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Original Research Article

Access, Quality and Outcome under the Sarva Siksha Abhiyan (SSA) Subject to Primary Education in India

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Abstract

The Sarva Siksha Abhiyan (SSA) is a significant flagship initiative for elementary education that paves the way for a skilled labour force as well as for rapid economic and social advancement. The importance of elementary education for both human development and economic prosperity has frequently been underlined by a variety of economists and policymakers. As a result, it is crucial to assess the current state of primary education in India in order to assess how well SSA is working there after reaching nearly universal enrolment rates. The current study examines the effectiveness of SSA in relation to two key factors: Access and Quality. Only those access and quality indicators that are pertinent to elementary education in public schools are included. Due to the lack of pertinent data for upper primary education, only issues pertaining to basic education are examined in the current study.

Keywords: Centrally Sponsored Scheme, Sarva Siksha Abhiyan, Primary Education, Indian States.

INTRODUCTION

During the 1980s and 1990s, low enrolment rates, poor literacy rates, and low human development were widespread in India. On this front, India was even criticized internationally. Numerous studies conducted in the 1980s and 1990s reaffirmed that India's goal of universalizing elementary education was a long way off from becoming a reality. Even in the primary level of education, which was a major source of worry for policymakers, there were indications of access and quality disparities. Given these tendencies, the Indian government introduced the SSA program in 2001 with the goal of achieving universal access to basic education and delivering high-quality instruction. In accordance with the country's commitment to achieving the Millennium Development Goals (MDGs), the Indian government placed a great deal of attention on the education sector during the eleventh and twelfth plans.

In response, estimates based on a number of government publications show that India has similarly attained enrolment levels for basic education that are nearly universal. There has undoubtedly been improvement in each Indian State, yet there are variations based on many metrics. To evaluate how well SSA performed in relation to its underlying goals and outcomes, several studies were carried out at various times. Some of these studies backed the case for SSA, while others highlighted significant obstacles that are still present under SSA.

Inequalities in educational possibilities for obtaining elementary education, caste- and gender-based variances or variations, and concerns with quality education were some of the research that were highlighted. The text above makes obvious reference to problems with accessibility and quality of basic education in India. As a result, it is crucial to assess the current state of primary education in India in order to assess how well SSA is working there after reaching nearly universal enrolment rates. It is significant to highlight that the current study examines the effectiveness of SSA in relation to two key factors: Access and Quality. Only those access and quality indicators that are pertinent to elementary education in public schools are included. Due to the lack of pertinent data for upper primary education, only issues pertaining to basic education are examined in the current study.

Measurements of Access, Quality, and Outcomes under SSA

In this section, a few of the significant SSA indicators for access, quality, and outcomes with regard

to primary education in India are evaluated. Table 1 contains a list of the indicators that were used for the analysis. Based on these broad metrics, the fundamental goals of ensuring that all children have access to high-quality education and that primary education is accessible under SSA in India are assessed.

Table 1: Indicators measuring Access, Quality and Outcomes under SSA in India

Access	Quality	Outcome
Average Student Classroom Ratio (ASCR)	The cumulative total of all facilities has been used to calculate the percentage of schools that provide infrastructure, including: Percentage of schools with drinking water facility Percentage of schools having boy's toilet Percentage of schools having girl's toilet Percentage of schools having computers Percentage of schools having electricity connection Percentage of schools having ramps Teachers Related Aspects: Average number of teachers per school Pupil-Teacher Ratio (PTR)	Gross Enrolment Ratio Gander Parity Index- Ratio of girls to boy's enrolment (GPI) Average Repetition Rate

Source: Authors preparation

Average Students Classroom Ratio (ASCR)

One key metric for assessing access to primary education is the Average Student-Classroom Ratio (ASCR). In relation to the number of students enrolled in elementary school, it alludes to the availability of classrooms. Greater access to primary education results from higher enrollment levels, which are correlated with lower ASCR. There are differences in average student-to-teacher ratios between states It was discovered that, in the 2007–08 fiscal year, Kerala (8.8), Meghalaya (8.5), and Sikkim (8.2) had the lowest average student–classroom ratios. Due to their significantly lower average student-to-classroom ratios, these states are performing better and are ranked first, second, and third, respectively. Conversely, when compared to the other states/UTs, Bihar, Jharkhand, and West Bengal had the highest average student-to-classroom ratio. These were the States with the lowest performance, placing them 33rd, 32nd, and 31st, respectively. Goa, Himachal Pradesh, and Sikkim had the lowest average student-to-classroom ratio in 2021–2022. These states have ranked first, second, and third, respectively, since they are outperforming the other States/UTs. On the other side, the average student-to-classroom ratio was highest in Gujrat, Bihar, and Chandigarh. These states rank 33rd, 32nd, and 31st, respectively, since they were the least productive in 2021–2022 (table 2). The poorest performing states are those with high ASCR because they have more students enrolled in primary education than there are available classrooms. This suggests that the overall enrollment in primary school is disproportionately low due to a lack of adequate infrastructure.

Further analysis revealed that some States, including Assam, Chhattisgarh, Haryana, Himachal Pradesh, Jharkhand, Madhya Pradesh, Mizoram, Nagaland, Uttar Pradesh, Uttarakhand, and West Bengal, had improved over time. The construction of new classrooms or the opening of more schools has resulted in a noticeable improvement for these states. A few states, including the A&N Islands, Bihar, Chandigarh, Delhi, Goa, Gujrat, and Karnataka, showed a decline in their rankings. The key cause of these states' subpar performance is the sluggish rate of infrastructural facility expansion, or the sluggish opening of new schools relative to the growing primary enrollment. But in the rankings of Andhra Pradesh, Arunachal Pradesh, Manipur, Puducherry, and Sikkim, there was no discernible shift (Table 2).

Table 2: State-wise Average Student-Classroom Ratio (ASCR) in India

S. No.	*States/UTs*	*2007-08*	*2021-22*	*R1*	*R2*	*Change in Rank*	*Change in Number (%)*
1.	A & N Islands	13.29426	16.48055	8	18	10	23.96741
2.	Andhra Pradesh	18.05322	16.12955	16	16	0	-10.6556
3.	Arunachal Pradesh	15.13541	12.93985	11	11	0	-14.5061
4.	Assam	38.59723	21.1547	30	23	-7	-45.1911
5.	Bihar	97.13556	60.40699	33	31	1	-37.8117
6.	Chandigarh	31.26997	180.5597	27	33	6	477.422
7.	Chhattisgarh	31.03323	15.77507	26	15	-11	-49.1672
8	Delhi	28.34354	35.15346	23	27	4	24.02636
9	Goa	12.97046	7.590549	6	3	3	-41.4782
10	Gujarat	26.44565	75.9492	21	32	11	187.1898

S. No.	*States/UTs*	*2007-08*	*2021-22*	*R1*	*R2*	*Change in Rank*	*Change in Number (%)*
11	Haryana	33.13233	18.66291	28	19	-9	-43.6716
12	Himachal Pradesh	13.95691	7.536345	9	2	-7	-46.0028
13	Jammu & Kashmir	11.62599	11.80446	4	8	4	1.535095
14	Jharkhand	67.22189	30.60877	32	26	-6	-54.4661
15	Karnataka	16.49263	45.05695	13	28	15	173.1945
16	Kerala	8.889575	11.84607	3	9	6	33.258
17	Lakshadweep	28.66443	51.875	24	30	6	80.97342
18	Madhya Pradesh	29.37434	14.8955	25	13	-12	-49.2908
19	Maharashtra	18.79363	20.1321	18	21	3	7.121934
20	Manipur	14.3415	12.75351	10	10	0	-11.0727
21	Meghalaya	8.587547	9.428012	2	5	3	9.787021
22	Mizoram	15.14471	11.04852	12	7	-5	-27.047
23	Nagaland	12.39405	9.073083	5	4	-1	-26.7948
24	Odisha	27.81037	25.56892	22	25	3	-8.05976
25	Puducherry	18.5	16.38047	17	17	0	-11.4569
26	Punjab	26.34778	20.14407	20	22	2	-23.5455
27	Rajasthan	23.58168	48.99695	19	29	10	107.7755
28	Sikkim	8.253951	5.707557	1	1	0	-30.8506
29	Tamil Nadu	13.14164	12.94482	7	12	5	-1.49768
30	Tripura	16.90442	23.48201	14	24	10	38.91047
31	Uttar Pradesh	35.77898	14.95232	29	14	-15	-58.2092
32	Uttarakhand	17.54174	9.985495	15	6	-9	-43.0758
33	West Bengal	42.46049	20.09718	31	20	-11	-52.6685
	All India	**24.88543**	**27.12487**				**8.999**

Source: *Compiled by the researcher from various reports of DISE.*

Note*: Figures for 2007-08 and 2021-22 have been extrapolated based on data from various DISE reports. R1 denotes Rank in 2007-08; R2 denotes Rank in 2021-22;*
(-) sign denotes improvement in an indicator; (+) sign indicates deterioration in an indicator.

Average Number of Teachers per school

The average number of teachers per school (ATCH) is an additional metric that emphasizes how crucial teacher availability is to improving access and raising standards of education. More access to primary education is associated with higher average teacher-to-school ratios. This is because understaffed classrooms negatively impact student performance, making parents unwilling to enrol their kids in school. As a result, higher enrollment levels in schools correspond with the greater instructor availability.

At the national level, it is noted that the average number of teachers per school grew from 2.8 in 2007–08 to 3.2 in 2021–22, representing a growth rate of 14.2% p.a. It was discovered that in Chandigarh, Delhi, and Lakshadweep had the greatest average number of teachers per school in 2008. Due to their bigger teacher populations, these states are performing better and are ranked first, second, and third, accordingly. In contrast, Rajasthan (2), Dadra & Nagar Havel (1.9), and Arunachal Pradesh (1.7) had the lowest average number of instructors per school. Due to their poor performance, these states came in at positions 35, 34, and 33, respectively. (See Table 3). This suggests that there is a teacher shortage in the educational system.

Further analysis revealed that a small number of states, including Arunachal Pradesh, Assam, Chhattisgarh, Dadra & Nagar Haveli, Goa, Haryana Manipur, Nagaland, Puducherry, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, and West Bengal, had improved over time. The increase in staff recruitment under SSA has led to a rise in the number of teachers, which has improved the performance of these States.

A number of states, including Andhra Pradesh, Bihar, Gujarat, Karnataka, Lakshadweep, Madhya Pradesh, Maharashtra, Mizoram, and Sikkim, saw a decline in their rankings. Insufficient teacher supply has been the primary cause of these states' subpar performance. Nonetheless, throughout the study period, the rankings of the A & N Islands, Chandigarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Kerala, and Meghalaya did not change.

Moreover, Chandigarh and Delhi had, on average, three to four times more teachers per school than the national average during the study period. Throughout the study period, Rajasthan had the lowest average number of instructors per educational facility, consistently falling short of the national norm (Table 3). It has also been noted that the average number of instructors per school has decreased in various states,

including Gujrat, Lakshadweep, and others. This suggests that these States are experiencing a teacher shortage. However, in several states, like as Arunachal Pradesh, Assam, Chhattisgarh, Manipur, Punjab, etc., there is a rise in the number of teachers as these States' performance in relation to the indicator is apparent.

Table 3: State-wise Average Number of Teachers per School (ATCH) in India

S.No.	*States/UTs*	*2007-08*	*2021-22*	*R1*	*R2*	*Change in Rank*	*Change in Number (%)*
1.	A & N Islands	4.4	4.1	9	9	0	-6.228
2.	Andhra Pradesh	2.4	2.5	22	24	2	3.718
3.	Arunachal Pradesh	1.7	2.6	35	22	-13	50.989
4.	Assam	2.3	2.9	26	19	-7	26.090
5.	Bihar	3.7	3.3	13	16	3	-9.997
6.	Chandigarh	13.3	11.4	1	1	0	13.71
7.	Chhattisgarh	2.4	2.7	22	21	-1	11.117
8.	Dadra & Nagar Haveli	1.9	3.2	34	17	-17	62.715
9	Delhi	12.8	10.12	2	2	0	-20.961
10	Goa	2.1	3.2	29	17	-12	48.081
11	Gujarat	3.1	2.5	17	24	7	-17.574
12	Haryana	4.0	4.3	11	7	-4	7.4532
13	Himachal Pradesh	2.5	2	21	21	0	-17.603
14	Jammu & Kashmir	2.3	2.4	26	26	0	1.397
15	Jharkhand	2.1	2.1	29	29	0	-2.795
16	Karnataka	2.1	2.0	29	31	2	-5.607
17	Kerala	5.9	6.5	4	4	0	10.275
18	Lakshadweep	12.6	0.5	3	34	31	-1.477
19	Madhya Pradesh	2.3	2.1	26	29	3	-8.890
20	Maharashtra	2.7	2.9	18	19	1	6.047
21	Manipur	3.2	3.9	16	12	-4	21.864
22	Meghalaya	2.4	2.6	22	22	0	5.577
23	Mizoram	4.4	4	9	11	2	-8.819
24	Nagaland	5.7	5.9	6	5	-1	3.423
25	Odisha	2.4	3.6	22	14	-8	6.226
26	Puducherry	5.9	6.6	4	3	-1	12.328
27	Punjab	2.6	3.6	20	14	-6	34.274
28	Rajasthan	2	2	33	31	-2	2.900
29	Sikkim	4.9	4.8	8	6	2	-2.449
30	Tamil Nadu	2.7	3.7	18	13	-5	35.387
31	Uttar Pradesh	3.4	4.2	14	8	-6	23.980
32	Uttarakhand	2.1	2.4	29	26	-3	15.276
33	West Bengal	3.3	4.1	15	9	-6	22.435
34	All States	2.8	3.2	-	-	-	14.23

***Source**: Compiled by the researcher from various reports of DISE.*

Pupil-Teacher Ratio (PTR)

The PTR, or pupil-teacher ratio, is a crucial metric for assessing the availability and calibre of elementary education. A greater student-to-teacher ratio puts additional strain on teachers, which lowers the quality of education since access to primary school is influenced by the availability of teachers. Therefore, greater access to basic schooling is indicated by a lower PTR score. PTR should be 30:1 at the primary level and 35:1 at the upper primary level, following the Right to free and Compulsory Education Act (2009). PTR is calculated with the following formula:

$$Pupil\ Teacher\ Ratio = \frac{Total\ Enrolment\ in\ School\ of\ primary\ category}{Total\ teachers\ in\ peimaryschools\ category}$$

PTR ranged from 20 to 30 during 2007–08, making Mizoram, Himachal Pradesh, and Lakshadweep the states with the lowest PTR, achieving first, second, and third rank, respectively. However, when compared to all other states/UTs, Chandigarh, Gujarat, and Kerala have the greatest student-teacher ratio, placing them 33rd, 32nd, and 31st, respectively. Kerala, Sikkim, and Goa achieved the lowest student-teacher ratios in 2021–22 and, as a result, were ranked first, second, and third accordingly.

Further analysis revealed that some States, including the A&N Islands, Goa, Jammu & Kashmir, Jharkhand, Kerala, Maharashtra, Nagaland, Puducherry, Sikkim, Tamil Nadu, Uttar Pradesh, and Uttrakhand, had improved over time. Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Haryana, Himachal Pradesh, Karnataka, Lakshadweep, Madhya Pradesh, Mizoram, Odissa, Punjab, Rajasthan, Tripura, and West Bengal are among the states that have seen a decline in their rankings. Nonetheless, there was no discernible shift in Gujrat's ranking (Table 4). Over the course of the study, PTR continued to be the lowest, mostly in Sikkim, Nagaland, and Goa. It was also substantially lower than the national average and much lower than the 30:1 ratio set by the RTE Act 2009 for basic level classes. Throughout the study period, PTR was consistently higher than the national average and was greatest in Chandigarh and Gujrat among all states. These phenomena have been linked to the ongoing number of open positions and the improper placement of teachers in the classrooms, both of which have a negative impact on the standard of instruction provided by SSA (CAG Report No. 23, 2017).

Table 4: State-wise Pupil-Teacher Ratio (PTR) in India

S.No.	*States*	*2007-08*	*2021-22*	*R1*	*R2*	*Change in Rank*	*Change in Number (%)*
1.	A & N Islands	46.047	17.375	15	12	-3	-62.265
2.	Andhra Pradesh	51.589	22.568	16	17	1	-56.253
3.	Arunachal Pradesh	36.487	20.516	8	14	6	-43.772
4.	Assam	32.890	22.814	6	19	13	-30.633
5.	Bihar	78.926	81.331	25	31	6	3.046
6.	Chandigarh	324.24	238.24	33	33	0	-26.522
7.	Chhattisgarh	41.175	21.104	10	15	5	-48.745
8	Delhi	62.379	37.473	22	27	5	-39.927
9	Goa	36.008	8.3681	7	3	-4	-76.760
10	Gujarat	130.81	93.998	32	32	0	-28.143
11	Haryana	53.940	27.578	19	22	3	-48.872
12	Himachal Pradesh	24.394	13.523	2	9	7	-44.564
13	Jammu & Kashmir	43.680	15.766	11	10	-1	-63.904
14	Jharkhand	89.177	52.330	29	28	-1	-41.318
15	Karnataka	81.593	52.771	26	29	3	-35.323
16	Kerala	98.363	0.2064	31	1	-30	-99.790
17	Lakshadweep	28.955	26.975	3	21	18	-6.840
18	Madhya Pradesh	58.476	31.758	21	25	4	-45.690
19	Maharashtra	83.850	27.772	28	23	-5	-66.879
20	Manipur	53.848	12.385	18	7	-11	-76.999
21	Meghalaya	45.815	10.641	14	5	-9	-76.772
22	Mizoram	23.618	11.571	1	6	5	-51.006
23	Nagaland	32.638	9.8237	5	4	-1	-69.901
24	Odisha	53.595	36.041	17	26	9	-32.753
25	Puducherry	75.130	18.578	24	13	-11	-75.271
26	Punjab	45.337	22.611	12	18	6	-50.125
27	Rajasthan	82.758	56.481	27	30	3	-31.750
28	Sikkim	30.214	6.6168	4	2	-2	-78.1
29	Tamil Nadu	90.54958	15.80418	30	11	-19	-82.546
30	Tripura	57.40556	28.67641	20	24	4	-50.045
31	Uttar Pradesh	71.48323	23.07772	23	20	-3	-67.715
32	Uttarakhand	39.40876	13.05296	9	8	-1	-66.878
33	West Bengal	45.50339	21.9453	13	16	3	-51.772

***Source**: Compiled by the researcher from various reports of DISE.*

***Note**: Figures for 2007-08 and 2021-22 have been extrapolated based on data from various DISE reports. R1 denotes Rank in 2007-08; R2 denotes Rank in 2021-22;*

(-) sign denotes improvement in an indicator; (+) sign indicates deterioration in an indicator.

Gross Enrolment Ratio (GER)

According to the State Report Card of DISE, the Gross Enrollment Ratio (GER) is calculated by dividing the total number of students enrolled in primary education (Grades I–V) by the total population in the age group of 6–11. Achieving universal enrolment through time-bound targets and diverse interventions is one of SSA's primary goals. The GER provides a comprehensive overview of primary school enrollment. Higher GER therefore denotes greater access to basic schooling. At the national level, it is discovered that the GER of students enrolled in schools during the study term is 100%. Enrollment levels have increased dramatically as a result of several SSA measures, including midday meals (Programme Evaluation Organization, 2010, Kaul, 2001, Shrivastava 2001, World Bank, 2003; Shabir *et al*., (2022). Climatic Change and Economic Growth: An Evidence from Low-Income Economies. *Saudi J Econ Fin*, *6*(7), 239-243.3). Furthermore, it has been noted that GER has increased in certain States while declining in others. The case for more students enrolling in primary education under SSA has been bolstered by studies on the subject of primary education undertaken by the World Bank (2003), Dreze and Goyal (2003), and Dar and Nain (2023a) and Programme Evaluation Organization (2010). However, according to the ASER Report 2018, there has been a noticeable drop in primary school enrollment in recent years across all states and UTs. The drop in overage children and the move to private schools may be the causes of the enrollment fall (Economic Survey, numerous concerns)

$$Gross\ Enrolment\ Ratio = \frac{Total\ enrolment\ in\ grade\ I\ to\ V}{Population\ of\ age\ 6-11}$$

Furthermore, it was discovered that Arunachal Pradesh ranked first in 2007–08 due to having the greatest gross enrolment ratio. Meghalaya and Mizoram came in second and third, respectively. This indicates that a significant number of students were enrolled in primary education in these States' schools. Of all the states, Goa ranked the lowest, coming in at number 33. Punjab and Kerala, meanwhile, ranked 32 and 31, respectively. With the greatest enrollment in 2021–2022, Meghalaya ranked first, followed by Mizoram in second place and Manipur in third. The Andaman and Nicobar Islands, at rank 33, are the lowest ranked, followed by Puducherry, at rank 32, and Lakshadweep, at rank 31 (Table 5). Since both younger and older students are enrolled in elementary school, the enrollment ratios show a significant increase. An overestimation of enrollment levels has resulted from the inclusion of children's enrollment in upper primary schools in some enrollment ratios.

Further analysis revealed that a small number of States, including Andhra Pradesh, Delhi, Goa, Haryana, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Meghalaya, Manipur, Punjab, Tripura, Uttarakhand, and West Bengal, had improved over time. This indicates that the number of children covered by the SSA has increased overall. Arunachal Pradesh, Bihar, Chandigarh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Lakshadweep, Madhya Pradesh, Nagaland, Orissa, Puducherry, Rajasthan, Sikkim, Tamil Nadu, and Uttar Pradesh are among the states that showed a decline in their rankings (Table 5). These states saw a similar trend as a result of school dropouts.

Furthermore, during the study period, GER was higher than the national average and continued to be highest in primarily Arunachal Pradesh, Manipur, Meghalaya, and Mizoram. Over the course of eleven years, there has been an overall growth in GER in every State and UT. Goa has experienced the largest growth in GER, with Punjab, Haryana, and Kerala following. This suggests that compared to other states, these states saw improvements in main enrollment rates significantly more quickly. The government's increased focus on primary education universalization is mostly to blame for this. States like Karnataka, Andhra Pradesh, and Chandigarh, on the other hand, experienced sluggish increases in enrollment, with increases of roughly 0.12%, 3.6 percent, and 2%, respectively. Furthermore, a decline in enrolment was observed in several states. The states with the biggest decreases are Madhya Pradesh (39%) Arunachal Pradesh (35%), and Jharkhand (34%).

Table 5: State-wise Gross Enrolment Ratio (GER) in India

States	*2007-08*	*2021-22*	*R1*	*R2*	*Change in rank*	*Change in number (%)*
Andaman and Nicobar Islands	88.24	67.8	28	33	5	-23.164
Andhra Pradesh	97.98	101.6	26	23	-3	3.694
Arunachal Pradesh	199.07	129.2	1	4	3	-35.098
Assam	132.02	119.6	9	7	-2	-9.407
Bihar	125.51	102.5	11	18	7	-18.333
Chandigarh	83.68	85.4	29	30	1	2.055
Chhattisgarh	124.24	96.6	12	26	14	-22.247

States	*2007-08*	*2021-22*	*R1*	*R2*	*Change in rank*	*Change in number (%)*
Delhi	102.86	116	22	8	-14	12.774
Goa	53.95	92.8	33	28	-5	72.011
Gujarat	107.23	93.1	21	27	6	-13.177
Haryana	80.31	104	30	17	-13	29.498
Himachal Pradesh	112.98	108.3	17	12	-5	-4.1423
Jammu and Kashmir	99.16	112	25	10	-15	12.948
Jharkhand	157.37	102.3	4	19	15	-34.994
Karnataka	107.96	108.1	19	13	-6	0.1296
Kerala	79.97	102.1	31	20	-11	27.672
Lakshadweep	102.64	79.6	23	31	8	-22.447
Madhya Pradesh	144.71	86.9	7	29	22	-39.948
Maharashtra	102.24	106.9	24	14	-10	4.557
Manipur	151.75	143.4	5	3	-2	-5.502
Meghalaya	184.73	187.7	3	1	-2	1.607
Mizoram	186.36	158.9	2	2	0	-14.734
Nagaland	126.36	102.1	10	20	10	-19.199
Odisha	115.81	97.9	16	25	9	-15.465
Puducherry	96.76	76.6	27	32	5	-20.835
Punjab	67.79	111.4	32	11	-21	64.331
Rajasthan	115.82	105.1	15	16	1	-9.255
Sikkim	150.08	106.2	6	15	9	-29.237
Tamil Nadu	117.83	99	13	24	11	-15.980
Tripura	135.44	126.1	8	5	-3	-6.8960
Uttar Pradesh	110.29	101.9	18	22	4	-7.607
Uttarakhand	107.48	120.5	20	6	-14	12.113
West Bengal	115.84	115.3	14	9	-5	-0.466
All India	**113.94**	103.4				**-9.250**

***Source**: Compiled by the researcher from various reports of DISE.*

***Note**: Figures for 2007-08 and 2021-22 have been extrapolated based on data from various DISE reports. R1 denotes Rank in 2007-08; R2 denotes Rank in 2021-22;*
(-) sign denotes improvement in an indicator; (+) sign indicates deterioration in an indicator.

Gender Parity Index (GPI)- (Ratio of Girls' to Boys' Enrolment in Primary Education)

One of the most crucial metrics for determining universal access to primary education is the Gender Parity Index (GPI). Its goal is to achieve universal access and inclusive education. The percentage of girls enrolled compared to boys indicates how equal access to primary school is. Access to primary education is positively correlated with GPI value and vice versa.

$$Gender\ Parity\ Index\ (GPI) = \frac{Girl's\ Enrolment\ in\ Primary\ Grades\ in\ year\ "t"}{Boy's\ Enrolment\ in\ Primary\ Grades\ in\ Year"t"}$$

The ratio of girls to boys enrolled in basic school has improved significantly and has been about 1.03, according to the all-India average. Studies conducted by the World Bank (2003) and the Programme Evaluation Organization (2010) have also shown this pattern. It is noted that Meghalaya and Himachal Pradesh ranked first in 2007–08 due to having the highest ratio of female to boy enrollment in basic school. Sikkim and Manipur came in third and fourth, respectively. This suggests that in these states, the number of girls enrolled is relatively higher than that of boys. With the lowest GPIs in 2007–08, Chandigarh, Haryana, and Punjab ranked 33rd and 31st, respectively. This suggests that fewer girls than boys have been enrolled in these States. It is significant to highlight that, in comparison to the other States and Union Territories, Chandigarh had the lowest enrollment ratio of girls to boys since a lower percentage of its children were enrolled in elementary education. With the largest ratio of female to boy enrolment in 2021–2022, (Table 6). The poor GPI in these states was mostly caused by high dropout rates.

A few States, including Andaman and Nicobar Island, Arunachal Pradesh, Assam, Bihar, Chandigarh, Delhi, Goa, Gujrat, Haryana, Jammu & Kashmir, Jharkhand, Maharashtra, Nagaland, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, and Uttarakhand, have been further analyzed to show improvement over time.

The primary driver of the GPI rise has been the emphasis on girls' education, combined with fee incentives, free books and uniforms, and midday meals. A number of states, including Madhya Pradesh, Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Lakshadweep, Orissa, Puducherry, Sikkim, and West Bengal, showed declines in their rankings. These states' high dropout rates, scarcity of incentives, and midday meal policies prevented them from expanding the number of girls enrolled. Still, there was no discernible shift in Punjab's ranking (Table 6). Moreover, GPI continued to be higher than the national average during the study period and was concentrated mostly in Assam, Sikkim, Manipur, and Meghalaya. Nonetheless, during the study period, GER increased generally in every State and UT. This suggests that compared to the other states, these states' primary enrollment rates improved far more quickly. Conversely, states like Karnataka had sluggish increases in enrolment. The GPI increased significantly in a few states, including Chandigarh, Arunachal Pradesh, Bihar, and Tripura. Furthermore, the GPI even decreased in a few States. Kerala and Sikkim have seen the biggest declines. As a result, it shows that States' performance in relation to GPI has been moderate. Nonetheless, action can be done to boost enrollment, particularly in States where the ratio is low and a discernible decline in the GPI has occurred (Table 6). The main cause of the GPI fall in these states has been the high dropout rate, which is particularly high for girls (Shrivastava, 2001; Kaul, 2001; World Bank, 2003; and Programme Evaluation Organization, 2010).

Table 6: State wise Gender Parity Index (GPI) in India

State	*2007-08*	*2021-22*	*R1*	*R2*	*Change in rank*	*%*
Andaman and Nicobar Islands	0.95	1.05	16	6	-10	10.526
Andhra Pradesh	0.97	1	7	24	17	3.0927
Arunachal Pradesh	0.92	1.01	24	19	-5	9.7826
Assam	0.97	1.06	7	3	-4	9.278
Bihar	0.87	1.03	28	14	-14	18.390
Chandigarh	0.81	1.11	33	1	-32	37.0370
Chhattisgarh	0.96	1	11	24	13	4.1666
Delhi	0.88	1.07	26	2	-24	21.590
Goa	0.94	1.05	20	6	-14	11.702
Gujarat	0.88	1.06	26	3	-23	20.454
Haryana	0.85	1	31	24	-7	17.647
Himachal Pradesh	1.01	1.01	1	19	18	0
Jammu & Kashmir	0.87	1.01	28	19	-9	16.091
Jharkhand	0.96	1.01	11	19	8	5.208
Karnataka	0.94	1	20	24	4	6.382
Kerala	0.98	0.99	4	31	27	1.0204
Lakshadweep	0.97	1.03	7	14	7	6.185
Madhya Pradesh	0.96	1	11	24	13	4.1666
Maharashtra	0.89	1.05	25	6	-19	17.977
Manipur	0.99	1.04	3	10	7	5.0505
Meghalaya	1.01	1.04	1	10	9	2.9702
Mizoram	0.95	1	16	24	8	5.2631
Nagaland	0.96	1.06	11	3	-8	10.416
Odisha	0.95	1	16	24	8	5.2631
Puducherry	0.98	1.02	4	17	13	4.0816
Punjab	0.85	0.99	31	31	0	16.470
Rajasthan	0.87	1.03	28	14	-14	18.390
Sikkim	0.98	0.94	4	33	29	-4.081
Tamil Nadu	0.94	1.02	20	17	-3	8.5106
Tripura	0.94	1.04	20	10	-10	10.638
Uttar Pradesh	0.96	1.04	11	10	-1	8.3333
Uttarakhand	0.95	1.05	16	6	-10	10.526
West Bengal	0.97	1.01	7	19	12	4.1237
All India	0.93	1.03	#N/A	14	#N/A	10.752

***Source**: Compiled by the researcher from various reports of DISE.*

***Note:** Figures for 2007-08 and 2021-22 have been extrapolated based on data from various DISE reports. R1 denotes Rank in 2007-08; R2 denotes Rank in 2021-22;*

(-) sign denotes improvement in an indicator; (+) sign indicates deterioration in an indicator.

Average Repetition Rate (ARR)

The enrolment of pupils in primary schools is negatively correlated with the Average Repetition Rate (ARR). It is an additional indicator that seeks to quantify the degree of quality and accessibility to education under the SSA. Greater access to primary school is associated with lower ARR values.

$$Repetition\ rate\ (r_g^t) = \frac{R_g^{t+1}}{E_t^g}$$

Where, E_t^g = Total number of students in grade 'g' in year 't

R_g^{t+1} = Number of repeaters in grade 'g' in year 't+1'

The average recurrence rate has been found to be extremely low throughout India, with the exception of Arunachal Pradesh, Meghalaya, Karnataka, and Nagaland, where it is less than 1% in every state. At the all-India level, ARR decreased with time, going from 5.25 in 2007–08 to 0.5 in 2021–2022. Two factors have led to the observation of this trend: first, increased primary education access due to the supply of physical facilities and incentives such as free textbooks and uniforms; and second, higher-quality education due to the hiring of more teachers under the SSA. The average repetition rate was significantly lower as a result of the RTE Act's "no detention" policy. It is also noted that Tamil Nadu received first position in 2007–08 due to having the lowest average recurrence rate. Andaman & Nicobar Islands and Puducherry came in second and third, respectively. This demonstrates that, in comparison to other States, there are much less repeat students in these States' schools. These make up the top three States in terms of performance. West Bengal came in at number 32 and Sikkim at the bottom, respectively. This indicates that compared to other states, these states have a higher percentage of repeat students in their elementary schools. These states have the lowest performance levels. States with the lowest average repetition rates in 2021–2022 were Delhi, Goa, Kerala, and the Andaman & Nicobar Islands. This indicates that there are significantly less repeat students in these states' schools than in those in other States. These therefore include the top-performing States. On the other hand, the States with the worst performance were Arunachal Pradesh (ranked 32nd) and West Bengal (ranked 32nd), which had the highest average repeat rate (Table 7).

Additional analysis revealed that certain states—Andaman & Nicobar Islands, Bihar, Chhattisgarh, Delhi, Goa, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Kerala, Lakshadweep, Madhya Pradesh, Maharashtra, Mizoram, Odisha, Puducherry, Punjab, Rajasthan, Sikkim, and Uttarakhand—showed improvement over time in their rankings.

The discussion above demonstrates that SSA performance is still moderate across States and UTs. Due to the government's strong emphasis on the universalization of primary education and the country's commitment to the Millennium Development Goals (MDGs), SSA has performed satisfactorily in terms of GER and GPI.

Enrolment ratios have, nevertheless, been observed to exhibit an inflationary trend. In addition, states like Bihar and Chandigarh continue to have high PTR, high ASCR, low average teacher-to-student ratios, and high dropout rates, all of which are indicators of problems with quality and accessibility under the SSA. In order to achieve the goals that underpin SSA, quality issues must be addressed.

Table 7: State-wise Average Repetition Rate (ARR) in India

State	*2007-08*	*2021-22*	*R1*	*R2*	*Change in rank*	*%*
Andaman and Nicobar Islands	0.5	0	3	1	-2	-100
Andhra Pradesh	2.2	0.3	9	26	17	-86.36
Arunachal Pradesh	6	2.4	24	32	8	-60.00
Assam	3.5	0.2	15	19	4	-94.28
Bihar	6.7	0	26	1	-25	-100
Chandigarh	2.4	0.1	11	12	1	-95.83
Chhattisgarh	5.9	0.2	23	19	-4	-96.61
Delhi	0.5	0	3	1	-2	-100
Goa	5.8	0	22	1	-21	-100
Gujarat	7.8	0	29	1	-28	-100
Haryana	6.4	0.2	25	19	-6	-96.87
Himachal Pradesh	4.2	0	16	1	-15	-100
Jammu & Kashmir	1	0.1	5	12	7	-90
Jharkhand	8.8	0.2	30	19	-11	-97.72
Karnataka	1.9	1.5	8	30	22	-21.05
Kerala	3	0	12	1	-11	-100
Lakshadweep	1.8	0	7	1	-6	-100
Madhya Pradesh	10.4	0.6	31	27	-4	-94.23

State	*2007-08*	*2021-22*	*R1*	*R2*	*Change in rank*	*%*
Maharashtra	5.3	0.1	19	12	-7	-98.11
Manipur	2.2	0.2	9	19	10	-90.90
Meghalaya	5.6	1.3	20	29	9	-76.78
Mizoram	3.1	0.1	13	12	-1	-96.77
Nagaland	3.4	1.7	14	31	17	-50
Odisha	5.7	0.2	21	19	-2	-96.49
Puducherry	0.4	0	2	1	-1	-100
Punjab	7.7	0.1	28	12	-16	-98.70
Rajasthan	7	0	27	1	-26	-100
Sikkim	16.6	0.1	33	12	-21	-99.39
Tamil Nadu	0.3	0	1	1	0	-100
Tripura	4.4	0.2	17	19	2	-95.45
Uttar Pradesh	1.1	0.6	6	27	21	-45.45
Uttarakhand	4.5	0.1	18	12	-6	-97.77
West Bengal	12	2.4	32	32	0	-80
All India	5.24	0.5	-	-	-	-90.45

***Source**: Compiled by the researcher from various reports of DISE.*
***Note**: Figures for 2007-08 and 2021-22 have been extrapolated based on data from various DISE reports. R1 denotes Rank in 2007-08; R2 denotes Rank in 2021-22;*
(-) sign denotes improvement in an indicator; (+) sign indicates deterioration in an indicator.

Correlation between CSS, GSDPPC and Key Education Outcomes

Both theoretical and empirical research regard education as one of the key factors influencing economic growth. Scholarly publications by Lucas *et al*., (1990), Schultz (1988), and Dar and Nain (2023b) have frequently highlighted the contribution of human capital to economic growth. Research by Barro (1991), Becker and Murphy (1992), and Gleaser (1994) found that the growth rate of per capita income is positively correlated with school enrolment rates. Research by a number of contemporary economists, including Breton (2012) and Mauro (2000), has also produced evidence in favour of the aforementioned claim. Studies by Bandyopadhyay and Subrahmanian (2008), Ramachandran (2004), Venkatanarayana (2004), Mukherjee (2005), Velaskar (2005), Tilak (1996, 2000), Mehrotra (1995), and Venkatanarayana (2004) examined trends in elementary education in India with regard to caste, gender, equity, access, drop-out rates, and deprivations. The 2010 SSA Programme Evaluation Report brought to light difficulties with inequities and inequality in primary education access. This indicates that there is a relationship between economic growth and education, especially formal education. In recent years, scholars and politicians have begun investigating the relationship between economic growth and education. It hasn't been precisely investigated, nevertheless, how CSS, GSDPPC, and important educational results are related.

METHODOLOGY

The relationship between CSS, Per Capita Gross State Domestic Product (GSDPPC), and important education outcomes (GER, GPI, and ARR) is covered in this section. The data of all states have been taken from 2008 to 2022. States/UTs are divided into two categories for in-depth examination: (i) High-Focus States (HFS) and (ii) Non-High Focus States (NHFS). Seven primary indicators—area, geography, population, literacy rate, IMR, MMR, and TFR—are used to classify the data. Regression analysis employing fixed and random effects model for capturing State-specific effects has been carried out in order to investigate the relationship between Per Capita Gross State Domestic Product (GSDPPC) and important education outcomes.

The basic regression equation is of the form:

$$Y_{it} = \beta_{1i} + \beta_2 X_{it} + w_{it} \quad (1)$$

where Y denotes dependent variable; X denotes independent variable; β_1 represents regression co-efficient of intercept; β_2 represents regression co-efficient of X; i represents ith cross-sectional units i.e. number of States (i = 1, 2, 3, ..., 22); t represents t_{th} time-period (t = 1, 2, 3,., 10) and wit is the composite error term consisting of cross-sectional error component (ϵ_{it}) and combined time series and cross-sectional error component (u_{it}).

Three sets of regression are used to get the results. In the first set, the logarithm of GER is used as the dependent variable and the logarithm of the GSDPPC of the States is used as the independent variable for the three State groups (HFS, NHFS, and HFS). For every State category in the second set of regression, the logarithm of the GPI is used as the dependent variable and the logarithm of the GSDPPC of the States is used as the independent variable. For each category of State, the third set of regression takes the logarithm of the ARR as the dependent variable and the logarithm of the GSDPPC of the States as the independent variable. The following linear logarithmic regression form can be used to describe the basic regression equation:

$L_nGER_{it} = \beta_{1i} + \beta_2 L_nGSDPPC_{it} + w_{it}$	(2)
$L_nGPI_{it} = \beta_{1i} + \beta_2 L_nGSDPPC_{it} + w_{it}$	(3)
$L_nARR_{it} = \beta_{1i} + \beta_2 LG_nSDPPC_{it} + w_{it}$	(4)

Table 8: Correlation between GSDPPC, GER, GPI and ARR

States	Dependent Variable:	LnGER	LnGPI	LnARR
All States	LnGSDPPC	-.325	0.123	-4.220
	Constant	6.997	0.066	31.07
	No. of observations	329	329	329
	No. of groups	22	22	22
	Hausman Test	0.000	0.000	0.001
	Wald Test			
	Z/T	-9.66	6.62	10.80
	p-value	0.000	0.000	0.000
HFS -	LnGSDPPC	-0.333	0.115	-2.092
	Constant	8.375	-1.317	10.386
	No. of observations	180	180	180
	No. of groups	12	12	12
	Hausman Test	0.0007	0.0000	0.0000
	Wald Test	-	-	
	Z /T	-9.83	6.72	-3.218
	p-value	0.0000	0.0000	0.0000
NHFS -	LnGSDPPC	0.060	0.124	-4.369
	Constant	3.934	-1.529	50.148
	No. of observations	150	150	150
	No. of groups	10	10	10
	Hausman Test	0.4465	0.0000	0.0002
	Wald Test	4.02	-	-
	Z/T	2.00	6.84	-10.22
	p-value	0.0450	0.0000	0.0000

***Source**: Author's computation*

RESULTS

The initial regression analysis reveals a weak positive correlation (0.60%) between PCGSDP and GER in the NHFS group. On the other hand, the HFS group and all of the States and UTs are observing a reverse trend. Stated otherwise, there is a negative correlation in these States between GSDPPC and GER. Put otherwise, SSA is outperforming the other groups in the NHFS group. The primary cause of this trend is the public's preference for private education over public education, which is shown in the rise in the GSDPPC. The desire for private schools is also influenced by the government schools' inadequate infrastructure and poor quality of instruction. Therefore, while GSDPPC is rising in government schools, there is no discernible growth in GER (Table 8).

In the second regression set, it is discovered that as GSDPPC increases, GPI rises for every group. The emphasis on girls' and universal basic education, the country's commitment to the MDGs, and the growth in the central share of spending in these States were some of the reasons that contributed to the increase in GPI.

An inverse relationship between GSDPPC and ARR has been discovered in each group in the third set of equations. This suggests that as GSDPPC rises, ARR decreases throughout States and UTs. An improvement in attendance rates along with an increase in GSDPPC has led to the observation of this occurrence. It also raises teaching standards, which raises educational standards overall and lowers the probability of recurrence.

CONCLUSION

So far the SSA is concerned, there has been an overall increase in access and quality of education w.r.t. the selected indicators namely, Average Student Classroom Ratio (ASCR), Infrastructural facilities, Average number of teachers per school, Pupil-Teacher Ratio, Gross Enrolment Ratio, Gender Parity Index at the national level. However, it is found that the enrolment ratios are highly inflationary in nature. The over-estimation of enrolment levels gives a dismal picture about universal access and quality education. Additionally, it is noted that SSA's success in boosting access and quality is still mediocre when compared to the other indices across States and UTs. It has been noted that economically disadvantaged States have not kept up with the SSA's efforts to increase access to and quality of education.

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