



PROBLEM STATEMENT ID- 1362

Student Dropout Analysis For School Education



By: Team Voyagers

Agarwal Shruti Hemant

Esha Mishra

Sharma Radhika Shivkumar

Sandhu PrableenKaur CharanjitSingh

Patel Vibhuti Kishorbhai

Sagar Khushi Rajeshkumar

M.Sc. (Integrated) Five Years Program

Department of AIML & Data Science.

School of Emerging Science and Technology

Gujarat University

Table of Contents

[Analysis of School Dropout Rates and Mitigation Strategies](#)

[Table of Contents](#)

[Abstract](#)

[Key words](#)

[1. Introduction](#)

[2. Methodology](#)

[3. Analysis of School Dropout Rates](#)

[4. Causes of School Dropout](#)

[5. Recommendations](#)

[7. Monitoring and Evaluation](#)

[8. Conclusion](#)

[9. References](#)

Abstract

Education is very important for ensuring a better life for citizens. It creates a level playing field and provides marginalized groups with the opportunity to progress. The dropout rate is a metric that quantifies the percentage of students who discontinue their education before completing a particular level or grade. It indicates that a significant proportion of students are not completing their education, which can have long-term consequences. They are going to find it difficult to reach their full potential and find better economic opportunities. This also leads to significant economic loss for the country. These students also face the risk of child marriage and getting into illegal activities. Thus, it is very important to ensure that more and more students complete their education. According to National Education Policy 2020, the government aims to ensure 100% GER in secondary education. Overall trends for dropout rate indicate that while there is significant decrease in students dropping out at primary level but a lot more needs to be done at secondary level education. One positive trend is that the female dropout rate has been lesser than males. Most affected group includes social categories like ST, SC, OBC and children of migrant workers. Top cause reported by students dropping out of school is that they are involved in domestic work (for females)/ economic work (for males) followed by financial constraints and lack of interest. On top of these challenges migrant workers' kids also face problems due to constant changing of schools. For the reduction of dropout rate, there needs to be improvement in the school infrastructure, quality of education, financial support for students with financial constraints and relevant curriculum. These efforts need to be done with collaboration of the local community for best results.

Key words

Primary - class 1 to 5
Upper Primary- class 6 to 8
Secondary - class 9 to 10
NEP - National Education Policy
GER - Gross Enrollment Ratio

1. Introduction

Education is universally recognized as a fundamental human right and a potent catalyst for social mobility and overall progress of a country. Education is key to creating a level playing field. The dropout rate is a metric that quantifies the percentage of students who discontinue their education before completing a particular level or grade. It serves as a crucial gauge of the education system's effectiveness.

1.1 Background

Various social and economic factors lead to students dropping out of schools. There has been a significant decrease in dropout rate in primary level but a lot more work needs to be done at secondary and senior secondary level. Identification of major challenges faced by students can help in formulation of targeted interventions that can reduce drop out rate.

1.2 Objectives and scope

Analysis of student dropout rate at school level based on following categories:

- Gender
- Area
- Age/standard
- Social Category

Understanding overall trends of drop out rate at various levels. Identification of factors that lead to students dropping out from schools. The aim is to help in developing data driven policies for reduction of student drop out rate.

1.3 Importance of Addressing School Dropout rates.

Drop rate is an important indicator of educational success and can vary significantly by region, country, and socioeconomic factors. It indicates that a significant proportion of students are not completing their education, which can have long-term consequences on their future opportunities and economic prospects. Students who drop out struggle to find better employment. They face higher risk of child marriage and getting into illegal activities. Thus, it is very important to ensure that more and more students complete their education. According to National Education Policy 2020, the government aims to decrease the dropout rate to zero and to ensure that the gross enrollment ratio in higher secondary schools is 100%.

2. Methodology

2.1 Data Collection

Data has been collected from official Indian government websites and databases.

1. [data.gov](#)
2. [UDISE+](#)
3. Ministry of Statistics and Programme Implementation, [Key Indicators of Household Social Consumption on Education in India \(2017-18\)](#)

2.2 Software and tools:

- **Programming Language:** Python
- **Libraries:** Numpy, Pandas, Sci-kit learn, Matplotlib, Seaborn, Plotly
- **Tools:** Tableau

2.3 Data Visualization and Analysis.

Created a diverse range of visualizations including bar charts, pie charts, stacked bar charts, grouped bar charts, line graphs to understand dropout rates. We focus on national level, state-level disparities, age/standard groups, social categories and gender differences. By creating visualizations like choropleth maps and bar charts, we identify variations among states and regions, revealing critical insights into dropout trends. This multifaceted approach allows us to discern patterns and disparities, enabling more targeted interventions to address dropout challenges effectively.

2.4 Recommendation:

Utilizing diverse visualizations, our analysis revealed disparities in dropout rates. Recommendations include tailored interventions at the national level, state level, and community engagement efforts. These suggestions come from what the data tells us, to better reduce dropouts and make education fair for everyone.

2.5 Benchmark Model for Evaluation

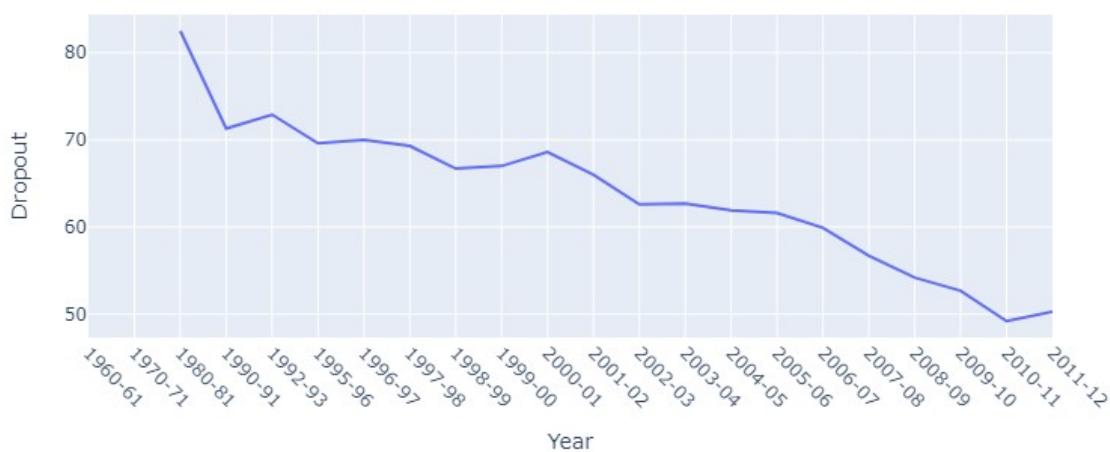
Applied linear regression model using scikit-learn library to predict the dropout rates for the primary, upper primary and secondary education levels over the next 10 years with the purpose of using it for comparison with actual trends.

3. Analysis of School Dropout Rates

3.1 Overall Trend

Overall Trend when it comes to drop out percentage is positive as there has been a steady decline in number of students dropping out of school each year.

3.1.1 Percentage of students dropping out for classes I-X (1960-2012)



Data Source: data.gov

3.1.2 India's Dropout Trend at Primary, Upper Primary, Secondary Students (2014 - 2022)

Even though the dropout rate has been decreasing for all school levels they seem to be still quite high for secondary level.

School Dropout Rates for Primary, Upper Primary & Secondary Students



Data Source:udise plus.gov.in

3.1.3 Gujarat's Dropout Rate Trend at Primary, Upper Primary and Secondary Level (2014- 2022)

State level trend of Gujarat matches with national level trend of dropout rates decreasing at all levels with still very high dropout rate at secondary level.

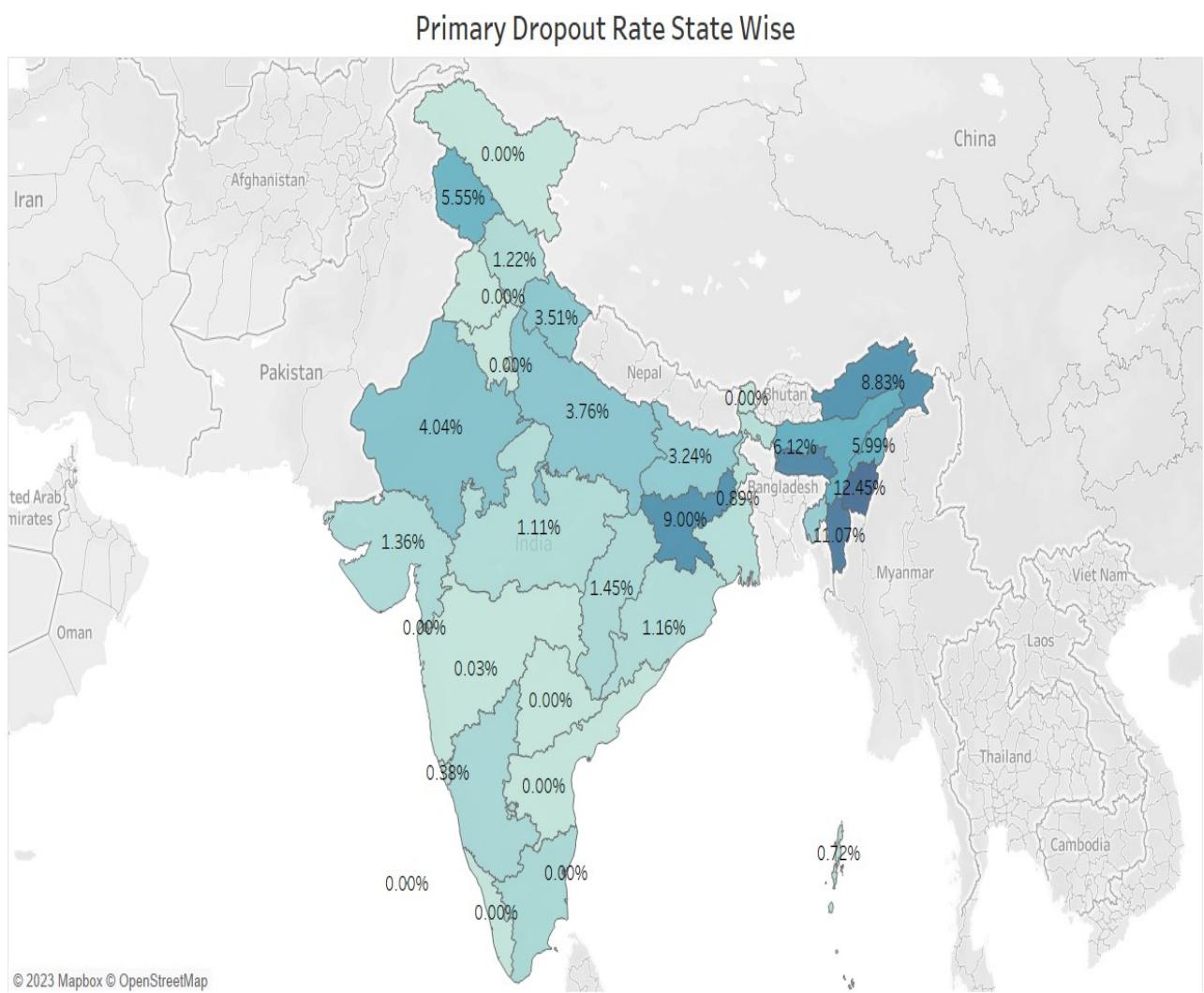
Dropout Rate Trends in Gujarat



Data Source:udise plus.gov.in

3.1.4 State wise primary level dropout rate (2019-20)

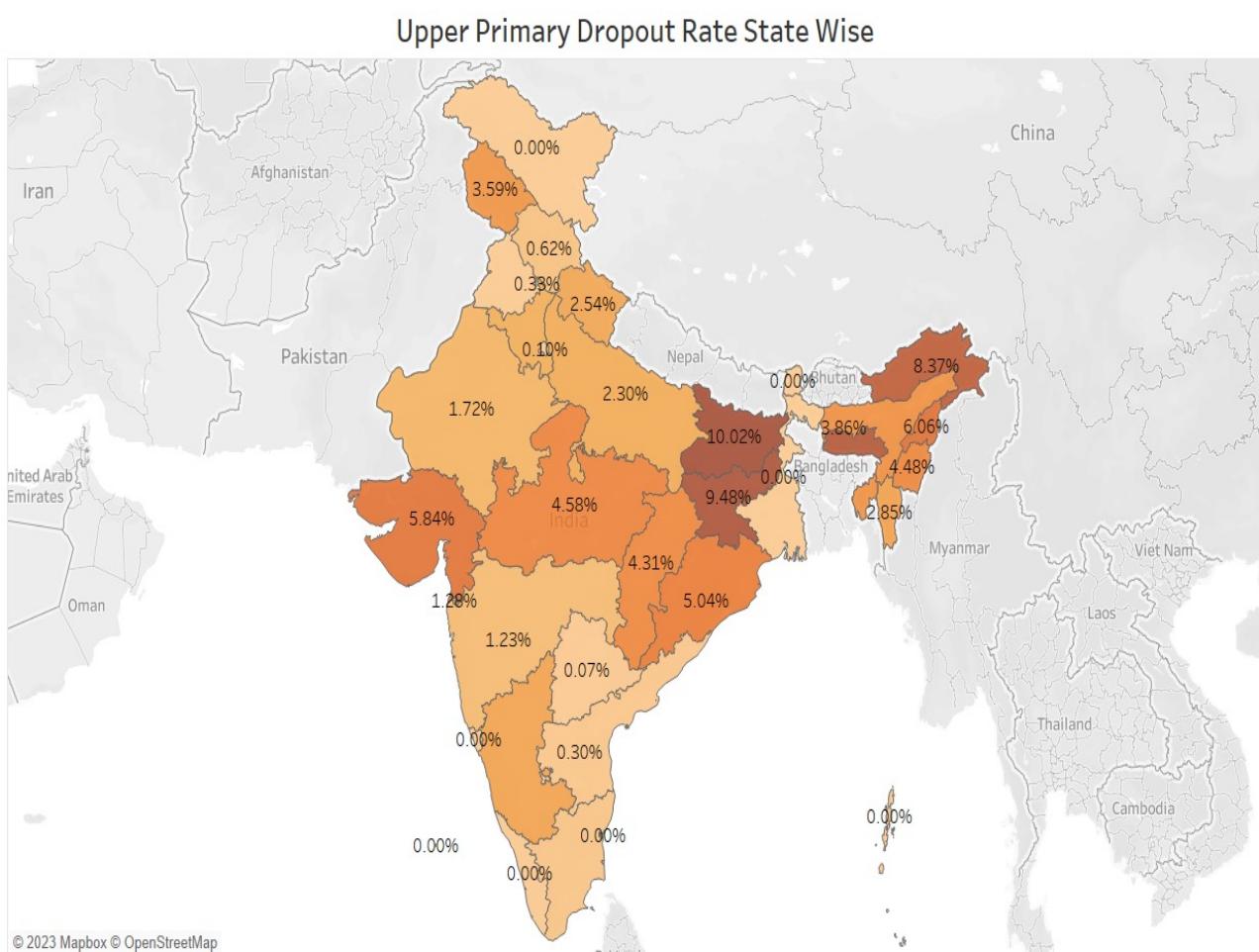
The chart below shows the dropout rate at primary level (class 1-5) all over India. States in Northeast seem to be the worst performing while southern states have the best performance.



Data Source:udiseplus.gov.in

3.1.5 State wise Upper Primary Dropout Rate (2019-20)

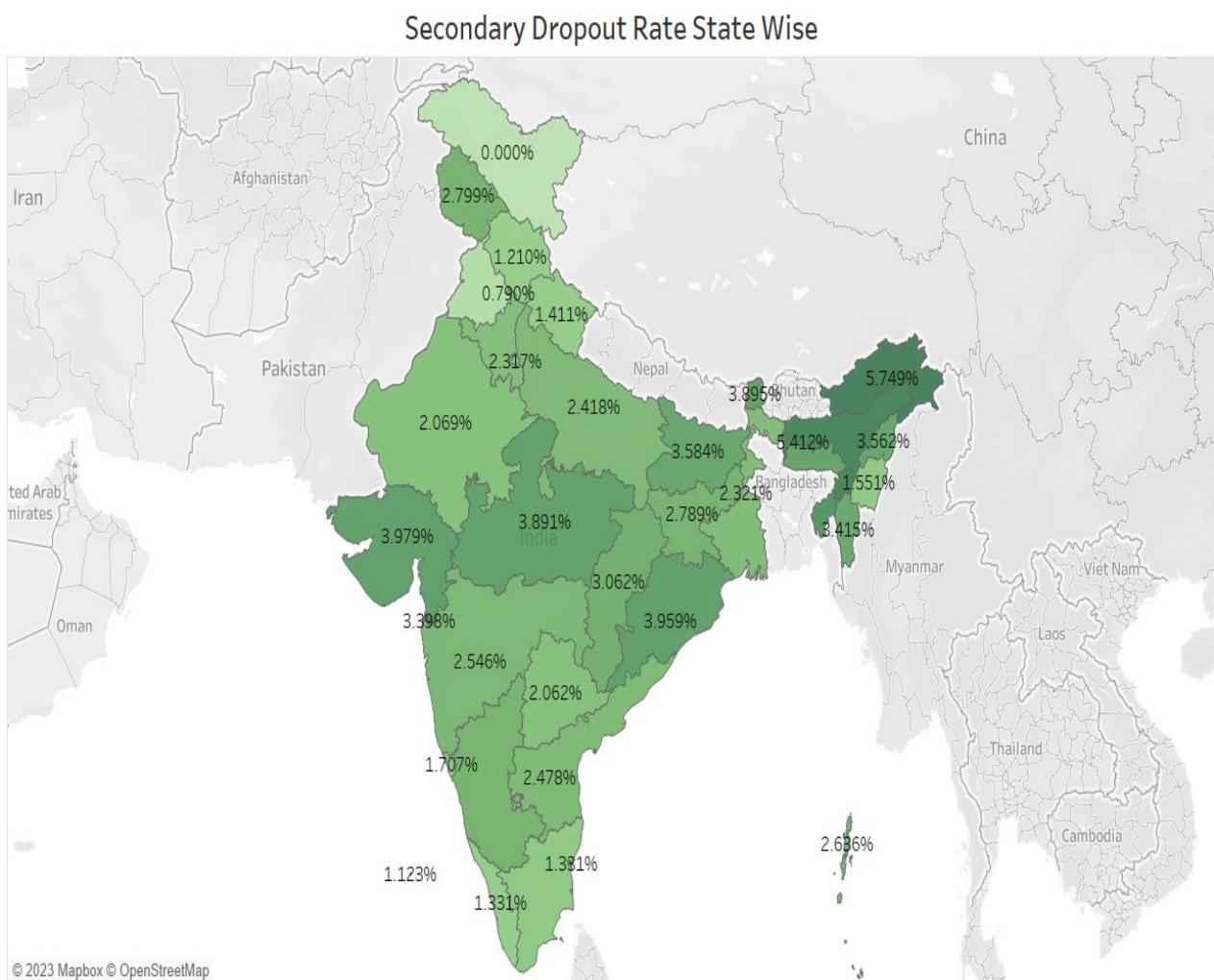
The chart below shows the dropout rate at upper primary (class 6-8) level all over India. Bihar, Jharkhand along with the states in northeast seems to be the worst performing while southern states have had the best performance.



Data Source: udiseplus.gov.in

3.1.6 State wise Secondary Dropout Rate (2019-20)

At secondary level (class 9-12) the dropout rate is highest among Northeast states. While Southern states seem to be best performing. Many states in other regions do not perform much better than the northeast states.



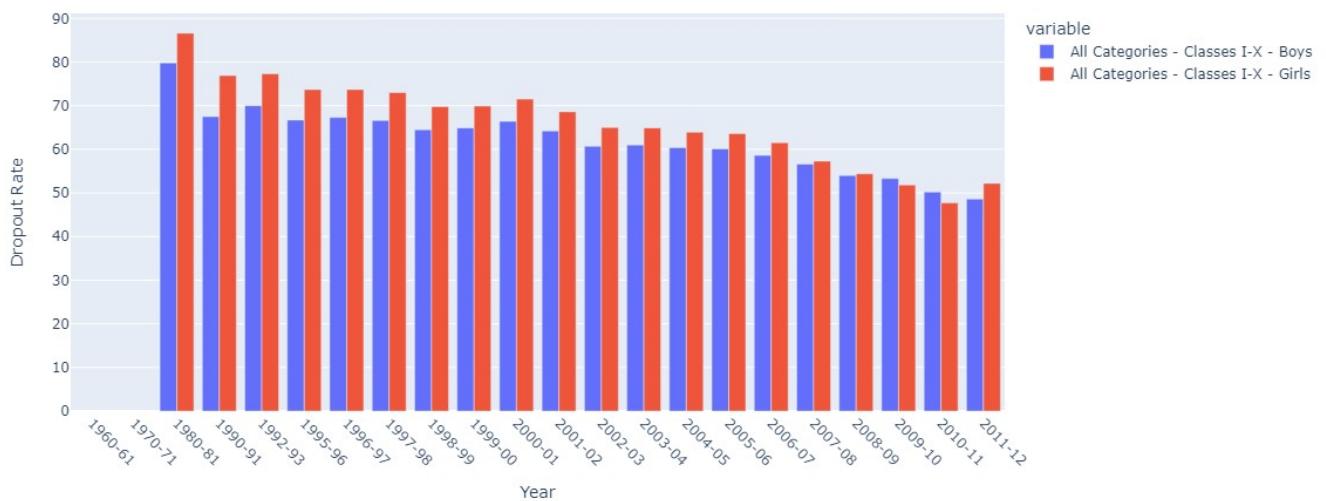
Data Source:udiseplus.gov.in

3.2 Gender

The gap between male and female dropouts has decreased over time. Historically female dropout rate has been higher than males. But the trend seems to be changing. Drop out rate for girls has become less than boys around 2014-15 and continues to be so according to Unified-District Information System For Education (UDISE). Another positive trend includes GER for boys (79.16%) and girls being 80.97% at secondary level based on data from Unified-District Information System For Education (UDISE) for year 2015-16.

3.2.1 Dropout rate comparison based on gender (1960-2012)

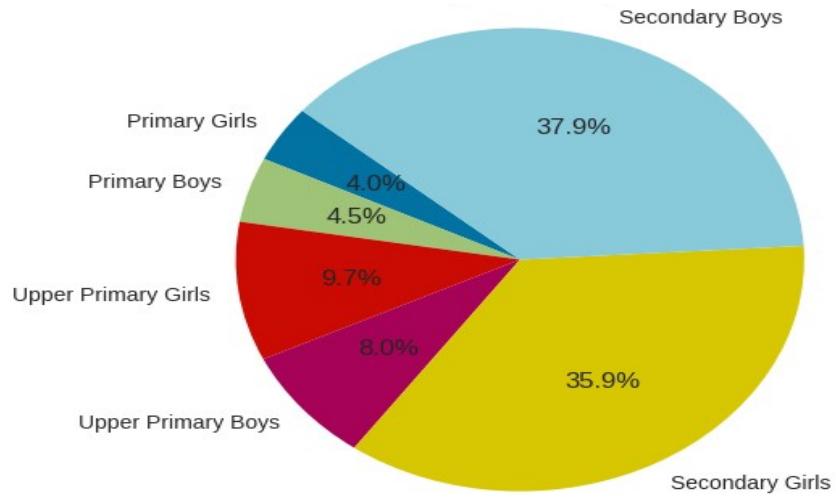
Decrease in dropout rate is observed over the years for both boys and girls in all categories. The rate of dropout for boys is recorded higher as compared to girls except for the year 2009-10 and 2010-11.



Data Source:udiseplus.gov.in

3.2.2 Share of male and female students dropping out at various level in India (2022)

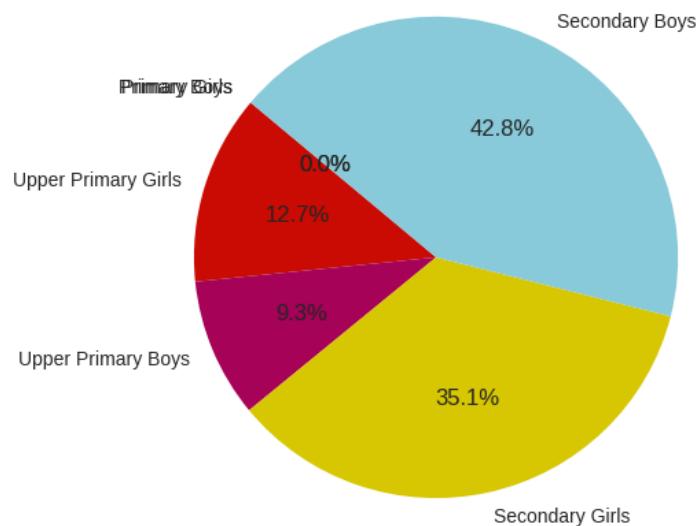
Out of all the students dropping out, most of them are secondary males with 37.9% followed by secondary females with 35.9%.



Data Source:udiseplus.gov.in

3.2.3 Gujarat's dropout rate of education level by gender of 2022

Among all the students dropping out in Gujarat Secondary males make the largest group followed by secondary females. Percentage primary school students among dropped out students is zero.

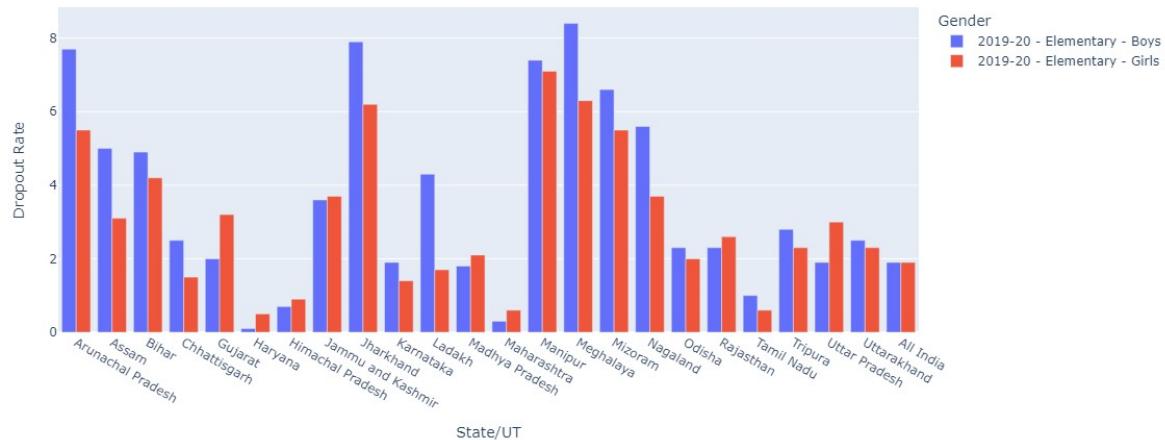


Data Source:udiseplus.gov.in

3.2.4 Gender based dropout rate at elementary level for different states (2019-20)

At elementary level, males have a higher dropout rate than females in 2019-20. Meghalaya records highest dropout rate in boys whereas Manipur has highest dropout rate for girls in the year 2019-20.

Total Dropout Rates by Gender Level (2019-20)

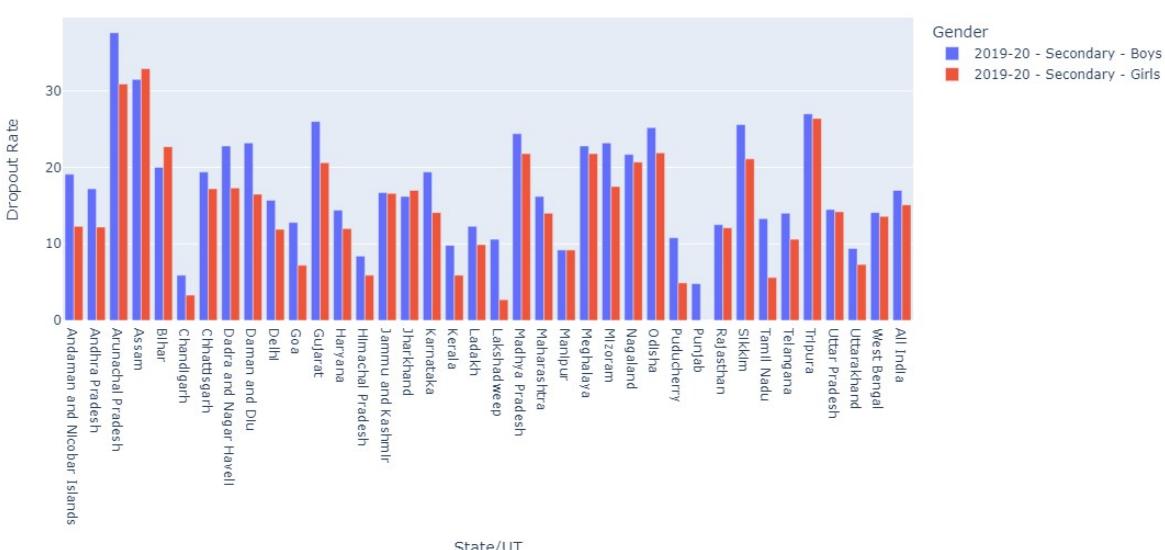


Data Source:udiseplus.gov.in

3.2.5 States dropout rate of secondary level by gender of 2019-20

At secondary level also male dropout rate is higher than females in 2019-20. Highest dropout recorded in Arunachal Pradesh for boys and Assam for girls.

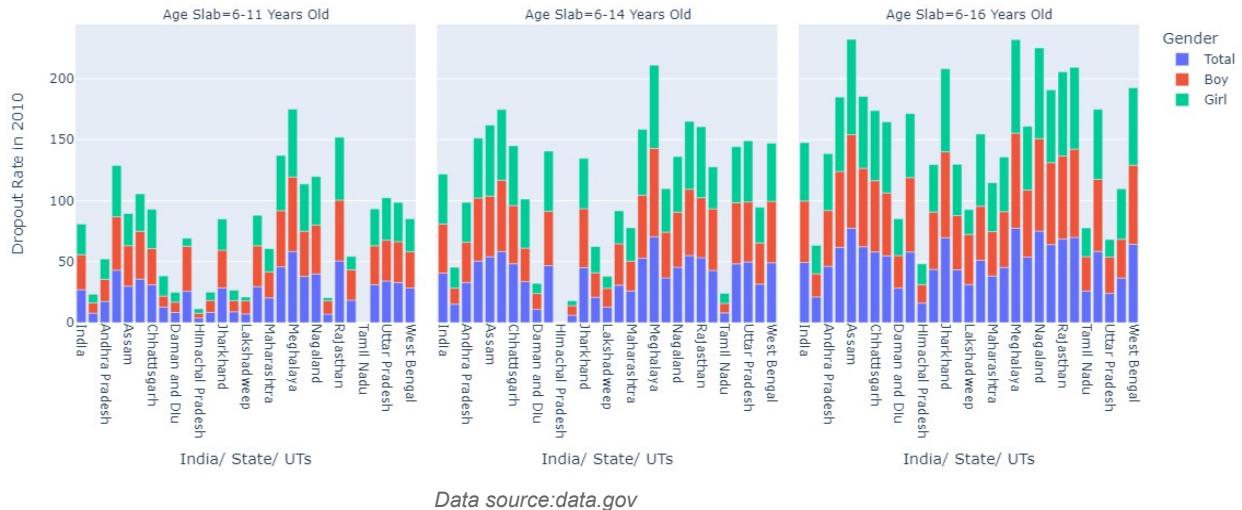
Total Dropout Rates by Gender Level (2019-20)



3.3 Age/Standard

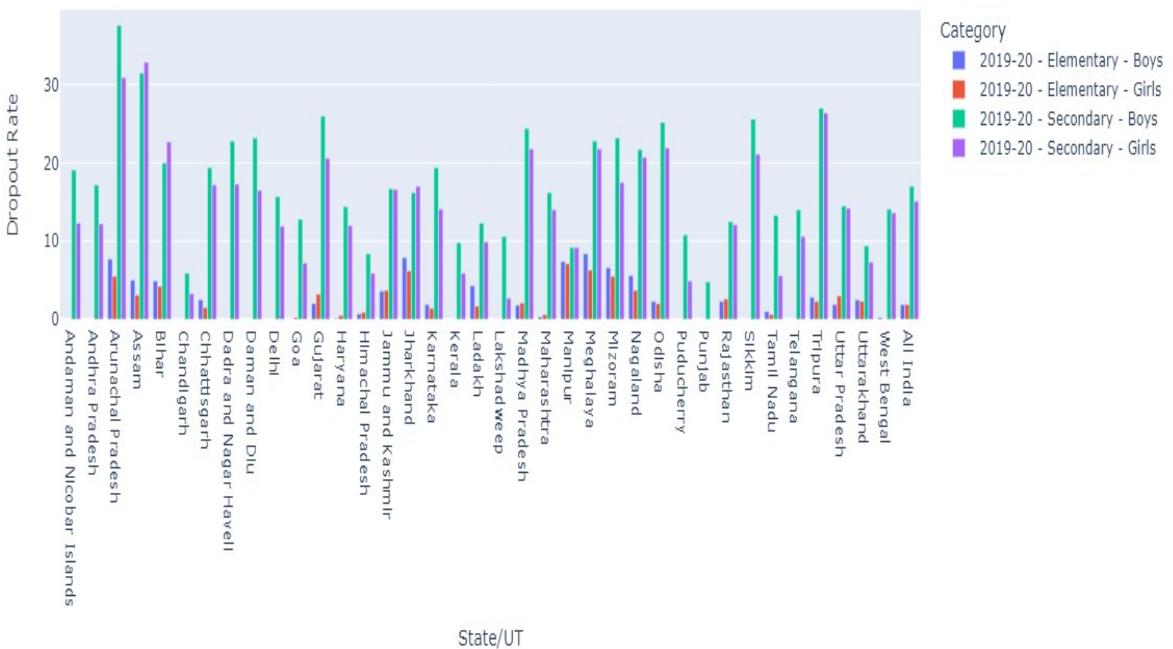
The Breakdown of drop out students based on age shows that older students are more likely to drop out. Possible explanation for this might be the fact that older students are expected to help out at home either with domestic work or by contributing to family income through a job.

3.3.1 Age wise dropout rates of states in 2010



3.3.2 State Wise Dropout rate at primary and Secondary School Level (2019-2020)

The below charts represent drop out rates in different states among males and females at both primary level and secondary level. We again see the same trend where more students are dropping out of school at secondary level.

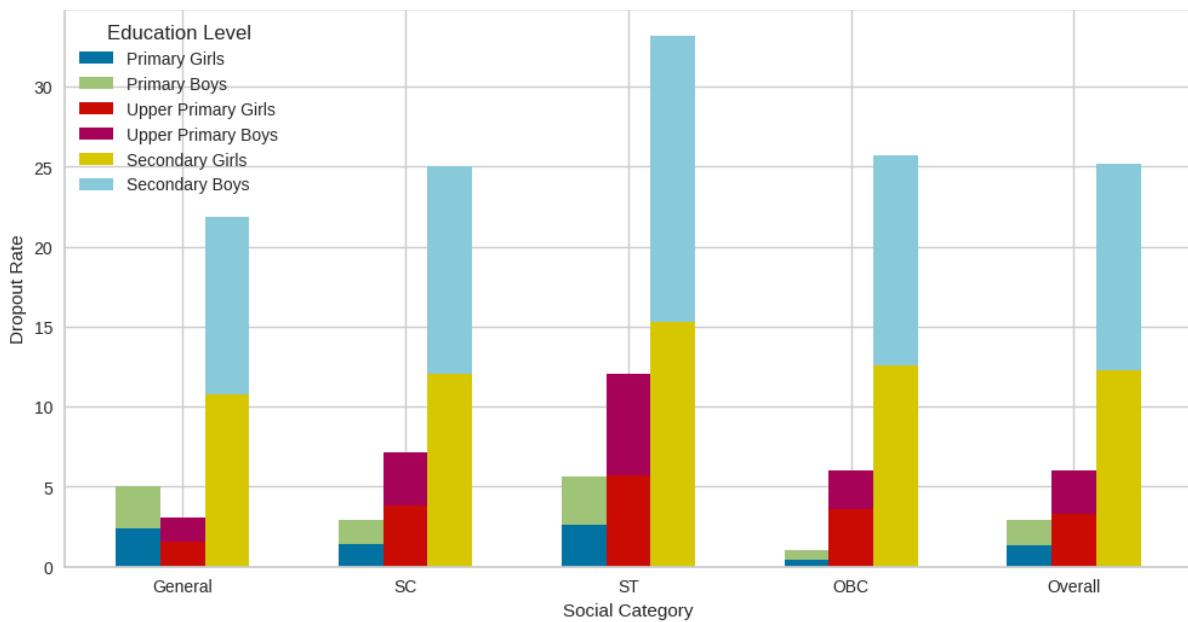


Data Source: udiseplus.gov.in

3.4 Social Category

3.4.1 Dropout rate among various social categories in India (2022)

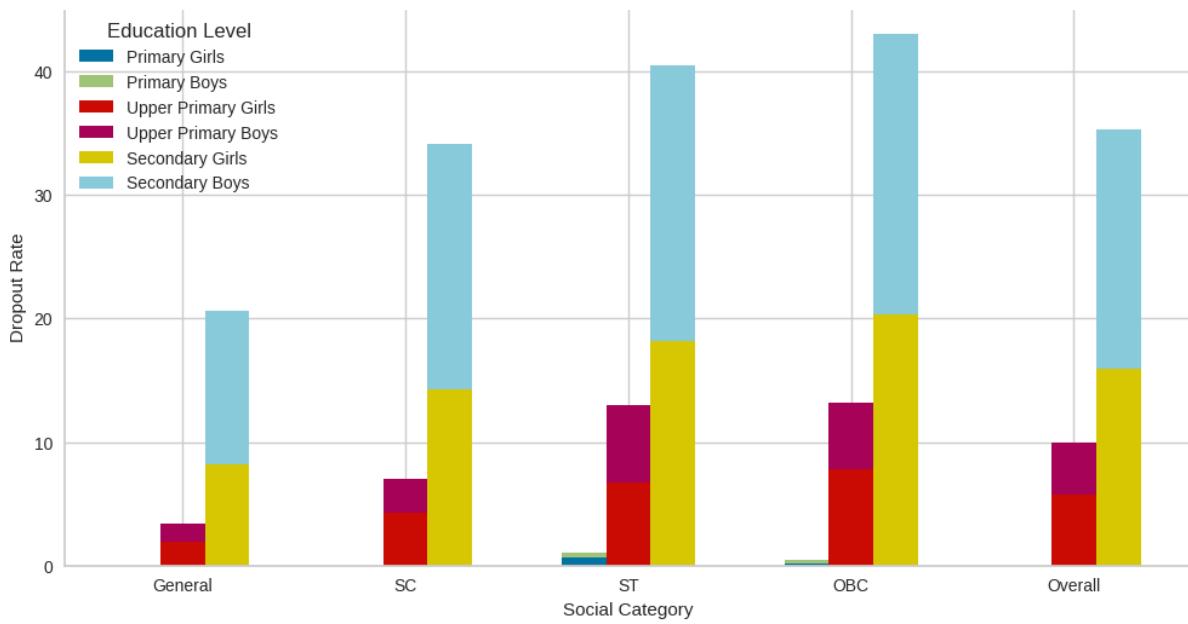
Among all social categories ST seems to be the most affected followed by OBC, SC and general. Females are more likely to drop out compared to males at Primary, Upper Primary level. Whereas Males are observed to drop out more in Secondary level as compared to girls in all categories.



Data Source:udiseplus.gov.in

3.4.2 Dropout rate among various social categories in Gujarat (2022)

Among all social categories OBC seems to be the most affected followed by ST, SC and general. Females are more likely to drop out compared to males at Primary, Upper Primary level. Whereas Males are observed to drop out more in Secondary level as compared to girls in all categories.



Data Source:udiseplus.gov.in

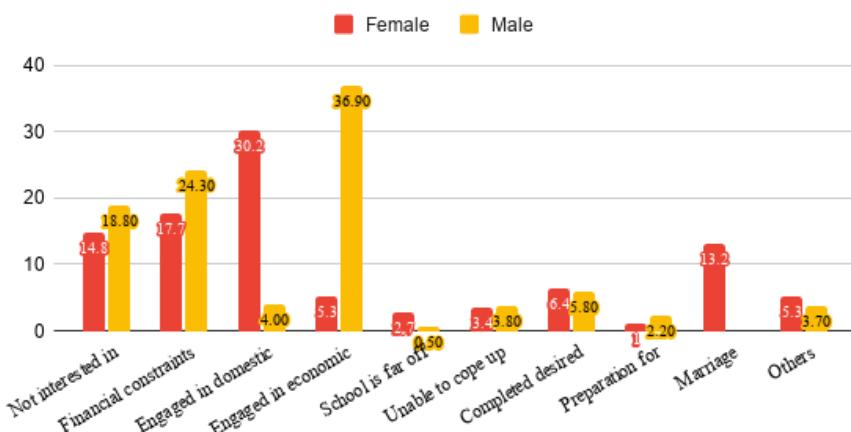
3.5 Causes of School Dropout

3.5.1 Percentage of ever enrolled persons of age 3 to 35 years currently not attending education and their distribution by major reason for not attending

Top causes stated by students for not attending school :

- Girls - Domestic work, financial constraints, not interested, marriage
- Boys - Economic work, financial constraints, not interested

Percentage distribution of ever enrolled persons by major reason for currently not attending

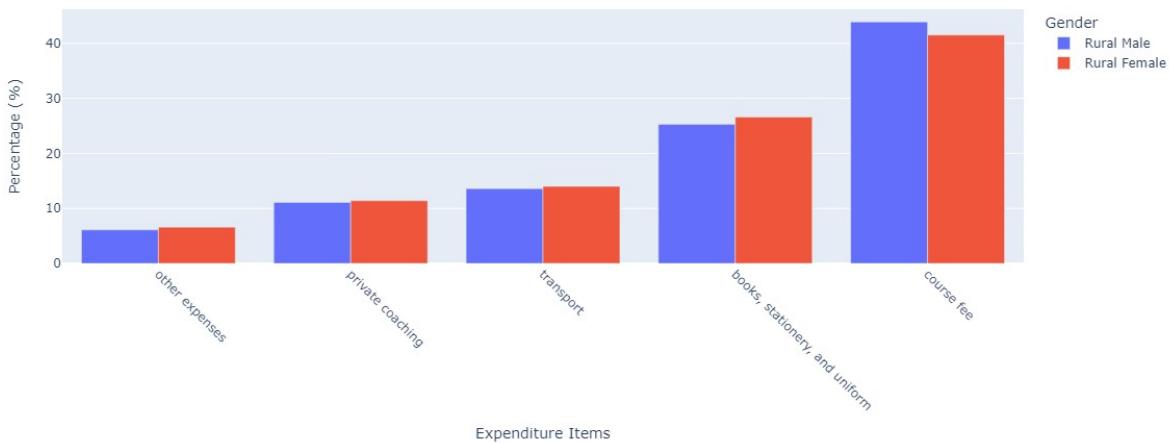


Data Source: Ministry of Statistics and Programme Implementation (2018), Household social consumption on Education in India,

3.5.2 Expenditure by Gender in Rural and Urban Areas (2018)

Financial Constraints is a major factor responsible for student dropout rate. Looking at the chart below we can see that in rural areas the majority of expenditure for students comes from course fees followed by books, stationary and uniform. All these make 70 percent of the expenditure for both the genders.

Expenditure by Gender and Location of rural people

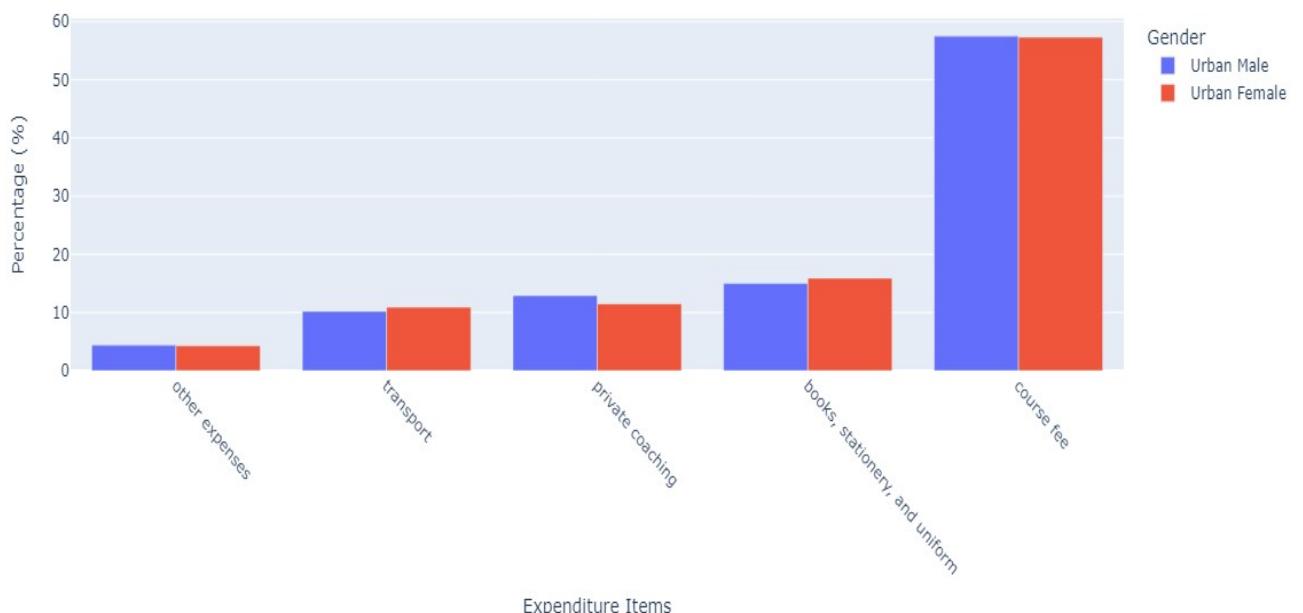


Data Source: Ministry of Statistics and Programme Implementation (2018), Household social consumption on Education in India,

3.5.2 Expenditure by Gender in Urban Areas (2018)

In Urban areas, more than 50 percent of the total expenditure on education comes from course fees for both the genders.

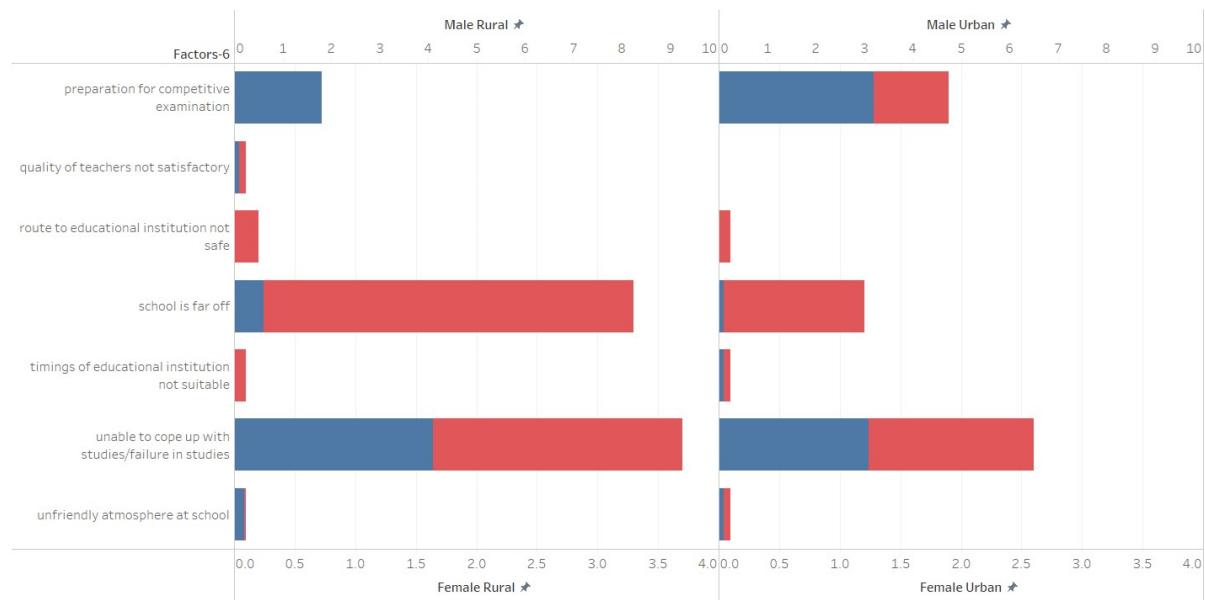
Expenditure by Gender and Location



Data Source: Ministry of Statistics and Programme Implementation (2018), Household social consumption on Education in India

3.5.2 Factors Affecting Dropout Rate in Rural & Urban Areas

In rural areas, one of the primary factors leading to dropout among females is the considerable distance to school, while both males and females in both rural and urban areas tend to leave school due to academic failure.



Data Source: Ministry of Statistics and Programme Implementation (2018), Household social consumption on Education in India,

4. Recommendations

4.1 Provide Holistic Education

Top factors for dropping out for both male and female students includes engagement in economic/domestic work (3.5.1). Vocational training can encourage students to continue education as skills obtained can help them find better employment opportunities.

4.2 Overall Improvement of Government School

Government schools are often associated with not so good quality of education. These schools are often understaffed with poor infrastructure. Quality of teaching faculty can also be very lacking. These reasons contribute to students losing interest in education or studies that are very challenging. Major portion of students drop out in urban and rural areas because of not being good at studies (3.5.2). Apart from more investment in infrastructure of these schools, the government can promote healthy competition through ranking and other incentives between the schools to improve. Also, retired individuals from various public and private sectors can help to fill in teacher/ staff demand at their local government schools.

4.3 Student Safety

Safety is very important especially for female students. This safety should not only be limited to the school environment but also extend to the path taken by students to go to school. This has been major reason for dropping out by rural females. The safety measures should be taken along with better quality roads and hostel facilities for students who live far away from school.

4.4 Flexible Enrollment and National Student ID for Migrant Kids

According to census 2011, there are 92.95 million migrant kids. According to Times of India 22% of these children between age 6-18 are not enrolled in any education center. These children are one of the most marginalized groups among the children population. Migrant workers face multiple problems from varying academic curriculum, language of instruction, peer-support, difficulty of re-enrolling in another school etc. There needs to be proper identification of these children first. There are multiple government schemes under RTE Act and Sarva Shiksha Abhiyan which give aid and hold camps for these kids but are ineffective. But these had limited effect primarily due to issues with keeping track of these kids. Solution can be to allow flexible enrollment, and Student IDs which allows easy sharing of their performance and attendance anywhere.

4.5 Relevant Curriculum and Use of Local Language

Lack of relevant curriculum due to outdated content and with no practical application leads to loss in interest. When the medium of teaching is a language which is difficult to understand students are more likely to rote learn and perform poorly. Updating curriculum

according to the requirements for present generation along with a fair amount of practical applications. Trend for new knowledge generated represents a Geometric progression. Thus, it will not be easy to translate the latest content into regional language. An open source community of educated students, teachers and other community members can help in translation. They can be rewarded by the state government by community swags.

4.6 Mobile First Approach for Digital Learning Platforms

Students can be given high quality content through online platforms. Most online platforms are made for desktops in mind which makes these platforms less convenient to use by a majority of students especially those from less privileged backgrounds. Even among students who have desktops, it still makes sense to focus on mobile first approach while developing these learning platforms to increase accessibility.

4.7 Study Help Group and Early Reporting of Dropouts

Third most common cause of dropping out is lack of interest. This can be also solved through a study help group at each level for helping students struggling with studies. Students are much more aware of each other's situation, therefore they can report about students who are struggling to continue education.

5. Monitoring and Evaluation

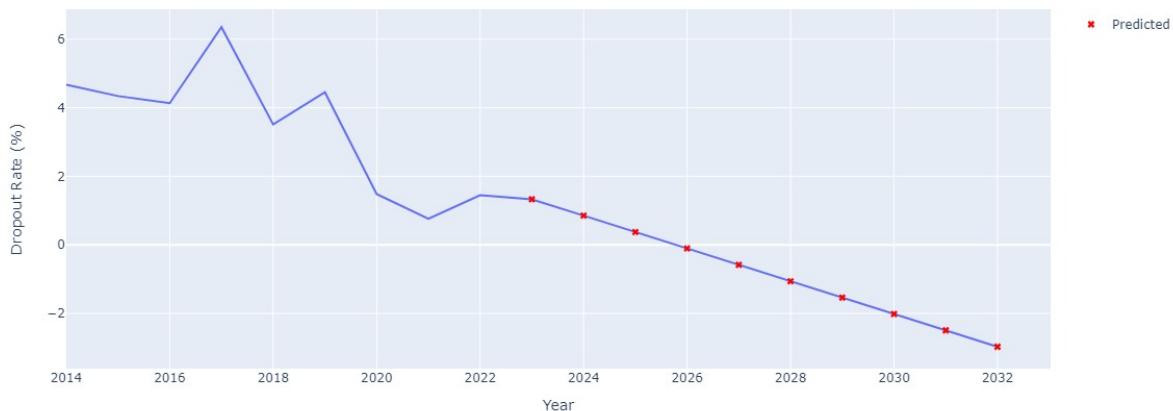
Below Benchmark models are simple linear regression models predicting trends for next 10 years assuming that group rate will decrease with the same pace every year. These models can be used for comparison with actual dropout rate in the next 10 years to see if interventions have any meaningful impact on the ground.

5.1 Benchmarks

Primary dropout rate prediction

Based on this prediction, it seems feasible to attain a dropout rate of 0% at the primary education level by the year 2026.

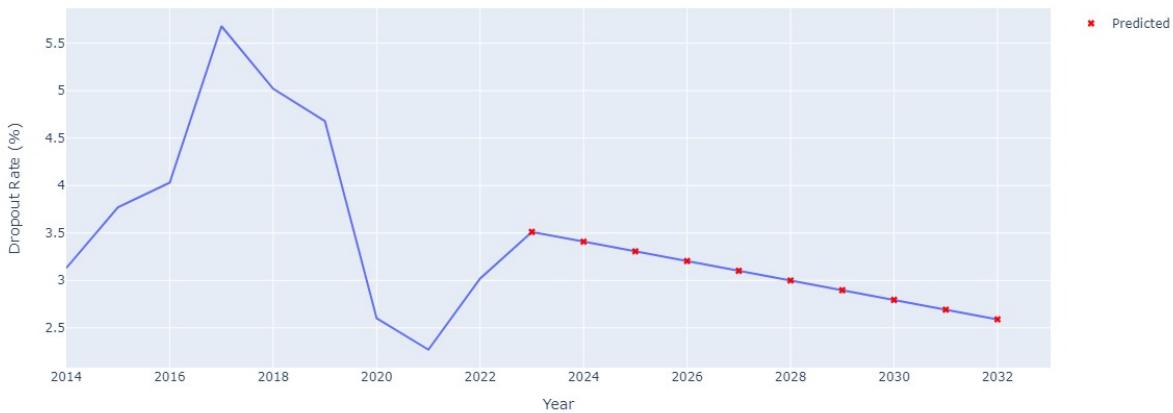
Primary Dropout Rate Predictions



Upper Primary dropout rate prediction

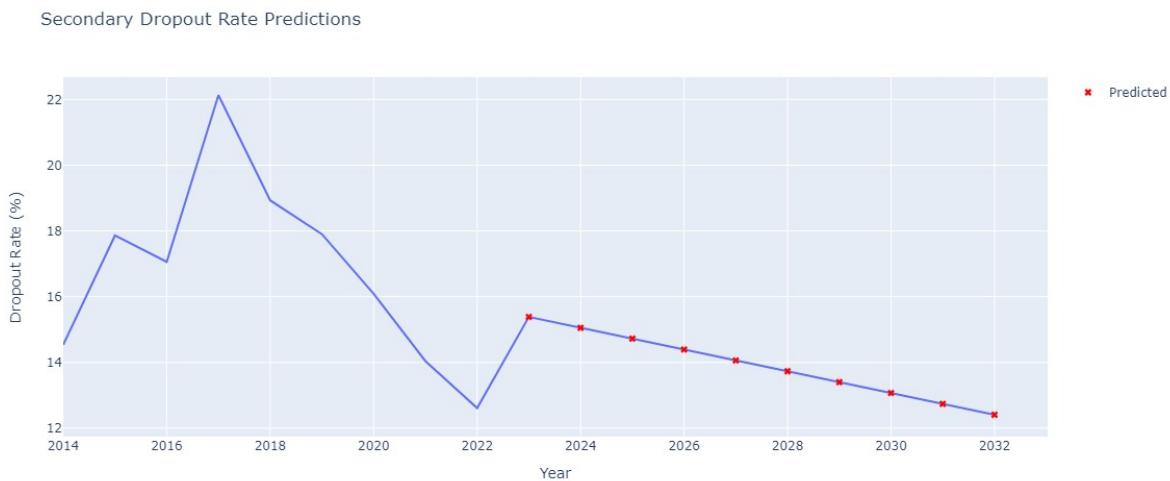
While this prediction for upper primary education shows a decreasing trend in dropout rates from 2024 onward, it doesn't seem likely that the dropout rate will reach 0% until 2032.

Upper Primary Dropout Rate Predictions



Secondary dropout rate prediction

Despite a declining trend in dropout rates at the secondary level, this prediction indicates that the rates will remain relatively high.



6. Conclusion

Overall trends in dropout rates indicate a significant decrease in students leaving school at the primary level. However, there is still much work to be done, especially in secondary-level education. The groups most affected by this issue include social categories such as ST, SC, OBC and children of migrant workers. The top reasons reported by students for dropping out of school are involvement in domestic work (for females) or economic work (for males), followed by financial issues and a lack of interest. Additionally, migrant children face challenges due to frequent changes in schools. To address these problems, improvements are needed in school infrastructure, the quality of education, financial support for students facing financial difficulties, as well as incentives to keep them in school. Overall, education should be made more relevant. These efforts should involve collaboration with the local community for better results.

7. References

- Department of School Education & Literacy Ministry of Education Government of India. (2022, October 2). . UDISE+. Retrieved September 26, 2023, from https://mospi.gov.in/sites/default/files/publication_reports//KI_Education_75th_Final.pdf
- GOVERNMENT OF INDIA. (n.d.). *data.gov*. Open Government Data (OGD) Platform India: Home. Retrieved September 27, 2023, from <https://data.gov.in/>
- Government of Ministry of Statistics and Programme Implementation, National Statistical Office. (2018). *Key Indicators of Household Social Consumption on Education in India*. mospi. Retrieved September 26, 2023, from https://mospi.gov.in/sites/default/files/publication_reports//KI_Education_75th_Final.pdf
- Pandey, P. (2021, April 19). *Always on the move: The troubling landscape of the right to education for migrant children in India*. The Times of India. Retrieved September 25, 2023, from <https://timesofindia.indiatimes.com/blogs/voices/always-on-the-move-the-troubling-landscape-of-the-right-to-education-for-migrant-children-in-india/>