

Data Visualization (India Education Data)

- Prakhar Agrawal

Introduction:

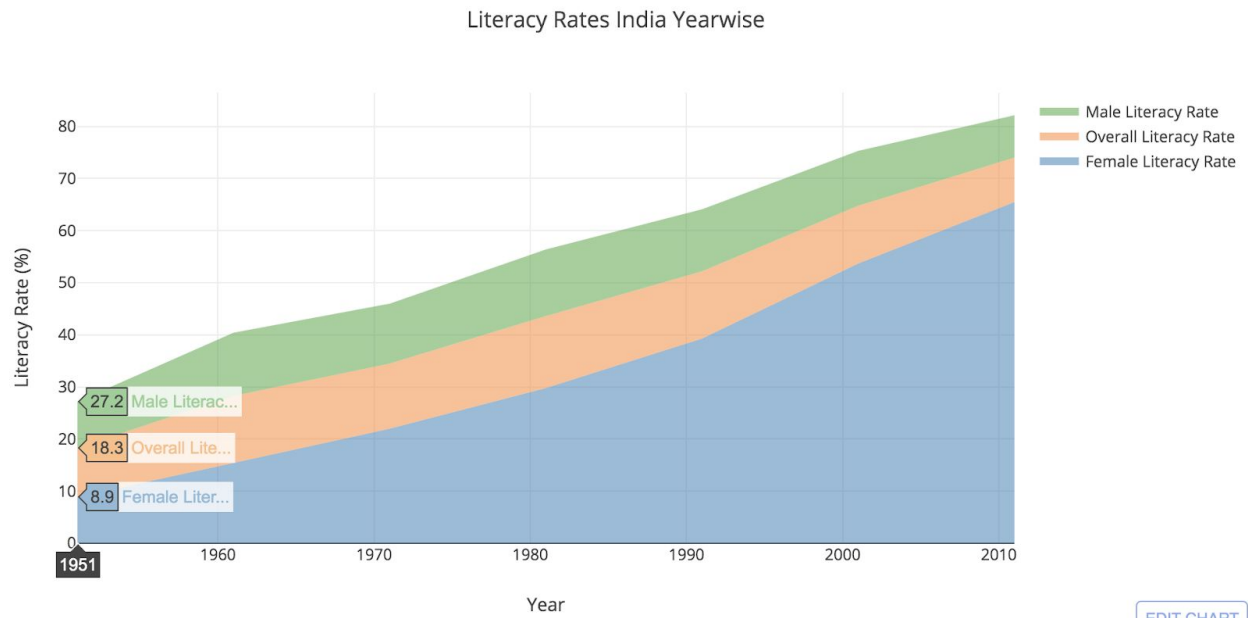
I am using three main sources of data:

1. [Indian Government Data Website \(Education Related Data\)](#)
 - a. India Gender-Wise Literacy Rate (Census Data - 1951 - 2011)
 - b. Number of Schools in India by Level (2001-2010)
 - c. India State-Wise Literacy Rate (Census Data - 1951 - 2011)
 - d. School Enrolment Rate by Level (2011-12)
 - e. Literacy Rate for Religious Groups and Minorities (2011)
 - f. Literacy Rates by Social Group (i.e., Affirmative Action Category) (2007-08)
 - g. Gender-Wise Enrolment by State and Category (2011-12)
 - h. Foreign Students in India, grouped by Academic Department (2011-12)
2. [Indian Government Data Website \(Education Related Data\)](#)
3. [Global Flow of Tertiary Level Students](#)
 - a. Inbound rate of international students, by country (2015)
 - b. Number of Indian students abroad, by country (2015)

I chose this dataset because:

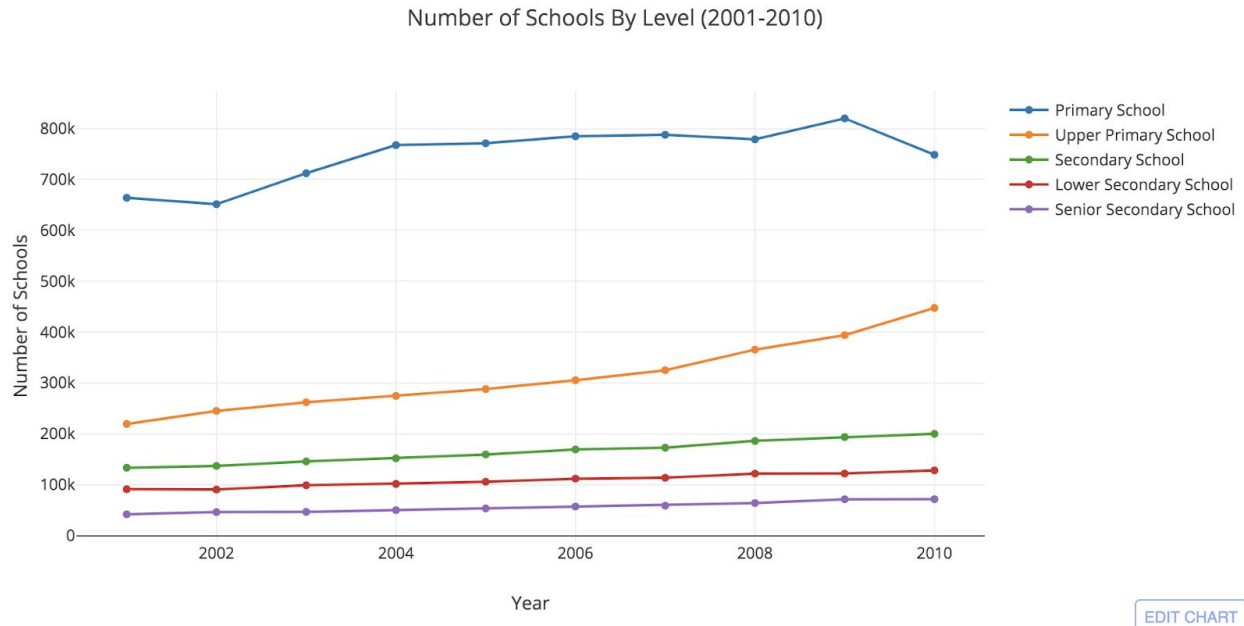
- Education is a subject that is close to my heart.
- In India, I worked in education, both as a full time employee and as a volunteer, and ever since then, I have had an interest in the topic and its potential effect on Indian society.

Summary:



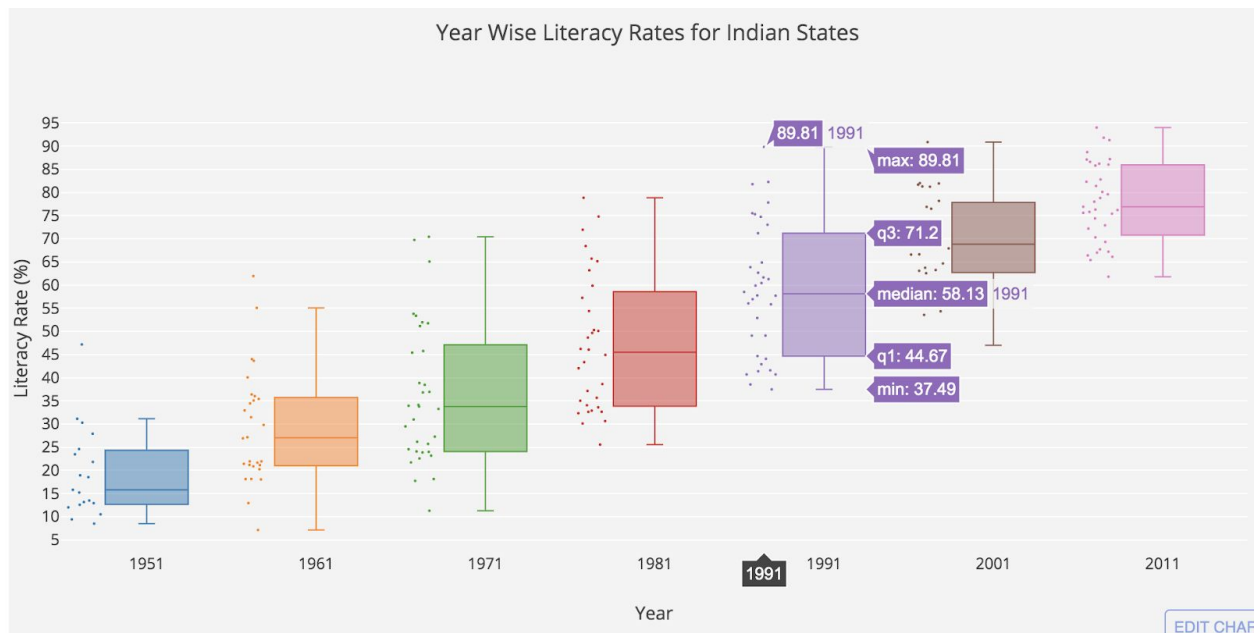
Literacy Rates (India) Yearwise ([Link](#))

India has come a long way since independence. The first census after the British left, in 1951, recorded the country's literacy rate at 18.3%, with female literacy rate standing at an appalling 8.9%. By the latest census in 2011 though, the overall literacy rate had risen up to 74%, with female literacy rate, standing at 65%.



Number of Schools By Level ([Link](#))

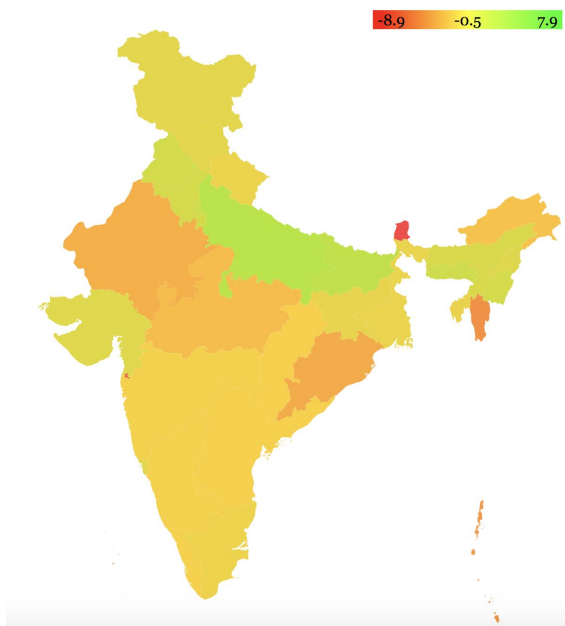
This progress is also apparent when you look at how many schools there are in India at each level. This number has been steadily increasing for each level of schooling in India.



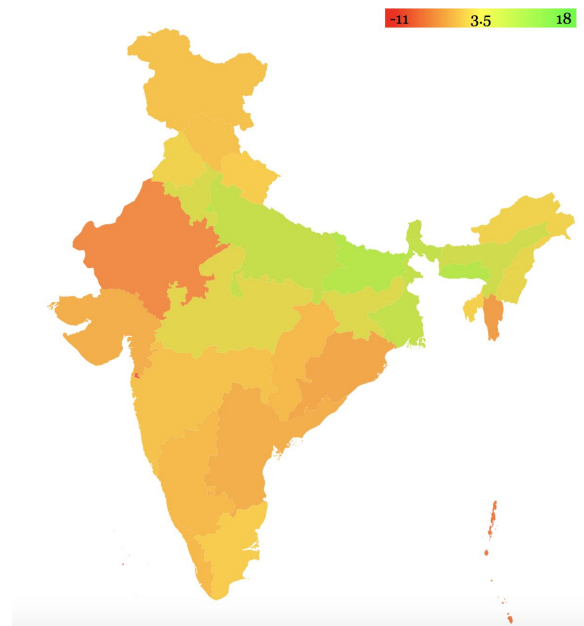
Literacy Rate Spread Among Indian States (1951-2011) ([Link](#))

This progress, however, has not been shared equally by everyone. As can be seen in the boxplot above, even in 1991, when the country's literacy rate stood at a measly 52%, some of the states already had a literacy rate of ~90%, while some were still lagging behind at 37.49%.

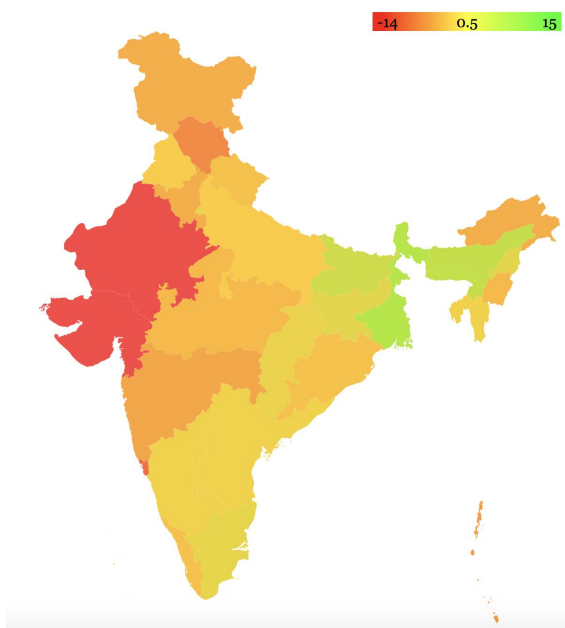
PRIMARY ENROLLMENT RATE DIFF.



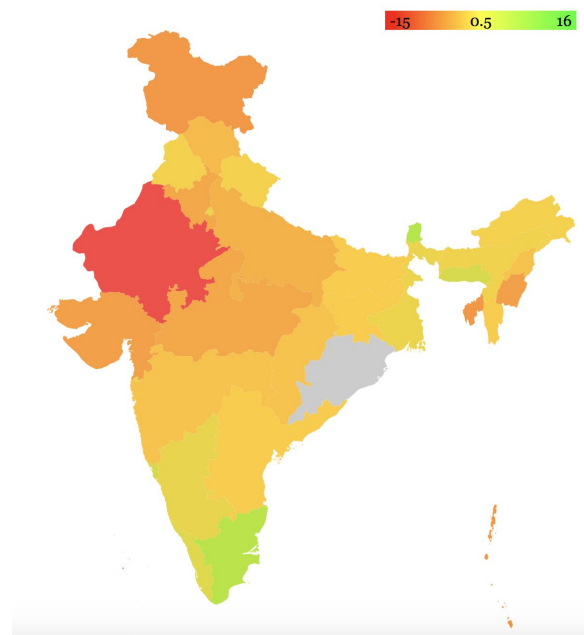
UPPER PRIMARY ENROLLMENT RATE DIFF.



SECONDARY ENROLLMENT RATE DIFF.



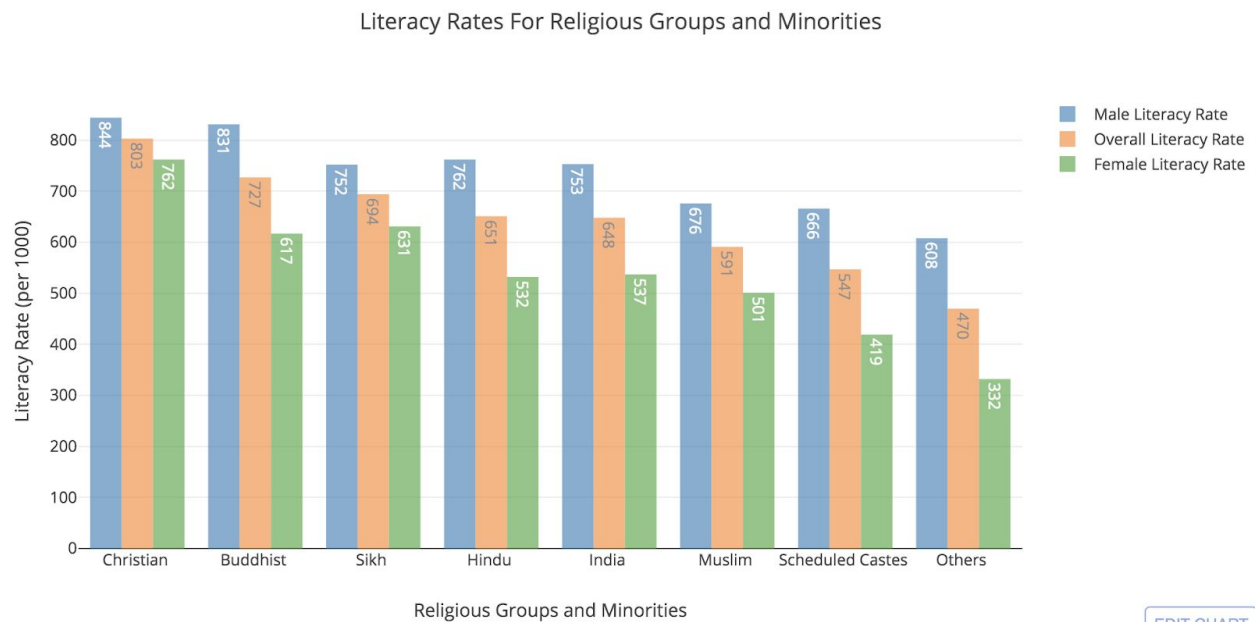
HR. SECONDARY ENROLLMENT RATE DIFF.



States also differ in how much their schooling programmes are encouraging female education. Let's explore that using the metric:

$$\text{Enrollment Rate Diff.} = \text{Enrollment Rate (Girls)} - \text{Enrollment Rate (Boys)}$$

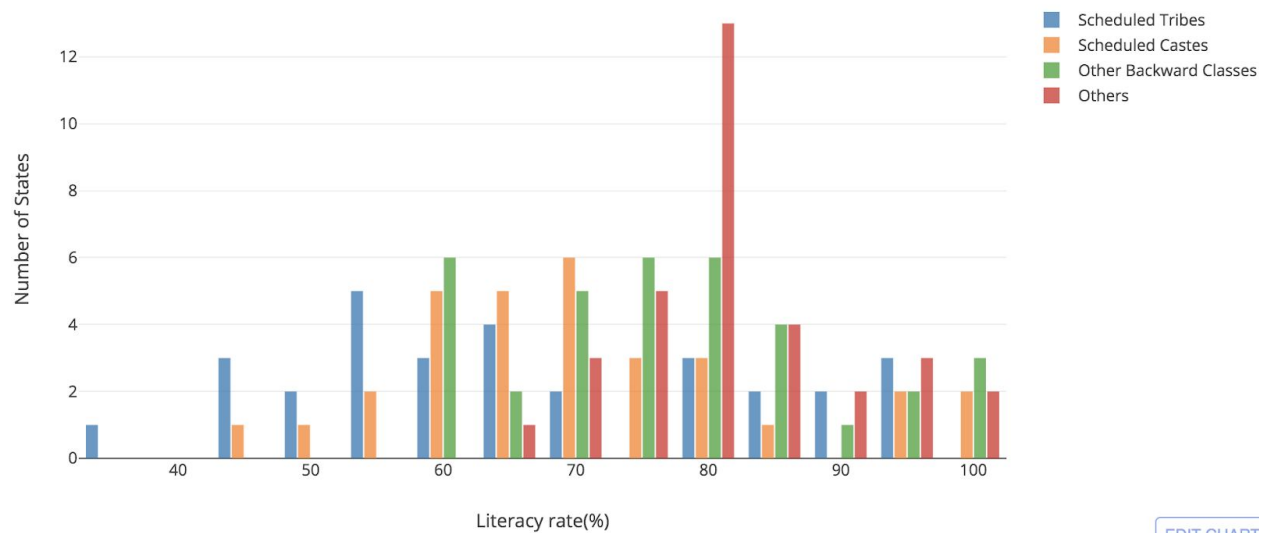
- It is very clear that states in the North East are doing very well in general.
- Something that surprises me is that the state of Uttar Pradesh (North, near Nepal), a traditionally conservative state is kicking it in Primary education, and Gujarat (West), an economic powerhouse, is lagging behind in Secondary education.



Literacy Rates by Religious Groups and Minorities ([Link](#))

Christians are the most literate minority in India, which is not surprising at all, considering that they also form one of the most affluent sections of society in India. That also probably explains the fact that difference in literacy rates across gender is also lowest for this group. Buddhists, Sikhs and Hindus are other groups in India that apparently have more access to education than others. However, something that could be improved upon, is the access to education that is afforded to Muslims and people of Scheduled Castes and Tribes in India.

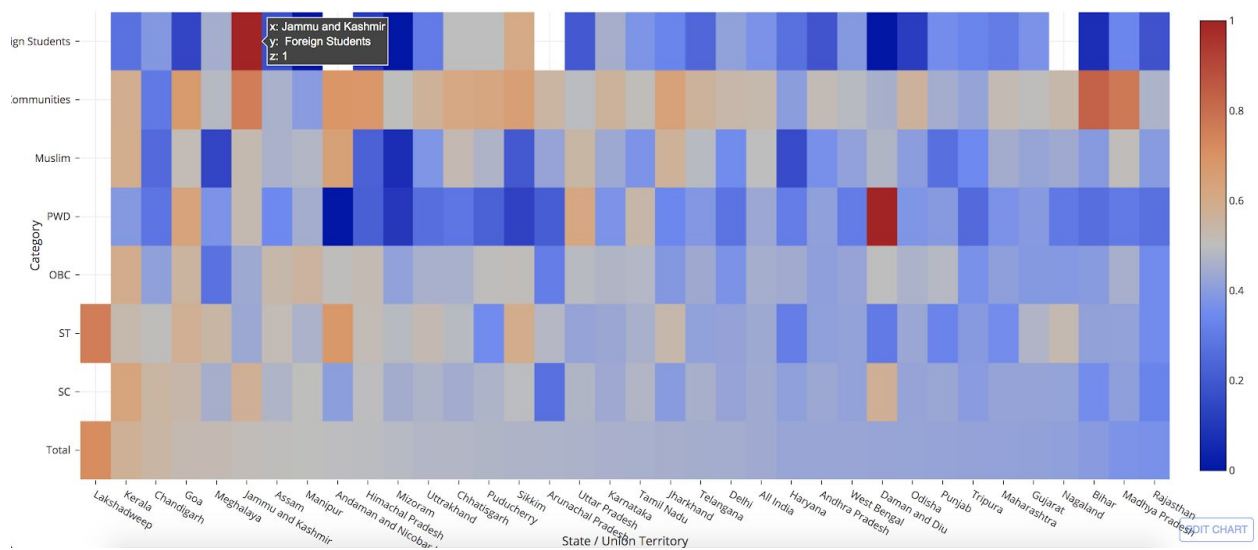
Literacy rate, by social groups (rural), 2007-08



Literacy Rates By Affirmative Action Groups ([Link](#))

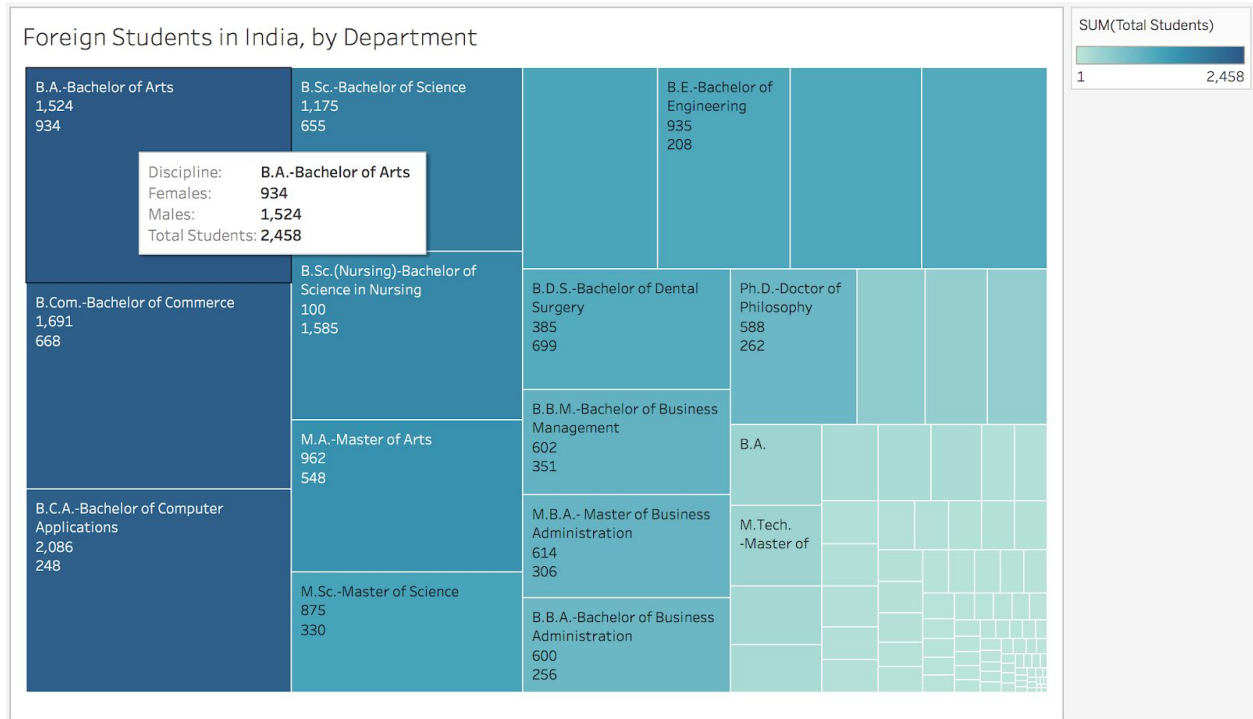
Digging deeper into the different affirmative action groups (Scheduled Castes, Scheduled Tribes, Other Backward Classes etc.), we can see that each of these three groups have lower access to education than the people not in those groups (i.e., Others). Number of states in which people from these categories have low literacy rates, is very high. Especially for the people that fall under Scheduled Tribes, this difference is extremely apparent.

Female Enrolment Percentage by State and Category, 2011-12



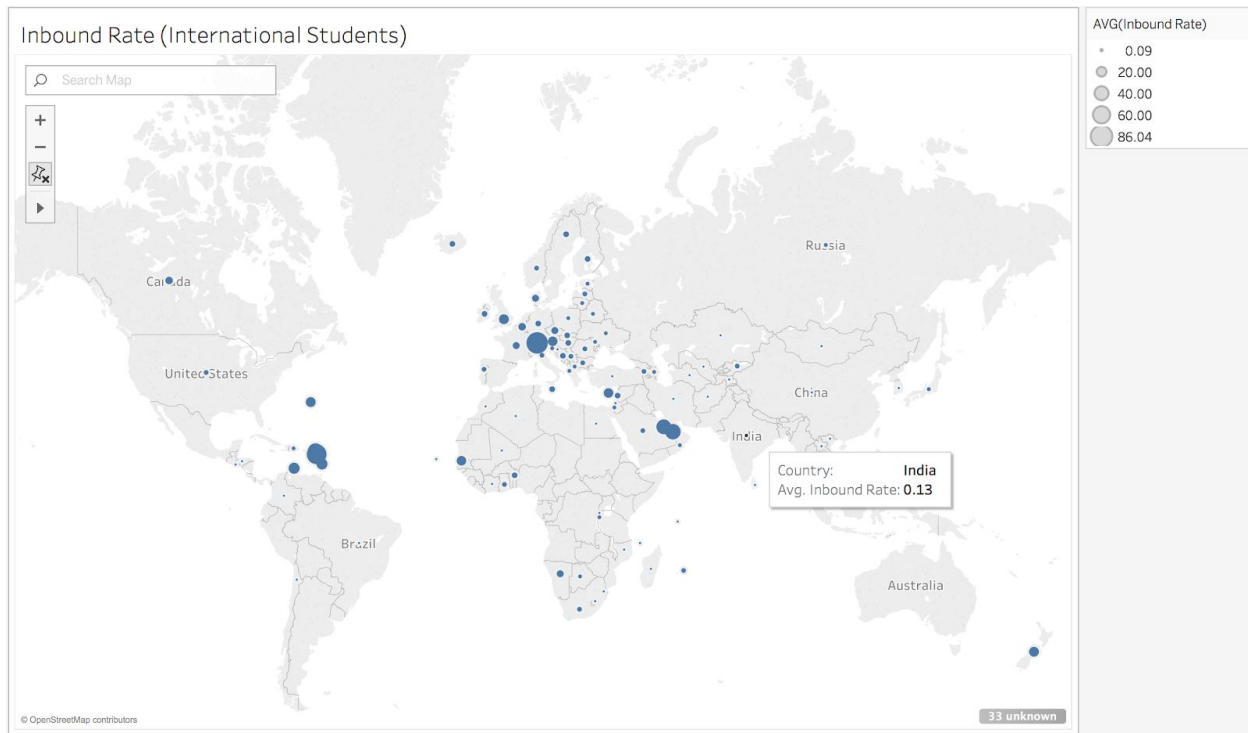
Female Higher Education Enrolment Percentage by State and Category ([Link](#))

Let's turn to higher education. The ratio overall, for female students to total, in Indian colleges, stands at 0.44, which is actually a not so bad number. The troubling thing, however, is that among foreign students in India, the number of female students is clearly not very high. That is something we could improve upon.



Foreign Students in India by Department

Speaking of foreign students, turns out that most of the foreign students in India are here to study the Arts, followed by Commerce, Computer Applications and Science. This is probably because of most Indian students not taking up these subjects, with Engineering being their preferred choice.

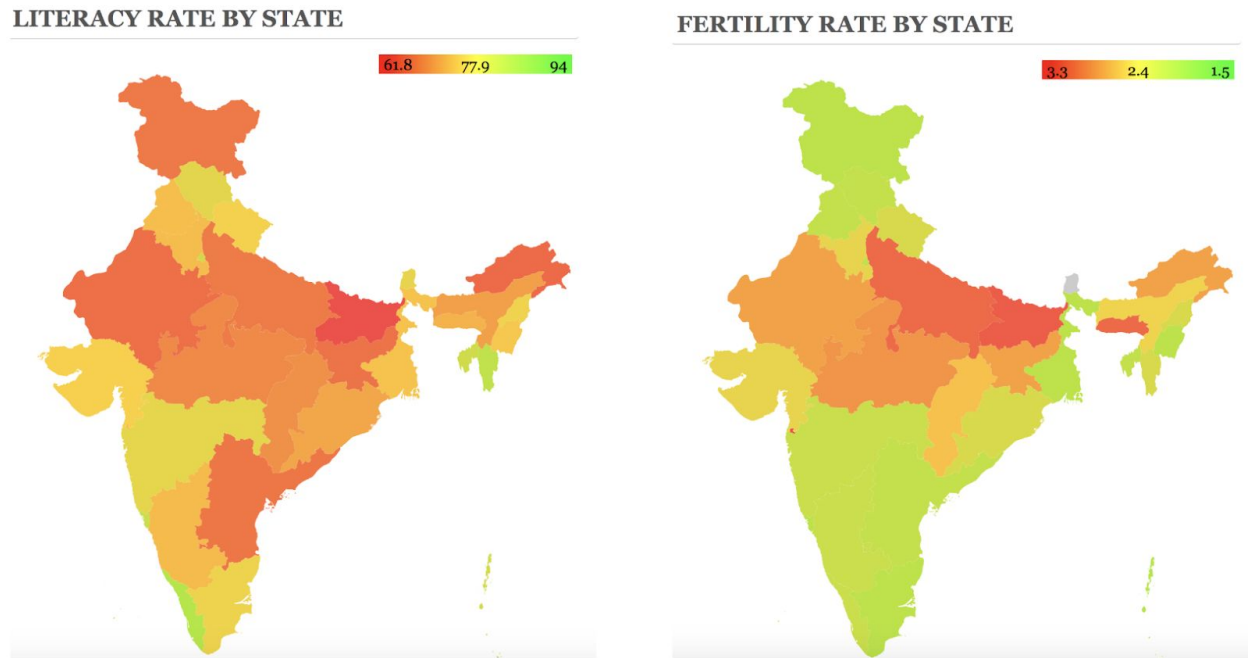


Foreign Students Inbound Rate, Country Wise

However, in general, India doesn't seem to be a very popular choice among international students anyway, with its inbound rate standing at just 0.13.

Final Story:

A Deeper Dive into State Wise Literacy Numbers:

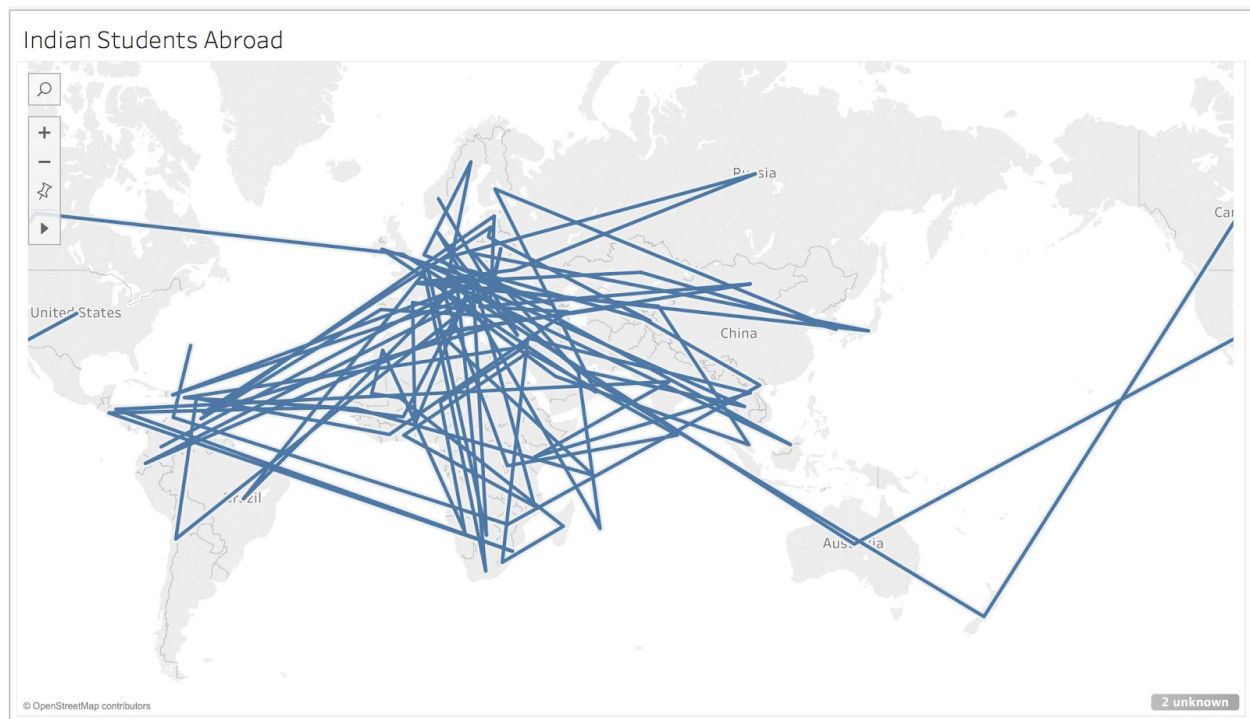


Literacy Rate versus Fertility Rate (2011)

- Indian states with high fertility rates, among others are, Rajasthan (West), Madhya Pradesh (Central), Uttar Pradesh (In the north near Nepal), Bihar and Jharkhand (East)
- For all of these states, the literacy rates are very low. There is an inverse relationship between fertility rate and literacy rate of Indian states.
- This is because some states started exercising (voluntary) population control early in the country's history, especially the southern states, and hence they have more resources and higher literacy rates.
- There are other factors that explain this correlation, like reduced role of women in society for states with fertility rate etc.
- Hence, other states should follow the example of the South and exercise voluntary population control

Appendix:

Connection Map:



Indian Students Studying Abroad

The above graph is my failed attempt at drawing a connection map. If drawn correctly, the map would have shown that most Indian students prefer to study in the US, followed by Australia.

Code:

All code is present on my github link - https://github.com/Prakhar-USF/india_edu_data_viz.

The following files contain the code for the above graphs:

1. Data_Viz_Project_Code.ipynb
2. tree_map.twb
3. bubble_map.twb
4. connection_map.twb