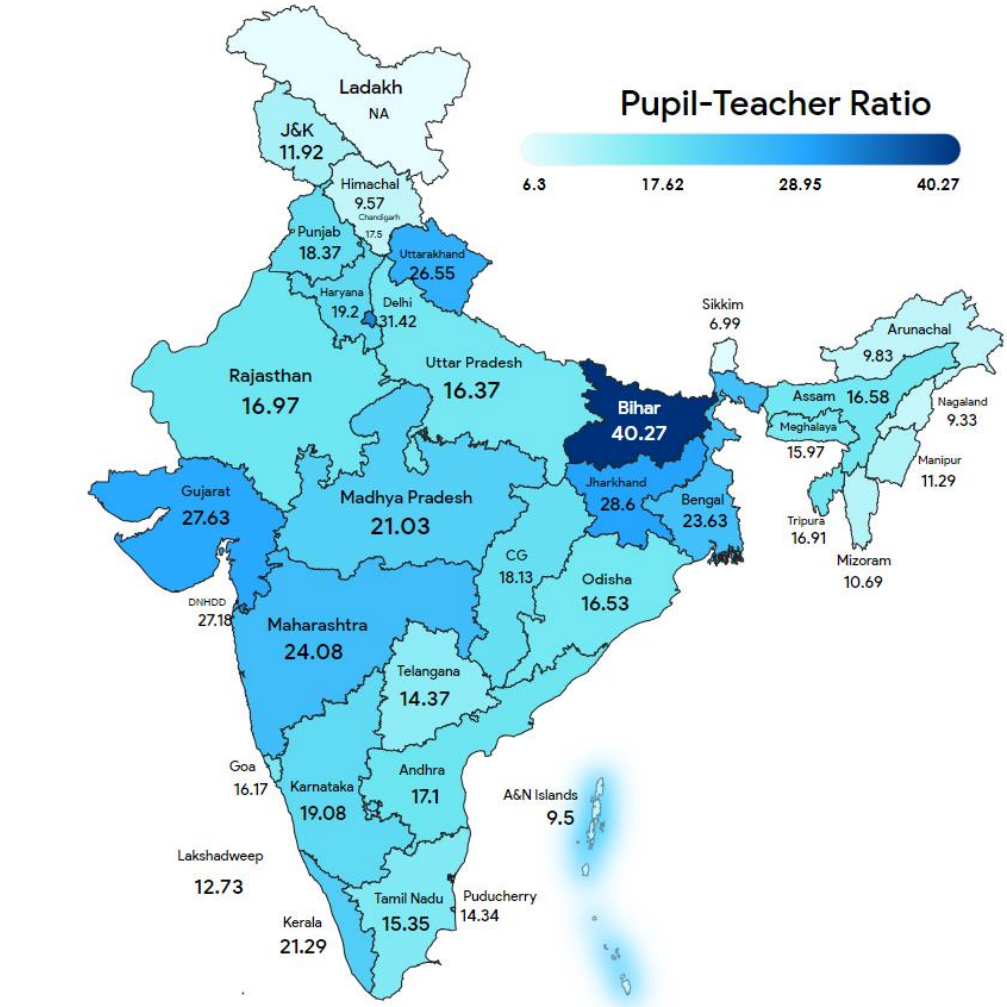
Graph: Pupil Teacher Ratio vs Upper-Primary Dropout Ratio



Graph: Pupil Teacher Ratio vs Secondary Dropout Ratio



Pupil-Teacher Ratio Heat Map of India:



Verdict:

There's a strong link between pupil-teacher ratio (PTR) and dropout rates. With fewer students, teachers can dedicate more time and attention to each student's needs. This allows them to identify struggling students early on, provide better support. In smaller classes, students are more likely to participate actively in discussions. In crowded classrooms, students might feel lost or invisible. Smaller class sizes can help students feel more connected to their peers and the teacher. The effect of PTR is very visible across all of primary, upper primary and secondary standards.

Availability of Drinking Water

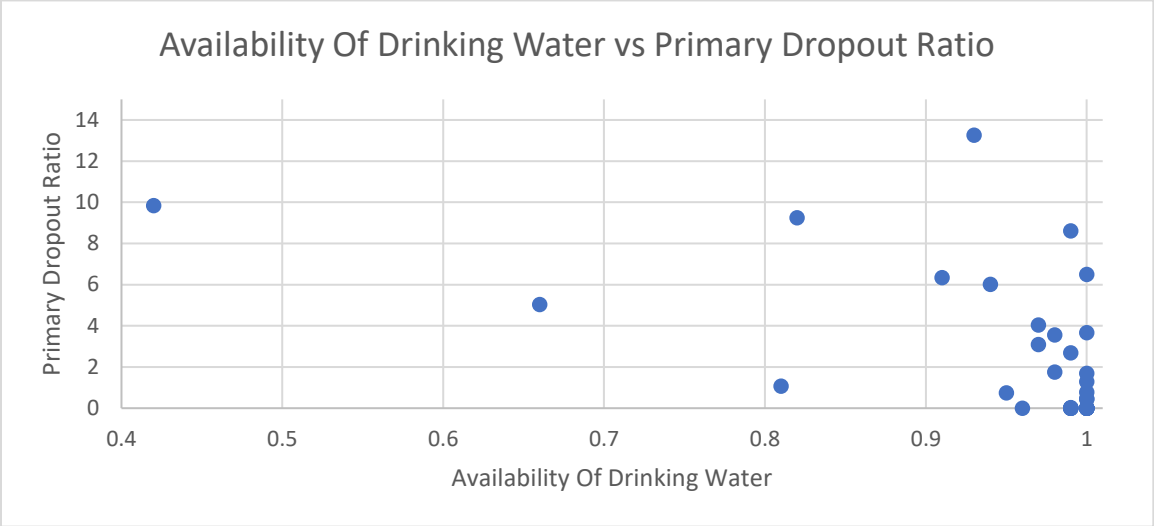
Water being a state subject, steps for augmentation, conservation and efficient management of water resources, including rural drinking water supply, are primarily undertaken by the respective State Governments. According to a report by the Ministry of Human Resource Development, 47% of schools in India have access to drinking water, and 50% of those schools have functional drinking water facilities. However, around 30% of rural schools lack access to safe drinking water. Students may have to carry water from home, or miss class to get it, which can lead to illness from water-borne diseases.

Table: Region-wise Availability of Drinking Water and Overall Dropout

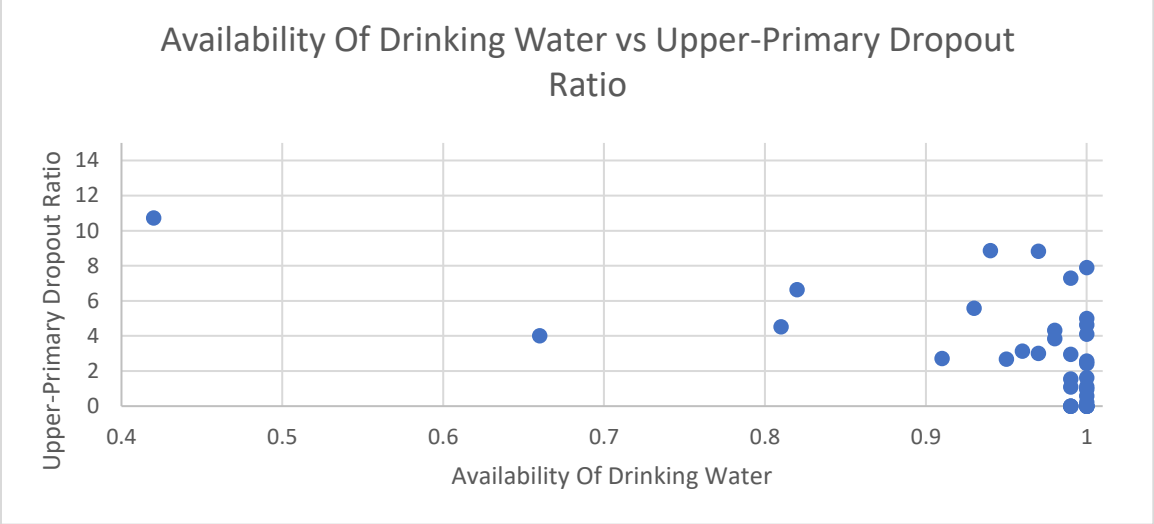
States/Union Territory	Availability Of Drinking Water	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	1	0.43	0.96	4.96
Andhra Pradesh	1	0.00	1.61	16.25
Arunachal Pradesh	0.82	9.25	6.63	11.73
Assam	0.94	6.01	8.86	20.22
Bihar	1	0.00	4.62	20.45
Chandigarh	1	0.00	0.00	0.00
Chhattisgarh	1	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	0.99	0.00	0.00	9.41
Delhi	1	0.00	0.00	4.78
Goa	1	0.00	0.00	8.75
Gujarat	1	0.00	5.00	17.64
Haryana	1	0.00	0.22	5.81
Himachal Pradesh	1	0.00	0.58	1.43
Jammu & Kashmir	0.97	4.04	3.00	5.99
Jharkhand	0.98	1.75	3.85	9.31
Karnataka	0.99	0.00	1.08	14.59
Kerala	0.99	0.00	0.00	5.46
Ladakh	1	6.49	1.11	4.86
Lakshadweep	1	0.46	2.57	0.22
Madhya Pradesh	0.97	3.08	8.82	10.11
Maharashtra	0.99	0.02	1.54	10.71
Manipur	0.93	13.25	5.58	1.28
Meghalaya	0.42	9.83	10.72	21.83
Mizoram	0.91	6.33	2.71	11.95
Nagaland	0.66	5.03	4.00	17.56
Odisha	0.99	0.00	7.29	27.23
Puducherry	1	3.67	2.42	6.26
Punjab	1	1.28	7.90	17.12
Rajasthan	0.98	3.55	4.32	7.64
Sikkim	1	1.69	0.00	12.02
Tamil Nadu	1	0.00	0.00	4.42
Telangana	0.96	0.00	3.14	13.72
Tripura	0.81	1.06	4.51	8.34
Uttarakhand	0.95	0.74	2.68	5.00

Uttar Pradesh	0.99	2.69	2.95	9.73
West Bengal	0.99	8.61	0.00	18.02

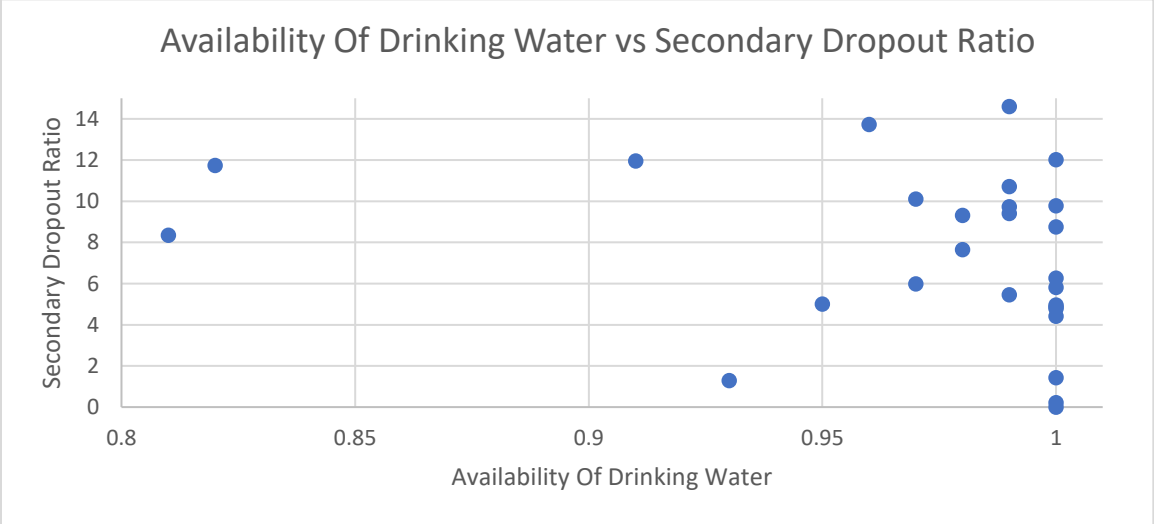
Graph: Availability Of Drinking Water vs Primary Dropout Ratio



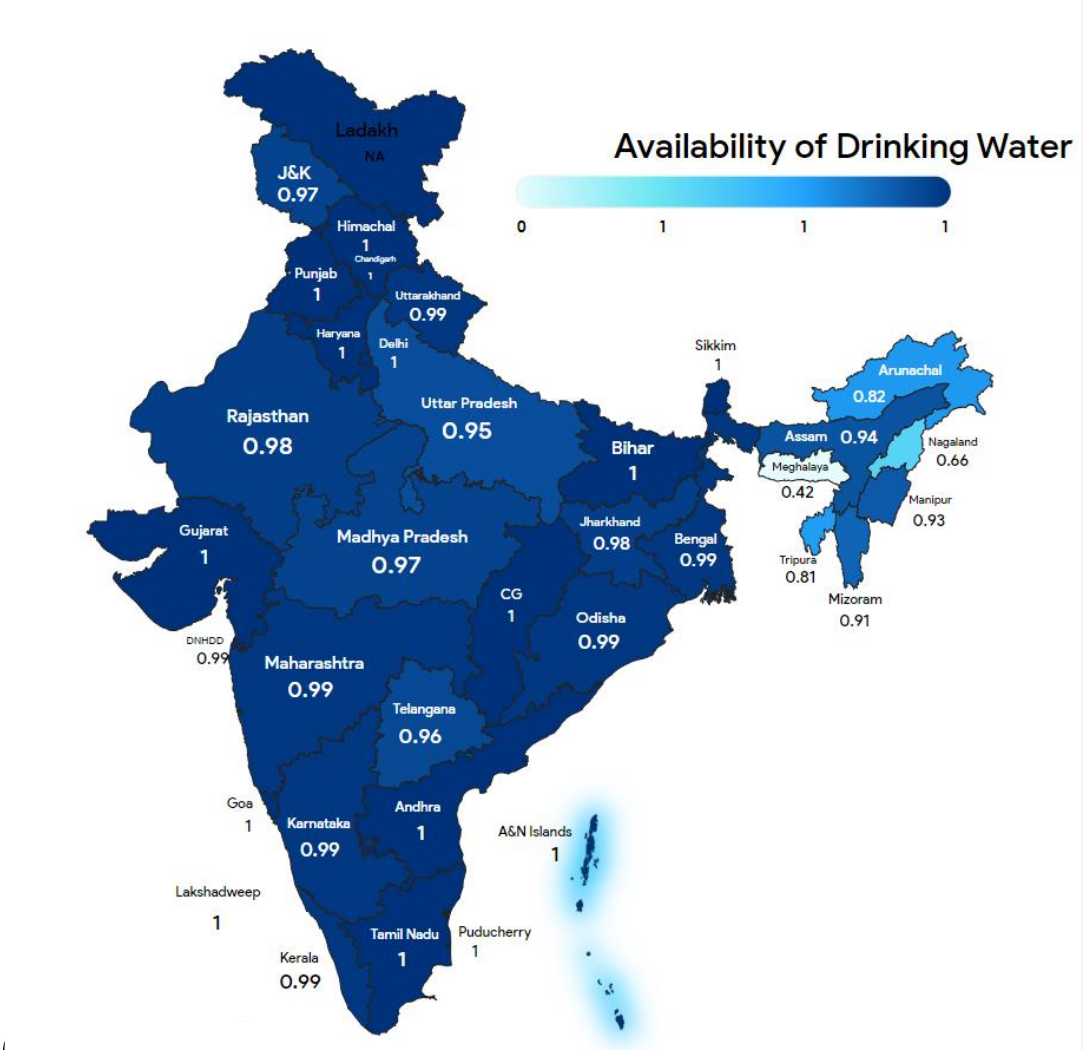
Graph: Availability Of Drinking Water vs Upper-Primary Dropout Ratio



Graph: Availability Of Drinking Water vs Secondary Dropout Ratio:



Availability of Drinking Water in Schools Heat Map of India:



Verdict:

Availability of drinking water has proved to be a key factor in influencing dropout rates. Although most of the states have clean drinking water available across all schools, the states that don't have a higher dropout rate across all standards. But the connection isn't very strong. While lack of water can affect attendance and health, it's unlikely to be the sole reason a student drops out. Deeper social and economic factors likely play a bigger role.

Availability of Electricity

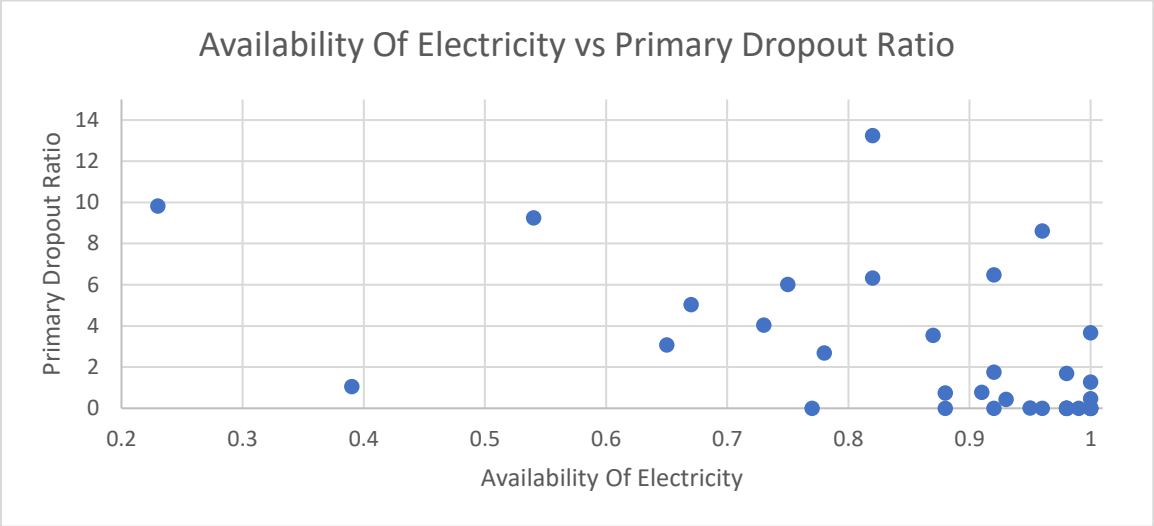
Some say that India's electrification policies focus on household electrification instead of schools and clinics, and that a lack of focus on reliability is a major fault. For example, in Assam, 100% of government schools have electricity, while in Jharkhand, 93% do. In financial year 2022, over 89 percent of the schools in India had access to electricity. It was an improvement compared to the figures recorded a year before. The lack of electricity in educational institutions results in reduced teaching quality and less participation.

Table: Region-wise Availability of Electricity and Overall Dropout Ratio

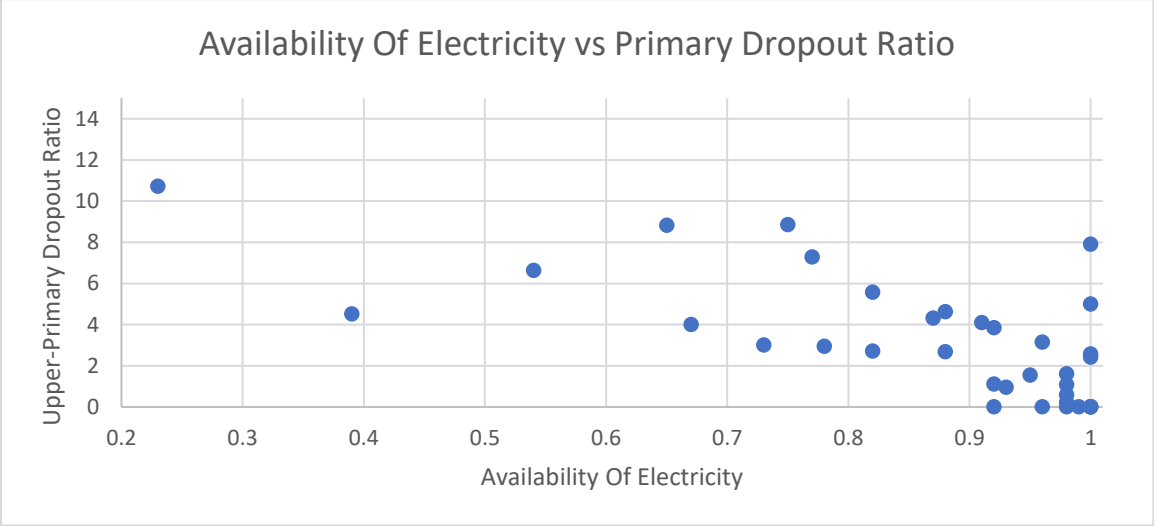
States/Union Territory	Availability of Electricity	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	0.93	0.43	0.96	4.96
Andhra Pradesh	0.98	0.00	1.61	16.25
Arunachal Pradesh	0.54	9.25	6.63	11.73
Assam	0.75	6.01	8.86	20.22
Bihar	0.88	0.00	4.62	20.45
Chandigarh	1	0.00	0.00	0.00
Chhattisgarh	0.91	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	0.92	0.00	0.00	9.41
Delhi	1	0.00	0.00	4.78
Goa	1	0.00	0.00	8.75
Gujarat	1	0.00	5.00	17.64
Haryana	0.98	0.00	0.22	5.81
Himachal Pradesh	0.98	0.00	0.58	1.43
Jammu & Kashmir	0.73	4.04	3.00	5.99
Jharkhand	0.92	1.75	3.85	9.31
Karnataka	0.98	0.00	1.08	14.59
Kerala	0.99	0.00	0.00	5.46
Ladakh	0.92	6.49	1.11	4.86
Lakshadweep	1	0.46	2.57	0.22
Madhya Pradesh	0.65	3.08	8.82	10.11
Maharashtra	0.95	0.02	1.54	10.71
Manipur	0.82	13.25	5.58	1.28
Meghalaya	0.23	9.83	10.72	21.83
Mizoram	0.82	6.33	2.71	11.95
Nagaland	0.67	5.03	4.00	17.56
Odisha	0.77	0.00	7.29	27.23
Puducherry	1	3.67	2.42	6.26
Punjab	1	1.28	7.90	17.12
Rajasthan	0.87	3.55	4.32	7.64
Sikkim	0.98	1.69	0.00	12.02
Tamil Nadu	1	0.00	0.00	4.42
Telangana	0.96	0.00	3.14	13.72
Tripura	0.39	1.06	4.51	8.34
Uttarakhand	0.88	0.74	2.68	5.00
Uttar Pradesh	0.78	2.69	2.95	9.73

West Bengal	0.96	8.61	0.00	18.02

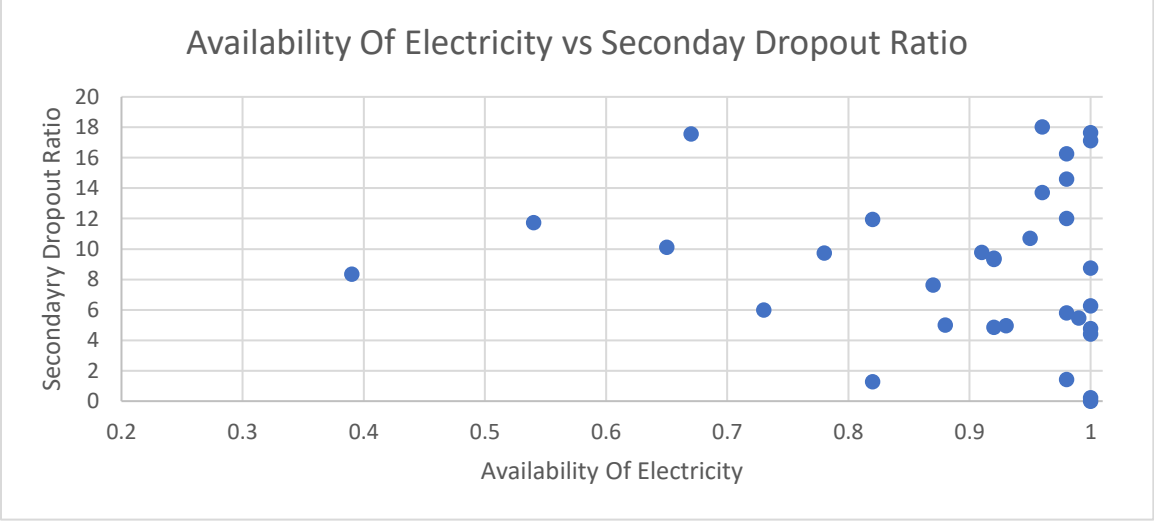
Graph: Availability Of Electricity vs Primary Dropout Ratio:



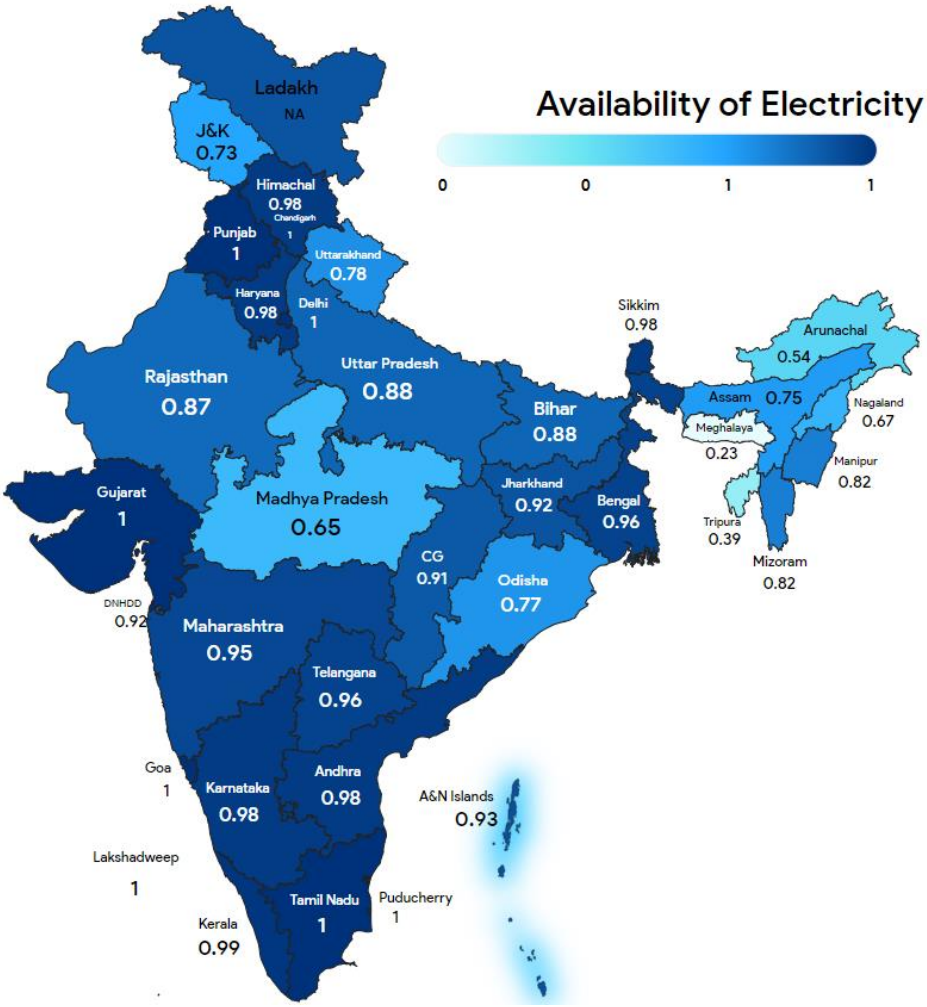
Graph: Availability Of Electricity vs Upper-Primary Dropout Ratio:



Graph: Availability Of Electricity vs Secondary Dropout Ratio:



Availability of Electricity in Schools Heat Map of India:



Verdict:

The availability of electricity in schools has a positive impact on dropout rates, particularly in rural and under-resourced areas. Electricity allows schools to integrate technology like computers, projectors, and audio-visual aids into lessons. This can make learning more engaging. Proper lighting in classrooms and hallways can create a safer learning environment. Schools with electricity can potentially provide internet access for students and teachers. This opens doors to a vast number of educational resources online.

Availability of Library with Books

The focus of the budget on strengthening school libraries is certainly well-placed and much needed, considering that the recently released Annual Status of Education Report (ASER) 2022, which covers rural India, has reported a dip from 46.8 per cent to 30.8 per cent in the availability of library books in schools.

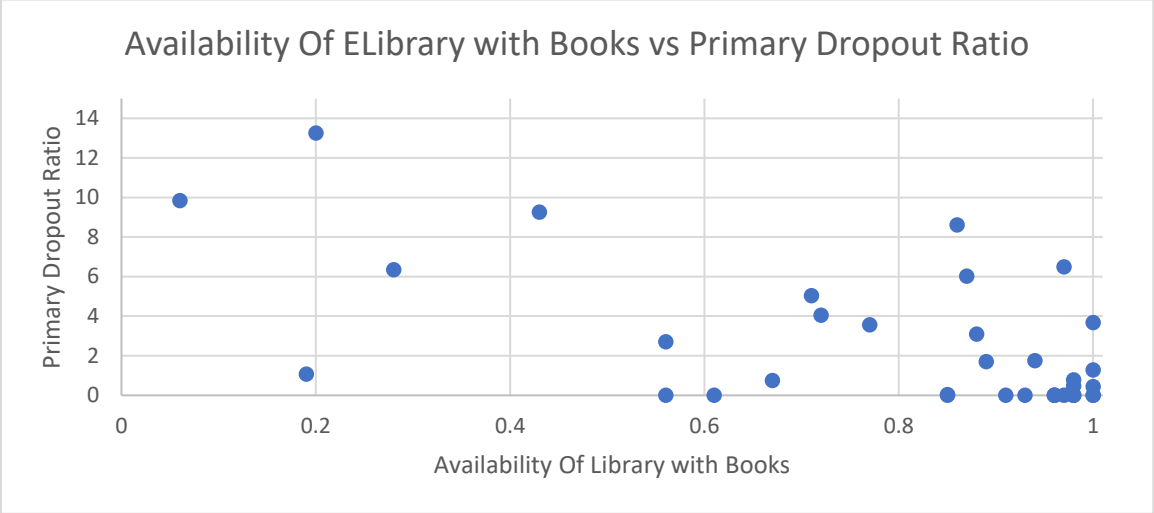
The percentage of public schools in India with libraries has increased from 37.3% in 2018 to 34.3% in 2022, but the percentage of library books available has decreased from 46.8% to 30.8%.

Table: Region-wise Availability of Library with Books and Overall Dropout Ratio

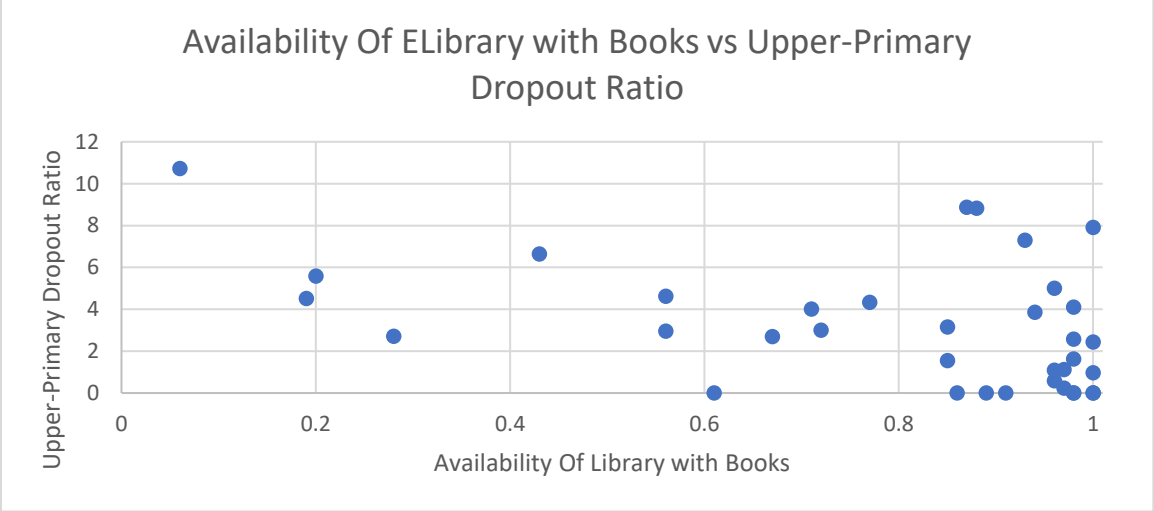
States/Union Territory	Availability of Library with Books	Dropout Ratio (Overall)		
		Primary	Upper-Primary	Secondary
Andaman & Nicobar Islands	1	0.43	0.96	4.96
Andhra Pradesh	0.98	0.00	1.61	16.25
Arunachal Pradesh	0.43	9.25	6.63	11.73
Assam	0.87	6.01	8.86	20.22
Bihar	0.56	0.00	4.62	20.45
Chandigarh	0.98	0.00	0.00	0.00
Chhattisgarh	0.98	0.77	4.09	9.78
Dadra & Nagar Haveli and Daman & Diu	0.91	0.00	0.00	9.41
Delhi	1	0.00	0.00	4.78
Goa	1	0.00	0.00	8.75
Gujarat	0.96	0.00	5.00	17.64
Haryana	0.97	0.00	0.22	5.81
Himachal Pradesh	0.96	0.00	0.58	1.43
Jammu & Kashmir	0.72	4.04	3.00	5.99
Jharkhand	0.94	1.75	3.85	9.31
Karnataka	0.96	0.00	1.08	14.59
Kerala	0.98	0.00	0.00	5.46
Ladakh	0.97	6.49	1.11	4.86
Lakshadweep	0.98	0.46	2.57	0.22
Madhya Pradesh	0.88	3.08	8.82	10.11
Maharashtra	0.85	0.02	1.54	10.71
Manipur	0.2	13.25	5.58	1.28
Meghalaya	0.06	9.83	10.72	21.83
Mizoram	0.28	6.33	2.71	11.95
Nagaland	0.71	5.03	4.00	17.56
Odisha	0.93	0.00	7.29	27.23
Puducherry	1	3.67	2.42	6.26
Punjab	1	1.28	7.90	17.12
Rajasthan	0.77	3.55	4.32	7.64
Sikkim	0.89	1.69	0.00	12.02
Tamil Nadu	0.61	0.00	0.00	4.42
Telangana	0.85	0.00	3.14	13.72
Tripura	0.19	1.06	4.51	8.34

Uttarakhand	0.67	0.74	2.68	5.00
Uttar Pradesh	0.56	2.69	2.95	9.73
West Bengal	0.86	8.61	0.00	18.02

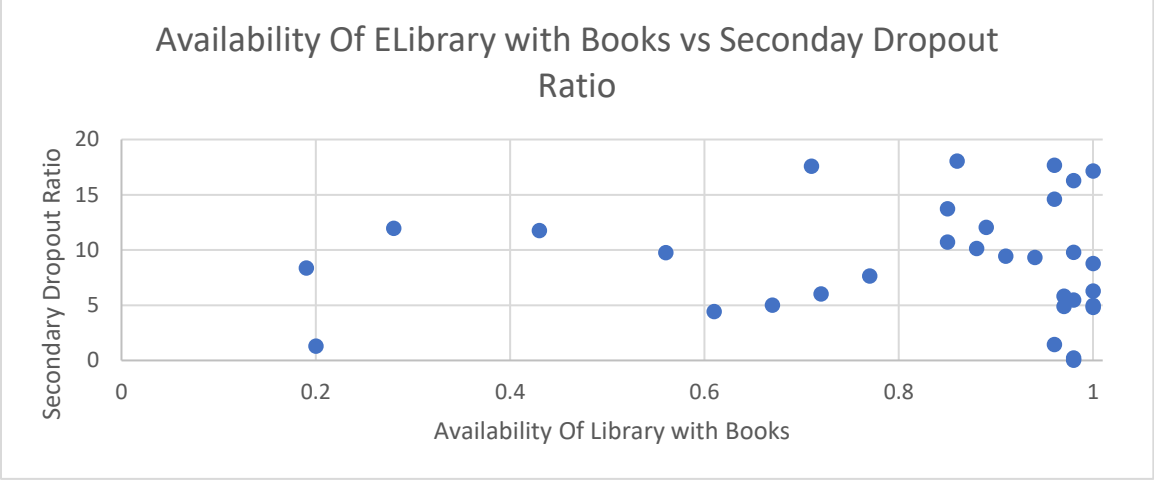
Graph: Availability of Library with Books vs Primary Dropout Ratio:



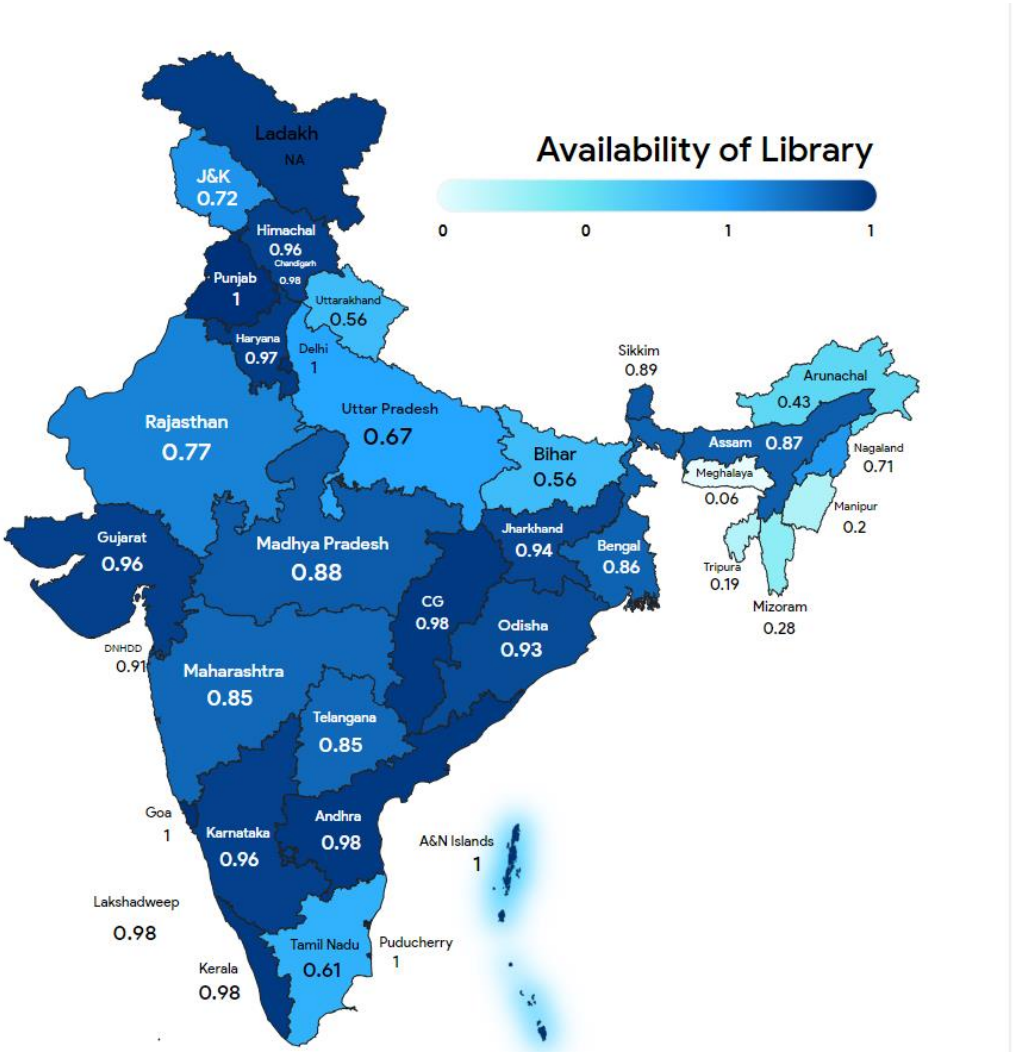
Graph: Availability of Library with Books vs Upper-Primary Dropout Ratio:



Graph: Availability of Library with Books vs Secondary Dropout Ratio



Availability of Library in Schools Heat Map of India:



Verdict:

The presence of a well-stocked library in schools has a positive impact on dropout rates. Libraries provide access to a wide range of books, motivating students to explore reading for enjoyment and develop stronger literacy skills. This allows students to delve deeper into subjects they're interested in, complete assignments, and develop critical research skills. A good library can be particularly important for students who lack a conducive learning environment at home.

Conclusion

Dropout is a crucial problem for universities that need to be overcome. The results of this study indicate that there are four-dimensional factors that influence dropout students, including Human Development Index, Gender Parity Index, Pupil-Teacher Ratio and School Infrastructure Data.

Population data such as Literacy Rate and Per Capita Income has been seen to influence dropout rates in students. Students from regions with low literacy tend to dropout more and the same goes for per capita income. This shows a clear division in the population about students who are more likely to dropout citing socio-economic reasons. Hence, the Human Development Index, which is an indicator which comprises of health, education and expected years of schooling becomes a key to figuring out the potential regions where dropout is more likely.

The Gender Parity Index aligns with our findings of disparity between male and female dropouts across the country in all the stages of education, as is evident from the definition of GPI. Pupil-Teacher Ratio is also found out to play a key role in dropouts with regions with less PTR having more retention rate.

Other school infrastructure data like availability of water, electricity and library with books also affects dropout rates across all standards of education, except for availability of library with books, which seems to affect only the dropout in upper-primary and secondary education.

References

1. J. M. Ortiz-Lozano, A. Rua-Vieites, P. Bilbao-Calabuig, and M. Casadesús-Fa, "*University Student Retention: Best Time and Data to Identify Undergraduate Students at Risk of Dropout*"

2. Zalizah Awang Long, Mohammad Faizuddin Mohd Noor, "*Factors Influencing Dropout Students in Higher Education*"

3. P. Perchinunno, M. Bilancia, and D. Vitale, "*A Statistical Analysis of Factors Affecting Higher Education Dropouts*"