




## Research Paper

# Monitoring WASH and school dropouts in India: Is there adequate data? An assessment of four national databases

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## ABSTRACT

Water, Sanitation and Hygiene (WASH) are crucial to human development. Lack of WASH affects girls' health and school attendance, particularly after puberty. This has long-term consequences on gender equality and empowerment. Several international efforts (like the World Health Organisation's WASH standards, the United Nations Sustainable Development Goals (4, 5 and 6)) and national initiatives (like The Right of Children to Free and Compulsory Education Act of 2009, the Swachh Bharat Swachh Vidyalaya campaign and guidelines for menstrual hygiene management) are expected to address this issue in schools. There is a need to systematically and regularly collect and disseminate WASH data on school infrastructure facilities and attendance details. This would help assess the achievement of better WASH infrastructure and examine how much it reduces school dropouts. We assess four national-level databases routinely used for studies in human development – the India Human Development Survey, the National Family Health Survey, the National Sample Survey Office and the Unified District Information System in Education. Our study find that there are data limitations for assessing the extent of target achievement. It underscores the need for re-orienting data collection on school attendance and WASH school infrastructure.

**Key words:** data inadequacy, right to education, school infrastructure, Sustainable Development Goals, WASH and dropouts

## HIGHLIGHTS

- Data gaps linking sanitation and dropouts in India.
- Comparison of datasets from the India Human Development Survey, the National Family Health Survey, the National Sample Survey Office, and the Unified District Information System in Education for assessing sanitation and dropouts.
- Limitations in the monitoring of WASH targets.

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GRAPHICAL ABSTRACT



## INTRODUCTION

The United Nations Sustainable Development Goals (UN SDGs), at their core, have three main objectives: ‘economic growth, social inclusion and environmental protection’ (UN 2015). They include Education (SDG4), Gender Equality (SDG5) and Sanitation (SDG6). These three goals are closely interconnected in developing countries where girls attend (or drop out of) school due to a lack of sanitation. Global estimates suggest that in 2021, over 500 million school-going children lacked basic drinking water and sanitation, and over 800 million lacked basic hygiene at their schools (UNICEF & WHO 2022). Globally, more than 500 million women and girls do not have access to menstrual hygiene management (MHM) (The Lancet 2022). The absence of sanitation infrastructure in schools poses a challenge, especially for girls post-puberty (Alugnoa *et al.* 2022; Rehan *et al.* 2022). The absence of WASH facilities in schools would create unequal learning opportunities, especially for girls, and inhibit the achievement of multiple SDGs (Adams *et al.* 2009).

### SDGs, WASH and dropouts

SDG4 aims to ensure inclusive and quality education for all. Target 5 aims to eliminate gender disparities and provides equal access to all levels of education. This goal connects to SDG5, which aims for gender equality and recommends legislation to enforce the equality and empowerment of women and girls – these two further link to SDG6, which aims to ensure clean water and sanitation for all. Target 2 includes (i) adequate and equitable sanitation and hygiene for all and (ii) putting an end to open defecation with a particular focus on the needs of women and girls.

While SDG4 focuses on education, SDG5 on gender equality and SDG6 on sanitation, the WASH guidelines explicitly connect education and gender equality with sanitation. The WASH guidelines provide base standards for school sanitation in low-cost settings designed especially for primary and secondary schools. These include (a) facilities for basic drinking water; (b) single-sex basic sanitation facilities (specifically 1 toilet per 25 girl students, 1 toilet for female staff, 1 toilet plus 1 urinal (or 50 cm of urinal wall) per 50 boys and 1 toilet for male staff) and (c) basic handwashing facilities (Adams *et al.* 2009, p. 32).

India faces numerous developmental challenges, especially in achieving gender equality. One of the pathways to gender empowerment is educational attainment (UNDP 2010). The reviewed literature in India has found that school enrolment (and its converse, dropout), especially of girls, is influenced by multiple factors (Sikdar & Mukherjee 2012). Some factors are individual-related (Choudhury 2006), and some are school access-related (Bhatty *et al.* 2017). It is widely acknowledged that lack of sanitary facilities in school creates a negative impact on female students’ health (Alexander *et al.* 2014) as well as school attendance (Jasper *et al.* 2012), which have long-term impacts on human development (Lansford *et al.* 2016). In acknowledgement of these developmental challenges, the Indian government has framed various policies and guidelines on school infrastructure (GOI 2014, 2015). These are expected to aid human development in the long run (GOI 2014). There is a need for systematic longitudinal data to assess the achievement of these goals and targets. The present paper poses the question of whether there are adequate mechanisms at the national level to monitor the following:

- (a) national and international targets and commitments on WASH and
- (b) the linkage between school WASH infrastructure and school dropouts, especially for girls.

Our assessment of four national databases finds inadequate data to (a) monitor targets and commitments on WASH and (b) understand the linkage between achievements on WASH and school attendance, especially for girls. This poses a challenge to researchers and policymakers.

## BACKGROUND

India has committed to numerous national and international WASH-related policies. The international commitments include UN SDGs, particularly SDG 4 and 6 (UN 2015) and the WASH guidelines (Adams *et al.* 2009). The national commitments include the Right of Children to Free and Compulsory Education (RTE) Act of 2009 (GOI 2009) legislation, Swachh Bharat Swachh Vidyalaya (SBSV) guidelines or ‘Clean India: Clean Schools’ campaign (GOI 2014) and MHM: national guidelines (GOI 2015). The RTE Act 2009, Section 8 (GOI 2009) mandates that the government provide school infrastructure with barrier-free access to the school building, separate toilets for boys and girls and a safe and adequate drinking water facility. To track the progress in the achievement of the SDGs, a National Indicator Framework was developed by the Government of India in 2016, assigning different agencies the task of compiling the data as per SDG and related target requirements. Under

SDG4, Target 4(a) focuses on education infrastructure for inclusive education. The specific national indicators for which data are to be assessed are stated as:

4.a.1 Proportion of schools with access to: (a) electricity; (b) computers for pedagogical purposes; (c) adapted infrastructure and materials for students with disabilities/ disabled friendly ramp and toilets; (d) basic drinking water; (e) single-sex basic sanitation facilities, and (f) basic hand washing facilities (as per the WASH indicator definitions), (in percentage). (MOSPI 2021, p. 14).

The Department of School Education and Literacy, Ministry of Education, was assigned to compile this annually since 2018–2019. Earlier, similar information was collected by the National Institute of Educational Planning and Administration, New Delhi.

### WASH and education-related policy interventions

The SBSV campaign was launched in 2014 to improve the sanitation facilities in schools and ensure girls do not drop out due to a lack of toilets. The key feature of the campaign is to ensure that every school has a set of functioning and well-maintained WASH facilities in India (GOI 2014). The SBSV guidelines mandate that every school must have (i) separate toilets for boys and girls, (ii) 1 toilet unit for every 40 students, (iii) MHM facilities including soap, (iv) adequate and private space for changing, (v) adequate water for washing clothes and (vi) disposal facilities for menstrual waste such as an incinerator and dust bins (GOI 2014).

MHM is an integral part of the Swachh Bharat Mission, and the Ministry of Drinking Water and Sanitation, Government of India, issued the national guidelines for MHM in December 2015. These guidelines place a particular emphasis on addressing the sanitation needs of adolescent girls and women. Managing menstruation hygienically with dignity is integral to attaining hygiene, sanitation and health for women and girls. Part 4 of the guidelines focuses on MHM infrastructure in schools and the safe disposal of menstrual waste. Every school must have basic water and sanitation infrastructure, including a separate toilet for (a) girls and boys and (b) male and female teachers. It further states that there should be (i) 500 l of water storage capacity and supply for every 100 students, (ii) soap availability for handwashing, (iii) space for washing and cleaning menstrual products and (iv) facilities for safe disposal of used menstrual products. The guidelines require that the water be available inside the toilet with a tap or a dedicated water container in each toilet or cubicle separately. A mug should be made available for dispensing water for personal cleaning and hygiene (GOI 2015).

The process of fulfilment of these guidelines and international commitments needs monitoring. This requires timely and good-quality data. The reviewed literature survey suggests that there have been multiple studies on dropout and sanitation in India, but most are case studies limited by the region (Mahon & Fernandes 2010; Sommer 2010; Jogdand & Yerpude 2011; Van Eijk *et al.* 2016). This paper aims to understand the availability of national-level data to evaluate WASH and dropout policies and their targets. This paper presents the first systematic assessment of four large-scale national-level databases commonly used for policy-making regarding girl dropouts and school infrastructure. These frequently referred-to databases lack adequate data in the public domain to monitor WASH targets and their link to school dropouts.

### MATERIAL AND METHODS

We examine four databases, namely the India Human Development Survey (IHDS I and IHDS II) (Desai & Vanneman 2015), National Family Health Survey (NFHS 3 and NFHS 4) (IIPS & ORC Macro 2007; IIPS & ICF 2017), National Sample Survey Office (64th and 71st rounds) (NSSO 2011, 2016) and the Unified District Information System in Education (UDISE) (from 2005–2006 to 2015–2016) (NIEPA 2015). Since UDISE is updated annually, we have also examined recent changes. The reason for choosing these databases is because they are widely used for development debates and policy making (Jayachandran 2007; Afridi 2010; Sikdar & Mukherjee 2012; Govinda 2013; Mukesh & Srivastava 2015; Adukia 2017; Chatterjee *et al.* 2018; Ghosh 2018).

India has a long tradition of large-scale surveys in the post-independence period, which have been used by researchers and policymakers globally (Deaton 2005; Harkare *et al.* 2021). The databases have been subjected to scrutiny concerning data quality – IHDS (Desai *et al.* 2005), NFHS (James & Rajan 2004; Rajan & James 2008; Harkare *et al.* 2021), NSSO (Ghosh 2018) and UDISE (GoI 2019). We briefly describe these surveys and systematically evaluate the instruments used. They help us identify the gaps in the survey instrument and the data available in the public domain.

### India Human Development Survey

The IHDS data are available for two rounds (IHDS I conducted in 2004–2005 and IHDS II undertaken in 2011–2012) (Desai & Vanneman 2008, 2015). This survey has multiple schedules: income and social capital expenditure, education and health, learning tests, primary school, medical facility and village schedule (Desai & Vanneman 2015). Among other information, the survey collects data on the status of the infrastructure facilities from primary schools up to Grade IV. The school schedule is divided into several parts: IHDS I had five (A to E) and IHDS II had seven (A to G). We next discuss the NFHS database.

### National Family Health Surveys

The NFHS collects data at the household level all over India, primarily focusing on health. Currently, NFHS 1 (1992–1993), NFHS 2 (1998–1999), NFHS 3 (2005–2006), NFHS 4 (2015–2016) and NFHS 5 (2019–2021) are available in the public domain. The two rounds discussed in this paper (NFHS 3 and NFHS 4) are compatible for comparison with the IHDS. The database provides information on completed education at the time of the survey. If the child is not attending school, then the reason for not attending school is recorded based on a closed set of options. The NFHS used the same set of options for response to not attending school. We next discuss the database of National Sample Survey (NSS).

### National Sample Survey

The NSSO of the Ministry of Statistics and Programme Implementation, Government of India, conducts large-scale sample surveys on various socio-economic issues. We limit our discussion to the surveys conducted on participation and expenditure in education for the 64R (July 2007 to June 2008) and the 71R on social consumption in India focused on education (January 2014 to June 2014). NSSO provides data for not attending school for the age group 5–29 years. The two NSSO rounds are comparable with IHDS and NFHS in periodicity (pre- and post-RTE). The 64R has used 20 codes for recording reasons for not attending school, whereas in the 71R, there are only 18 codes. The coding and reasons used in the two rounds are not the same. Some of the reasons included in 64R were removed, and new reasons were added in 71R. We next discuss the UDISE database.

### Unified District Information System in Education

The UDISE provides school data at the national level for all the states and Union Territories on an annual basis. At the time of writing, this database provided information for all schools from Class I to Class VIII from 2005–2006 to 2011–2012 and from Class I to Class XII from 2012–2013 to 2015–2016. Over the years, there have been revisions in the school data capture format.

Twelve sections are listed (i.e. A to L section) in the data capture format. Three data types were collected, namely total population, never enrolled children and dropout, and these were removed after 2008–2009. The data are collected district/block/village-wise for the age groups 6–10 and 11–13 based on gender and social group. From 2012–2013 onwards, the data were collected for higher secondary students by adding additional sections. The UDISE collects data from recognised and unrecognised schools and provides information on students for characteristics like gender, caste and disability. Data on students repeating a year are also made available.

The database included RTE-specific information from 2010–2011. Data on toilets were available as a dichotomous variable (Yes and No responses) up to 2008–2009. From 2009–2010 onwards, data on the total number of school toilets were collected. Since the school was the unit of data collection, no data on reasons for not attending school are available from the UDISE database.

We can now compare the different databases and evaluate their strengths and weaknesses in the context of data availability that links dropouts to school infrastructure.

## RESULTS AND ANALYSIS

We begin by listing the RTE, SDG 4, WASH, SBSV and MHM guidelines for infrastructure requirements (see Table 1) and examine which databases discussed here provide adequate information regarding these requirements.

**Infrastructure facility:** Several specific targets concerning school infrastructure have been specified under RTE, SDG 4, WASH, SBSV and MHM guidelines. We discuss some of them below.

1. **Separate toilet facility:** The data on the presence of gender-specific toilets in schools are available in IHDS I and IHDS II up to Grade IV only, and UDISE data on the number of toilets for girls and boys are available from 2009 to 2010.

**Table 1** | Sanitation requirements and data availability

S. No	Indicator	RTE	SDG 4 and 6	WHO guidelines on WASH Standards	SBSV guidelines	MHM guidelines	Databases with this information and the type of data available
1	Separate toilets	Separate toilets for boys and girls	Single-sex-specific basic sanitation facilities	Boys' and girls' facilities should be in separate toilet blocks or toilet areas separated by solid walls (not lightweight partitions) and should have separate entrances. Doors should reach down to floor level	Separate toilets for boys and girls with one unit generally having one toilet plus 3 urinals	Separate toilets for boys and girls	IHDS (I & II) provide data on toilets up to IV grade only as mentioned below. (a) Whether the school has a toilet facility or not? (b) Whether girls and boys have separate toilet facilities or not? (c) Where the toilet is located inside or outside of the building for boys and girls and (d) The type of toilet facility separately available for boys and girls UDISE provides data on the availability of toilets till 2008 and on the number of toilet seats constructed and available for boys and girls separately up to VIII grade from 2009 to 2010 onwards and after 2013 till XII grade IHDS (I & II) do not provide data on the number of toilets in schools; therefore cannot compare it with UDISE
2	Drinking water	Safe and adequate drinking water facility for all children	Basic drinking water and <i>access to safe and affordable drinking water</i>	A reliable drinking water point is accessible for staff and schoolchildren, including those with disabilities, at all times. Provide safe drinking water from a protected groundwater source (spring, well or borehole)	Daily provision of child-friendly and sustainable safe drinking water		IHDS (I & II) provide information on whether drinking water facility is available and where the source of water is located. In addition, if a separate source is provided based on caste, this information is recorded. UDISE currently does not

*(Continued.)*

Table 1 | Continued

S. No	Indicator	RTE	SDG 4 and 6	WHO guidelines on WASH Standards	SBSV guidelines	MHM guidelines	Databases with this information and the type of data available
3	Kitchen	A kitchen where mid-day meal is cooked in the school					provide data on the source of drinking water IHDS (I & II) provide information on whether the school has a kitchen for cooking meals. UDISE currently does not provide data on whether the mid-day meal is cooked on school premises or not
4	The ratio of toilets for girls		<i>Access to adequate and equitable sanitation and hygiene for all, with special attention to the needs of girls and women</i>	1 toilet per 25 girls students	1 unit for every 40 girl students	1 toilet for every 40 girls (and/or 1 urinal for every 20 girls)	UDISE provides data on the number of toilet seats constructed and available for boys and girls separately. Data are provided on the number of toilet seats functional for boys and girls. Grade-wise number of students enrolled is available for boys and girls separately
5	The ratio of toilets for boys			One toilet plus one urinal (or 50 cm of urinal wall) per 50 boys	One unit for every 40 students		Same as above (S. No. 4)
6	Toilet for female teachers/staff			One toilet for female staff			IHDS II provides this information
7	Toilet for male teacher/ staff			One toilet for male staff			IHDS II provides this information
8	Toilet facility for children /staff with disabilities			At least one toilet cubicle should be accessible for staff and children with disabilities, preferably one for females and one for males		Separate toilets for male and female teachers and staff	UDISE collects data on the availability of toilets for children with special needs. But, no data on the availability of separate toilets for teachers and staff
9	MHM facilities			Appropriate facilities should be provided for menstrual hygiene for female teachers and older girls	MHM facilities, including soap	Adequate space in the cubicle for girls to change their napkins/ cloth and wash themselves. A well-positioned mirror so that	Earlier, no data were collected by UDISE on the availability of menstrual absorbents or access to sanitary napkins on the school premises. The new questionnaire of 2021–2022 includes questions on

				girls can check for stains on their clothes	the availability of incinerators and sanitary pad dispensers. However, these data are not available in the public domain
10	Space for MHM	Toilets should be safe and secure for use by children	Adequate and private space for changing	Safe location to assure privacy/adequate privacy wall for changing and cleaning	Data not available from any dataset
11	Functioning toilet	The water inside toilet cubicles for cleaning, private place to wash and dry cloth	Adequate water for cloth washing	Toilet cubicles with a shelf, hooks or niche to keep clothing and menstrual adsorbents dry	UDISE collects data on the availability of functional toilets and then separately asks how many of them have running water available for flushing and cleaning. While the data for functional toilets (first part of the query) are placed in the public domain, the information on the availability of running water for flushing and cleaning is not available
12	Disposal of menstrual waste	Waste baskets to throw away sanitary pads	Disposal facilities for menstrual waste such as an incinerator and dust bins	Facilities for safe menstrual disposal options and disposal bins to be inside the cubicle	Data not available from any dataset

Source: Authors' compilation based on Adams *et al.* (2009), GOI (2009, 2014, 2015), UN (2015), MoE (2023).

Note: SDG6 targets are specified in italic.



**Gap:** Data on toilets having water availability for flushing and cleaning are collected by UDISE but are not available in the public domain. These data can help measure compliance per WHO-WASH, SBSV and MHM guidelines (see Table 2).

2. **Drinking water:** According to SDG 4 targets and WASH guidelines, drinking water facilities should be available in the school. Information on drinking water facilities is available in IHDS I, IHDS II and UDISE databases. Additionally, UDISE records functional water sources in schools.

**Gap:** Data on the functionality of drinking water are now available in the public domain, but the quantum and source of water availability are not available. The quantum and source must be collected as per the WHO-WASH expanded joint monitoring programme (UNICEF & WHO 2022).

3. **Kitchen for cooking:** As per the RTE guidelines, a mid-day meal is to be cooked in the school. Adequate space and proper hygiene and cleaning are to be maintained. IHDS I, IHDS II and UDISE collected data on whether (a) the kitchen is available in the school and (b) if a mid-day meal is cooked within the school premises or not.

**Gap:** With respect to (a) above, the UDISE database only records whether the kitchen space is available but does not record whether the school is equipped with water and a cleaning area. Since these data are not collected, there is no mechanism for assessment (MoE 2023). With respect to (b) above, these data were collected by UDISE but not placed in the public domain as per the data accessed by us, and the current data capture format does not collect this information (MoE 2023).

4. **The ratio of toilets for girls:** The UDISE database provides data on the availability of girls' toilets up to 2008–2009 as a dichotomous variable and data on the total number of toilets available for girls from 2009–2010 onwards.

**Table 2** | Sanitation-related infrastructure requirements and availability of data

S. No.	Policies	Infrastructure requirements of RTE, SDG, WASH-WHO, SBSV and MHM	IHDS I	IHDS II	UDISE
1	RTE Act 2009	(a) Separate toilet for boys	✓ Part B 16d	✓ Part B 16a	✓ B(I) 5
		(b) Separate toilet for girls	✓ Part B 16d	✓ Part B 16a	✓ B(I) 5
		(c) Safe and adequate drinking water	✓ Part B 15a	✓ Part B 15a	✓ B(I) 6
		(d) Kitchen	✓ Part B 17g	✓ Part B 17i	✓ B(II) 1(i)
		(e) Mid-day-meal cooked	✓ Part A 10b	✓ Part A 10b	✓ B(II) 1(ii a)
2	SDG 2030 Goals 4 & 6	(a) Basic drinking water	✓ Part B 15a	✓ Part B 15a	✓ B(I) 6
		(b) Single-sex basic sanitation facilities	✓ Part B 16b	✓ Part B 16a	✓ B(I) 5
		(c) Basic handwashing facilities.			✓ B(I) 5a
3	WHO-WASH guidelines	(a) One toilet for every 25 girls			✓ B(I) 5
		(b) One toilet for female staff			
		(c) One toilet plus one urinal for every 50 boys			✓ B(I) 5
		(d) One toilet for male staff			
		(e) Reliable drinking water point	✓ Part B 15a	✓ Part B 15a	✓ B(I) 6
		(f) Reliable water point with soap/alternative for washing in toilets and kitchen			
4	SBSV	(a) Separate toilets for boys and girls	✓ Part B 16d	✓ Part B 16a	✓ B(I) 5
		(b) MHM facilities include soap, adequate and private space for changing, adequate water for cloth washing and disposal facilities for menstrual waste such as an incinerator and dust bins			
5	MHM	(a) Separate toilets for girls and boys	✓ Part B 16d	✓ Part B 16a	✓ B(I) 5
		(b) Separate toilets for male and female teachers and staff			
		(c) Adequate space in the cubicle for girls to change their napkins/cloth and wash themselves. A well-positioned mirror so that girls can check for stains on their clothes			
		(d) Availability of menstrual absorbents and disposal facility			2.7 (e) and (f)*

Source: Author's compilation (Desai & Vanneman 2008, 2015; Adams *et al.* 2009; GOI 2009, 2014, 2015; NIEPA 2015; UN 2015; MoE 2023).

**Gap:** The data on the number of functional toilets with water availability inside the toilet for flushing and cleaning are collected as per the survey instrument but are not available in the public domain (refer to item 12 below on the functionality of toilets) (MoE 2023).

5. **The ratio of toilets for boys:** The UDISE database provides data on the total number of toilets available for boys from 2009 to 2010 onwards.

**Gap:** Data on the number of functional boys' toilets/urinals with water inside the toilet for flushing and cleaning are collected as per the survey instrument by UDISE but are not available in the public domain.

6. **Toilet for female teachers and non-teaching staff of schools:** WASH guidelines require gender-specific toilets to be available for the school staff. IHDS II collected data on the number of toilets available exclusively for teachers up to Grade IV.

**Gap:** No data are available on gender-specific separate toilets allotted for teachers and non-teaching staff of schools.

7. **Toilet for male teachers and non-teaching staff of schools:** WASH guidelines require gender-specific toilets to be available for the school staff. IHDS II collected data on the number of toilets available only for teachers up to Grade IV.

**Gap:** No data are available on gender-specific separate toilets allotted for teachers and non-teaching staff of schools.

8. **Toilet for children/staff with special needs:** UDISE collects data on the availability of toilet facilities for children with special needs. Currently, toilet data for children with special needs are provided.

**Gap:** No data on toilets for staff with special needs are available.

9. **Menstrual hygiene-related facilities:** The management of these facilities is prescribed under SBSV and MHM guidelines.

**Gap:** Earlier, no data were collected by UDISE on the availability of menstrual absorbents or access to sanitary napkins on the school premises. The new questionnaire for 2021–2022 includes questions on the availability of incinerators and sanitary pad dispensers. However, these data are not available in the public domain.

10. **Space for MHM:** MHM guidelines specify the need for separate toilet and sanitation blocks to be located in a safe location to assure privacy/adequate privacy wall. It is also supposed to provide adequate space in the cubicle for girls to change their napkins/clothes and wash themselves.

**Gap:** No data are collected explicitly on MHM space provided in the schools.

11. **Functioning toilet:** As per MHM guidelines, girls and female staff must have clean, easily accessible water and soap to wash them, wash their clothing if soiled and wash menstrual cloths or reusable napkins. Water must be inside the toilet cubicle. The UDISE provides information on whether the toilet is functional or not. A toilet is considered functional in UDISE if it has water available, minimal foul smell, has an unbroken seat, is regularly cleaned, has a working drainage system, is accessible to users and has a closable door (MoE 2023).

**Gap:** UDISE collects data on the availability of functional toilets and then separately asks how many of them have running water available for flushing and cleaning. While the data for functional toilets (the first part of the query) are placed in the public domain, the data on running water for flushing and cleaning are unavailable.

12. **Disposal of menstrual waste:** Safe disposal of used and soiled materials should be provided as per MHM guidelines.

**Gap:** The data on the availability of disposal facilities were not collected by any of the agencies until recently. The current questionnaire of UDISE+ has included a question on this. However, no data were available in the public domain when writing this paper.

## DISCUSSION

Significant gaps exist in openly accessible data to assess WASH achievements and link them to dropouts. This limits the bandwidth to assess the progress of WASH-related commitments and calibrate interventions.

The data on the number of available toilets are self-reported by schools in the UDISE. Since it is not verified through observation, there could be over- or under-reporting. This could be one of the limitations of the available data.

While UDISE collects school data yearly and has a rich database, it does not record the reasons for dropouts. This limits its use for understanding sanitation and dropouts in an integrated manner.

IHDS I and IHDS II provide data on school infrastructure up to Grade IV. However, school information data cannot be compared between the two rounds as there is a variation in the school questionnaire used in both rounds. Besides, longitudinal school analysis is impossible as the schools surveyed differ in the two rounds. The IHDS data provide us with data on

basic toilet facilities but does not provide us with information related to handwashing and MHM facilities. The IHDS questionnaire covers multiple areas, including education. Unfortunately, they did not include any questions on reasons for dropouts. This limits the use of IHDS for studying the link between sanitation and dropouts. The last round of IHDS data was collected almost a decade ago, limiting its use for contemporary policy-making.

The NSSO collects data on reasons for currently not attending school. It is the only survey among the four we have reviewed that asked the respondents if girls were not in school due to the ‘non-availability of ladies’ toilet’. However, the NSSO surveys do not provide information on whether any of the sanitation targets are being fulfilled. So we have no idea whether the dropouts are occurring from schools because of a lack of meeting the targets or despite it.

The NFHS is a special survey on health. However, it does not have any direct questions related to school sanitation. There is a question that relates dropouts to school infrastructure, but it is not specific to sanitation. One of the options the respondent can choose as to why a child is not attending school is that there are ‘no proper school facilities for girls’. Unfortunately, this is not a specific question on sanitation infrastructure. Also, the reasons linking school infrastructure to dropout of NFHS do not match those of NSSO.

## CONCLUSION

Our study has examined four popular national-level databases related to achieving sanitation targets. Currently, these surveys do not provide adequate information to monitor the impact of critical sanitation-related guidelines and legislations like RTE, SDG4, WASH, SBSV and MHM on school dropouts, especially girls. There is an urgent need for more detailed data to be collected, which can help monitor the progress in fulfilling the desired WASH targets and assess its impact on dropouts, especially girls.

There has been little effort to collect attendance data. What most researchers use to study dropout rates is enrolment data. However, the two differ, sometimes significantly. A child could be enrolled but not attend school. Attendance data can help in monitoring individual child-related progression in school. The consequence of this could be as significant as not being in school. We understand that UDISE had collected such data for two years, i.e. in 2010–2011 and 2011–2012, but these data were not placed in the public domain. Currently, no data on attendance on a large scale are available.

If a new round of IHDS is undertaken soon, it could be expanded to collect information on secondary and higher secondary classes. This would help monitor the completion of elementary and secondary education in India.

Similarly, additional quality, functionality and adequacy information should be collected while monitoring the WASH facilities.

One way to address this data challenge could be to plan specific sample surveys that collect data on school infrastructure, enrolment and reasons for dropouts. This would allow researchers and policymakers to monitor and assess the impact of progress in school WASH infrastructure on dropouts, especially girls. Accordingly, appropriate intervention strategies could be planned to reduce the dropout rate, achieve gender equality and achieve health targets through better sanitation.

## LIMITATIONS

This study focuses on a limited number (four) of the national databases frequently used in the development literature about dropouts or WASH. Future research could explore more databases for further insights. We had considered using the Annual Survey of Education Research (ASER 2023), widely referred to in debates on school enrolment and children’s education. These reports provide some WASH-related information on schools as well as dropout rates. However, they do not place their microdata in the public domain; therefore, it is impossible to infer the links between WASH and dropout rates from the ASER reports.

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## DATA AVAILABILITY STATEMENT

The repository links are available at: NFHS: <https://dhsprogram.com/data/>; NSSO: <http://mospi.gov.in/>; IHDS: <https://www.icpsr.umich.edu/>; UDISE: <http://udise.in/>; UDISE Plus: <https://udiseplus.gov.in/#/home>.

## CONFLICT OF INTEREST

The authors declare there is no conflict.

## REFERENCES

- Adams, J., Bartram, J., Chartier, Y. & Sims, J. 2009 *Water, Sanitation and Hygiene Standards for Schools in Low-Cost Settings*. World Health Organization, Geneva. Available from: <https://apps.who.int/iris/handle/10665/44159>.
- Adukia, A. 2017 *Sanitation and education*. *American Economic Journal: Applied Economics* **9** (2), 23–59. doi:10.1257/app.20150083.
- Afridi, F. 2010 *Women's empowerment and the goal of parity between the sexes in schooling in India*. *Population Studies* **64** (2), 131–145. doi:10.1080/00324721003774544.
- Alexander, K., Oduor, C., Nyothach, E., Laserson, K., Amek, N., Eleveld, A., Mason, L., Rheingans, R., Beynon, C., Mohammed, A., Ombok, M., Obor, D., Odhiambo, F., Quick, R. & Phillips-Howard, P. 2014 *Water, sanitation and hygiene conditions in Kenyan rural schools: Are schools meeting the needs of menstruating girls?* *Water* **6** (5), 1453–1466. doi:10.3390/w6051453.
- Alugnoa, D. N., Cousins, T. & Sato, M. 2022 *Period poverty and menstrual belonging: A matter of climate justice*. *The Lancet Planetary Health* **6** (7), e551–e552. doi:10.1016/S2542-5196(22)00141-3.
- ASER. 2023 *Annual Status of Education Report (Rural) 2022 Provisional*. Pratham, New Delhi.
- Bhatty, K., Saraf, R. & Gupta, V. 2017 Some insights on what We know and what we do not. *Economic and Political Weekly* **49** (8), 69–76.
- Chatterjee, I., Li, I. & Robitaille, M.-C. 2018 *An overview of India's primary school education policies and outcomes 2005–2011*. *World Development* **106**, 99–110. doi:10.1016/j.worlddev.2018.01.016.
- Choudhury, A. 2006 Revisiting dropouts old issues, fresh perspectives. *Economic & Political Weekly* **41** (51), 5257–5263.
- Deaton, A. 2005 *Data and dogma: The great Indian poverty debate*. *The World Bank Research Observer* **20** (2), 177–199. doi:10.1093/wbro/lki009.
- Desai, S. & Vanneman, R. 2008 *India Human Development Survey (IHDS), 2005: Version 12. [Data set]*. Inter-University Consortium for Political and Social Research. doi:10.3886/ICPSR22626.V12.
- Desai, S. & Vanneman, R. 2015 *India Human Development Survey-II (IHDS-II), 2011-12: Version 6. [Data set]*. Inter-University Consortium for Political and Social Research. doi:10.3886/ICPSR36151.V6.
- Desai, S., Dubey, A., Joshi, B. L., Sen, M. & Shariff, A. 2005 *India Human Development Survey: Design and Data Quality*. University of Maryland and National Council of Applied Economic Research, New Delhi. Available from: <https://ihds.umd.edu/system/files/2020-03/technical%20paper%201.pdf>.
- Ghosh, A. 2018 *Enrolment and dropout in schools in India-evidences from NSSO data*. *Journal of Educational Planning and Administration* **XXXII** (1), 15–33.
- GOI. 2009 *The Right of Children to Free and Compulsory Education Act, 2009*. The Gazette of India, Government of India. Available from: [http://mhrd.gov.in/sites/upload\\_files/mhrd/files/upload\\_document/rte.pdf](http://mhrd.gov.in/sites/upload_files/mhrd/files/upload_document/rte.pdf).
- GOI. 2014 *Swachh Bharat Swachh Vidyalaya A National Mission Clean India: Clean Schools A Handbook*. Government of India, New Delhi.
- GOI. 2015 *Menstrual Hygiene Management: National Guidelines*. Ministry of Drinking Water and Sanitation, Government of India, New Delhi. Available from: <https://jalshakti-ddws.gov.in/publication/menstrual-hygiene-management-national-guidelines-december-2015>.
- GOI. 2019 *UDISE + : Unified District Information System for Education Plus*. Department of School Education and Literacy, Ministry of Human Development, Government of India. Available from: [https://dsel.education.gov.in/sites/default/files/update/UDISE\\_Booklet.pdf](https://dsel.education.gov.in/sites/default/files/update/UDISE_Booklet.pdf).
- Govinda, R. 2013 *Who Goes to School? Exploring Exclusion in Indian Education*, 1st edn. Oxford University Press, New Delhi.
- Harkare, H. V., Corsi, D. J., Kim, R., Vollmer, S. & Subramanian, S. V. 2021 *The impact of improved data quality on the prevalence estimates of anthropometric measures using DHS datasets in India*. *Scientific Reports* **11** (1), 10671. doi:10.1038/s41598-021-89319-9.
- IIPS, ICF. 2017 *India National Family Health Survey -NFHS-4 2015-16*. International Institute for Population Sciences – IIPS/India and ICF, Mumbai, India. Available from: <http://dhsprogram.com/pubs/pdf/FR338/FR338.pdf>.
- IIPS, ORC Macro. 2007 *National Family Health Survey (NFHS-3), 2005-06, India: Key Findings*. Indian Institute for Population Studies (IIPS), Mumbai.
- James, K. S. & Rajan, S. I. 2004 Respondents and quality of survey data. *Economic and Political Weekly* **39** (7), 659–663.
- Jasper, C., Le, T.-T. & Bartram, J. 2012 *Water and sanitation in schools: A systematic review of the health and educational outcomes*. *International Journal of Environmental Research and Public Health* **9** (8), 2772–2787. doi:10.3390/ijerph9082772.
- Jayachandran, U. 2007 How high are dropout rates in India. *Economic and Political Weekly* **42** (11), 982–983.
- Jogdand, K. & Yerpude, P. 2011 A community based study on menstrual hygiene among adolescent girls. *Indian Journal of Maternal and Child Health* **13** (3).
- Lansford, J. E., Dodge, K. A., Pettit, G. S. & Bates, J. E. 2016 *A public health perspective on school dropout and adult outcomes: A prospective study of risk and protective factors from Age 5 to 27 years*. *Journal of Adolescent Health* **58** (6), 652–658. doi:10.1016/j.jadohealth.2016.01.014.
- Mahon, T. & Fernandes, M. 2010 *Menstrual hygiene in south Asia: A neglected issue for WASH (water, sanitation and hygiene) programmes*. *Gender and Development* **18** (1), 99–113. doi:10.1080/13552071003600083.

- MoE. 2023 *Report on Unified District Information System For Education Plus (UDISE+) 2021-22 Flash Statistics*. Department of School Education and Literacy, Ministry of Education, Government of India, New Delhi. Available from: [https://dsel.education.gov.in/sites/default/files/statistics/report\\_in\\_PDF/udise\\_21\\_22.pdf](https://dsel.education.gov.in/sites/default/files/statistics/report_in_PDF/udise_21_22.pdf).
- MOSPI. 2021 *National Indicator Framework (Version 3.0)*. Ministry of Statistics and Programme Implementation, Government of India, New Delhi. Available from: <https://www.mospi.gov.in/national-indicator-framework>.
- Mukesh & Srivastava, N. 2015 Impact of socio-economic background on school dropout rates in rural India. *Journal of Educational Planning and Administration* **XXIX** (1), 29–36.
- NIEPA. 2015 *U-DISE School Data Capture Format (2015)*. NIEPA, New Delhi. Available from: <http://schoolreportcards.in/SRC-New/>.
- NSSO. 2011 *National Sample Survey, 64th Round, Schedule- 25.2 Participation and Expenditure on Education*. M/O Statistics & Programme Implementation. Available from: <http://www.icssrdataservice.in/datarepository/index.php/catalog/2/study-description>.
- NSSO. 2016 *Education in India: NSS 71st Round (January-June 2014) (No. 575(71/25.2/1))*. NSSO, Ministry of Statistics and Programme Implementation Government of India, New Delhi.
- Rajan, S. I. & James, K. S. 2008 Third national family health survey in India: Issues, problems and prospects. *Economic and Political Weekly* **43** (48), 33–38. Available from: <https://www.jstor.org/stable/40278234>.
- Rehan, S. T., Ul Hussain, H. & Hasan, M. M. 2022 Serious absenteeism amongst Pakistani school and university girls during menstruation: Is this a neglected threat to already deteriorating girls' education in the country? *The Lancet Regional Health – Southeast Asia* **7**, 100072. doi:10.1016/j.lansea.2022.100072.
- Sikdar, S. & Mukherjee, A. 2012 Enrolment and dropout rate in school education. *Economic and Political Weekly* **47** (1), 27–31.
- Sommer, M. 2010 Putting menstrual hygiene management on to the school water and sanitation agenda. *Waterlines* **29** (4), 268–278. doi:10.3362/1756-3488.2010.030.
- The Lancet. 2022 Menstrual health: A neglected public health problem. *The Lancet Regional Health – Americas* **15**, 100399. doi:10.1016/j.lana.2022.100399.
- UN. 2015 *Transforming our World: the 2030 Agenda for Sustainable Development*. United Nations. Available from: <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>.
- UNDP 2010 *The Real Wealth of Nations: Pathways to Human Development*, 20th Anniversary Edition. United Nations Development Programme, New York, NY.
- UNICEF, WHO. 2022 *Progress on Drinking Water, Sanitation and Hygiene in Schools 2000-2021 Data Update*. World Health Organization, Geneva.
- Van Eijk, A. M., Sivakami, M., Thakkar, M. B., Bauman, A., Laserson, K. F., Coates, S. & Phillips-Howard, P. A. 2016 Menstrual hygiene management among adolescent girls in India: A systematic review and meta-analysis. *BMJ Open* **6** (3), e010290. doi:10.1136/bmjopen-2015-010290.

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