

Education Infrastructure Dashboard

Bihar vs Rajasthan

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Background

Bihar and Rajasthan have some of India's lowest literacy rates and struggle with educational equity. As of the 2011 Census, Bihar's overall literacy was only ~70.7% (male 79.7%, female 60.5%) and Rajasthan's was ~67.1% (male 80.5%, female 52.7%) Female literacy in both states is particularly low, contributing to entrenched gender gaps in education [mospi.gov.in en.wikipedia.org](https://mospi.gov.in/en.wikipedia.org). These deficits correlate with socio-economic challenges: higher poverty rates, poorer health and nutrition outcomes, and limited job opportunities. Improving literacy and digital skills in Bihar and Rajasthan is therefore critical for human development and inclusive growth.

Problem Statement

Both states face acute access and infrastructure challenges:

- **Overcrowded and Unequal Access:** Bihar's young population (~22.3 million children aged 6–13) greatly exceeds its schooling capacity (~93,000 schools), leading to very high student-to-school ratios. Rajasthan's child population is roughly half as large (~12.3 million aged 6–13) with more schools (~106,000), but still significant rural gaps.
- **Infrastructure Gaps:** State and national data show steep shortfalls in ICT resources. Only ~18.4% of Bihar's schools had a functional computer in 2023-24 (versus 57.2% nationally). Internet access is similarly low (~18.5% of Bihar schools). Rajasthan's figures are better than Bihar's but still trail leading states.
- **Digital Literacy:** Few adults have basic computer skills (Bihar's adult computer literacy ~44%). Poor electricity and broadband in rural areas exacerbate these gaps.
- **Equity and Quality:** Within each state, female and rural students lag behind. For example, rural female literacy in Rajasthan (~45.8%) is far below urban male levels. These gaps undermine the goals of recent education reforms (e.g. NEP 2020) and impede 21st-century learning.

Approach

To analyze these challenges, we compiled demographic and school data into a Tableau dashboard for interactive exploration. Key steps included:

- **Data Integration:** Collected state-wise population projections (ages 6–15) and UDISE+ 2021-22 school data. We processed these in Tableau to align age cohorts (6–10, 11–13, 14–15 years) with counts of schools and ICT resources.
- **Dashboard Design:** Built interactive views showing population segments by age and comparisons of school infrastructure (total schools, % with computers/internet). Filters let users compare Bihar vs. Rajasthan and drill down by district or gender.
- **Visualization:** Used bar charts, maps, and summary metrics to highlight key contrasts. For example, population pyramid charts for each state by age group, and side-by-side bar charts of schools per child. An embedded map visualizes district-level school density.

Data Overview

Key data points highlight the scope of need in each state:

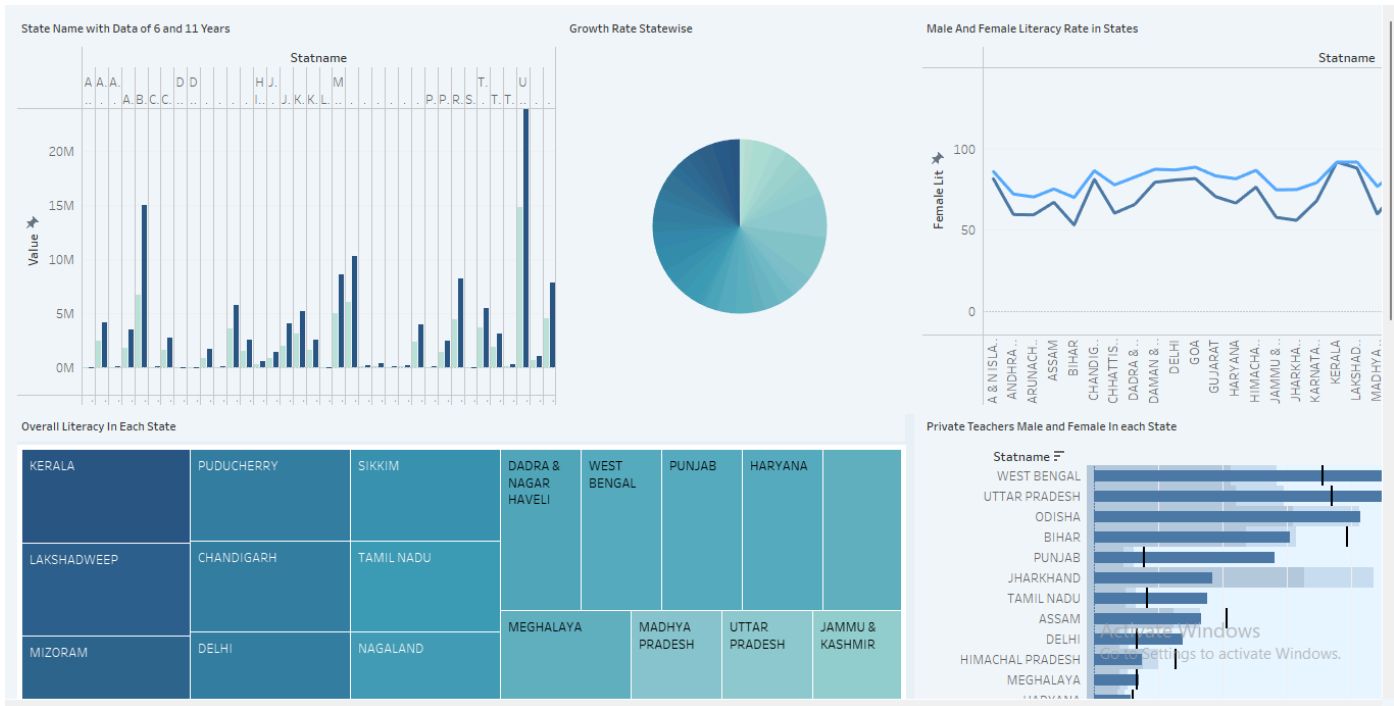
- **Child Population (2021 projections):** Bihar has ~13.8M children age 6–10 and 8.44M age 11–13, whereas Rajasthan has ~7.86M (6–10) and 4.49M (11–13). In total, Bihar's 6–13 cohort (~22.3M) is nearly double Rajasthan's (~12.3M). (For 14–15 years, Bihar has ~5.57M vs Rajasthan ~3.06M.)
- **Schools & Resources:** UDISE 2021-22 reports ~93,000 schools in Bihar and ~106,000 in Rajasthan (all levels). The heavy child population means far more students per school in Bihar. Nationally only ~57.2% of schools have computers – Bihar's figure is ~18.4%. Just ~18.5% of Bihar schools have Internet. (Rajasthan's ICT coverage is higher than Bihar's but well below top states.)
- **Literacy and Enrolment:** Female literacy is ~51.5% in Bihar and ~52.7% in Rajasthan, both far below the national average. Large dropout rates in higher grades exacerbate these stats.

Dashboard

We developed an interactive Tableau dashboard to illustrate this data. Key views include population pyramids for 6–15 year olds in each state, charts of schools per 1,000 children, and tables of ICT facility percentages. Users can toggle between age bands and filter by gender or region.

Dashboard: [Link](#)

Figure: Dashboard Screenshot



Key Insights

- **Population vs. Infrastructure Mismatch:** Bihar's vast youth population (more than double Rajasthan's in the 6–13 range) is supported by fewer schools. Approximate pupils-per-school (age 6–10) are ~150 in Bihar vs ~75 in Rajasthan. This suggests severe overcrowding in Bihar's classrooms.
- **Technology Divide:** Bihar's schools are dramatically under-equipped. Only ~18% have computers (versus 57% nationally). Rajasthan does better but still falls short (national average). This digital divide implies students in Bihar are far less prepared for online learning or ICT skills.
- **Gender Disparities:** Both states have large gender gaps. For example, rural female literacy is especially low ($\approx 45.8\%$ in Rajasthan vs male $\sim 79\%$). In Bihar, girls' enrollment drops sharply after primary school. Bridging these gaps will require targeted efforts.
- **Policy Levers:** Rajasthan's literacy improvement programs (e.g. Lok Jumbish, Shiksha Karmi) have shown progress historically. Bihar may emulate such community-based teacher programs. Both states must focus on retaining students past primary level to realize the benefits of basic literacy gains.

Recommendations

Focus Area	Bihar	Rajasthan
Expand Access	<ul style="list-style-type: none"> • Accelerate school construction in high-density districts; use multi-shift schooling where needed. • Subsidize transportation (e.g. buses) for rural children. • Strengthen Anganwadi/bridge programs to prepare 6–10 year olds for schooling. 	<ul style="list-style-type: none"> • Extend existing schools to secondary level, especially in remote areas. • Improve school management to reduce reliance on private tuitions (which many poor families cannot afford).
Girls Education	<ul style="list-style-type: none"> • Offer scholarships and conditional cash transfers for girls' attendance past Grade 5. • Build (and maintain) separate girl's toilets and ensure safety (lighting, female staff). • Community outreach to change norms (e.g. local women ambassadors). 	<ul style="list-style-type: none"> • Enforce and raise minimum education requirements for local governance (panchayat committees) to prioritize girls' schooling. • Provide cycling programs or bicycles to female students (to reduce absenteeism due to distance).
ICT & Digital	<ul style="list-style-type: none"> • Deploy computer labs with locally relevant content (Hindi/Urdu medium) and 	<ul style="list-style-type: none"> • Expand digital classrooms (PM e-Vidya etc.) to block-level centers.

	<p>teacher training.</p> <ul style="list-style-type: none"> • Partner with telecoms for school Wi-Fi in clusters of villages. • Adult digital literacy drives (libraries, night classes) to build parent support. 	<ul style="list-style-type: none"> • Incentivize solar-powered computer kiosks in villages (to overcome power issues). • Integrate e-learning modules in teacher training (via DIKSHA, NISHTHA).
Quality Improvement	<ul style="list-style-type: none"> • Implement catch-up/remedial literacy programs for older children, especially girls. • Recruit and train local para-teachers (e.g. similar to Shiksha Karmi) to address teacher shortages. • Monitor learning outcomes via ASER-like assessments to target interventions. 	<ul style="list-style-type: none"> • Scale successful campaigns (e.g. adult literacy drives) from one district to others. • Strengthen school-community committees (SMCs) for accountability in resource use.

Summary Table of State-Wise Stats

Metric	Bihar	Rajasthan
Population (2023 est.)	~130.7 million	~68.5 million
Children (6–13 yrs, 2021)	~22.3M	~12.3M
Schools (total, UDISE 2021-22)	~93,000	~106,000
Literacy (2011 Census)	70.7% (M:79.7%, F:60.5%)	67.1% (M:80.5%, F:52.7%)
% Schools w/ Computers	18.4%	(Data not reported; likely ≈50%)
% Schools w/ Internet	18.5%	(Data not reported; higher than Bihar’s)
Students per school (6–10)	~150 (approx.)	~75 (approx.)
Female literacy gap	~19% gap (M–F)	~27.8% gap (M–F)
<p><i>Notes:</i> Bihar’s child population is nearly double Rajasthan’s, yet it has far fewer schools per child. Both states lag national averages in ICT deployment. These figures highlight the actionable gaps.</p>		

Reflections

This analysis reinforced the power of data-driven storytelling. By aligning population projections with school infrastructure data, we revealed stark mismatches that a simple report might miss. The dashboard approach let us “show not tell” – e.g., immediately seeing Bihar’s overcrowded schools chart against Rajasthan’s. We also saw how important context is: for example, knowing that national computer access is ~57% made Bihar’s 18% feel even more critical. From a policy perspective, the exercise clarified that interventions must be state-specific: Rajasthan needs to consolidate and quality-improve existing schools, while Bihar requires massive expansion of capacity and ICT. Overall, the project underscored how analysts must blend quantitative insight with local understanding to frame useful education policies.

Closing

For further discussion or portfolio inquiries, please contact Darshit at bhagtanidarshit01@gmail.com or connect via LinkedIn ([Link](#)) This analysis is part of my consulting portfolio, demonstrating data storytelling and policy analysis skills.

References

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