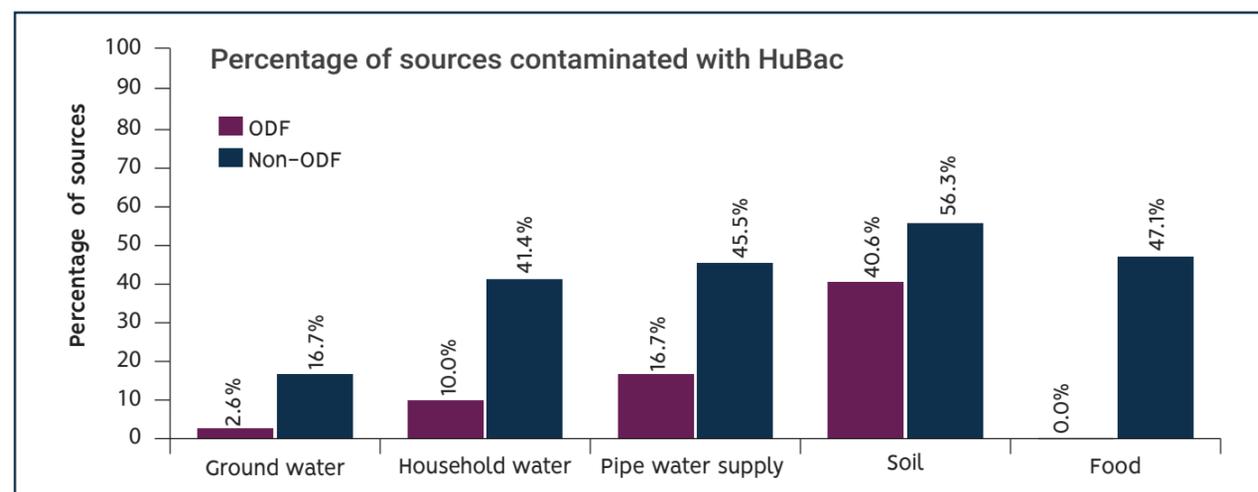


2.2: Topline findings in West Bengal

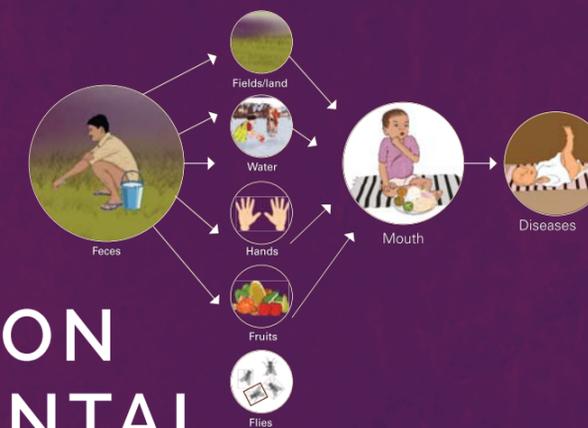
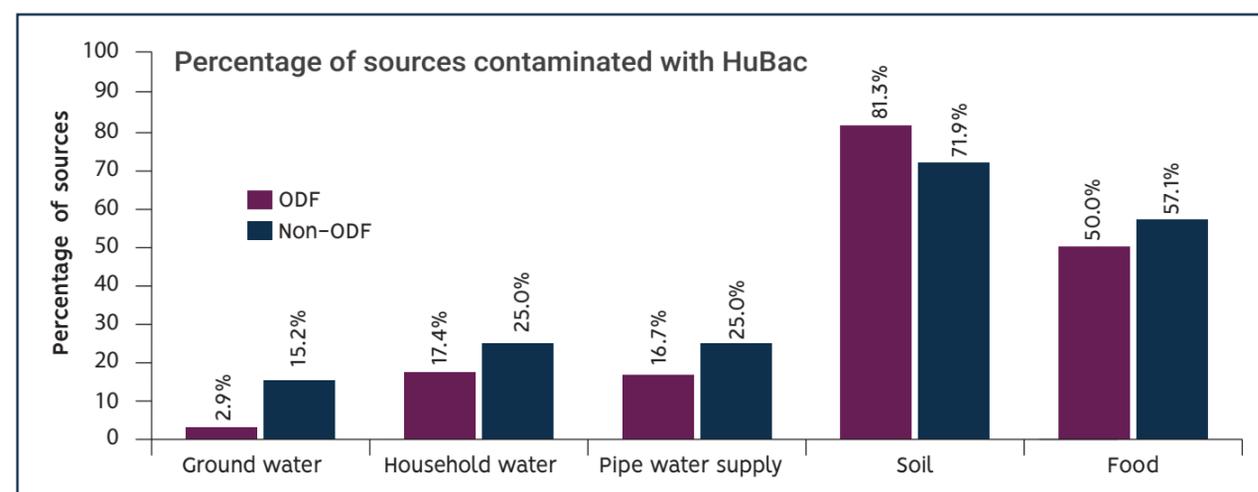
Figure 2: Contamination of environmental medium in West Bengal with faecal indicator bacteria of human origin



2.3: Topline findings in Odisha

In Odisha, the sample collection coincided with periods of rain, which has potentially resulted in a decreased impact of the protective effect of residing in an ODF village, as compared to the other two states. This indicates that systems for solid and liquid waste management, including faecal sludge management and drainage would need improvement to better prevent faecal contamination in the environment.

Figure 3: Contamination of environmental medium in Odisha with faecal indicator bacteria of human origin



UNICEF REPORT ON THE ENVIRONMENTAL IMPACT OF THE SWACHH BHARAT MISSION ON WATER, SOIL AND FOOD

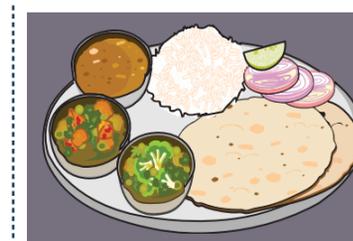
Overall, in terms of faecal contamination from human origin, non-ODF villages were, on average:



12.7 times more likely to have their groundwater sources contaminated (12.7 times more from contaminants traceable to humans alone)



1.1 times more likely to have their soil contaminated



2.16 times more likely to have food contaminated and 2.48 times more likely to have household drinking water contaminated

The study findings indicate that these substantial reductions may potentially be attributed to the improvement in sanitation and hygiene practices, as well as supportive systems such as regular monitoring and behaviour change messaging.

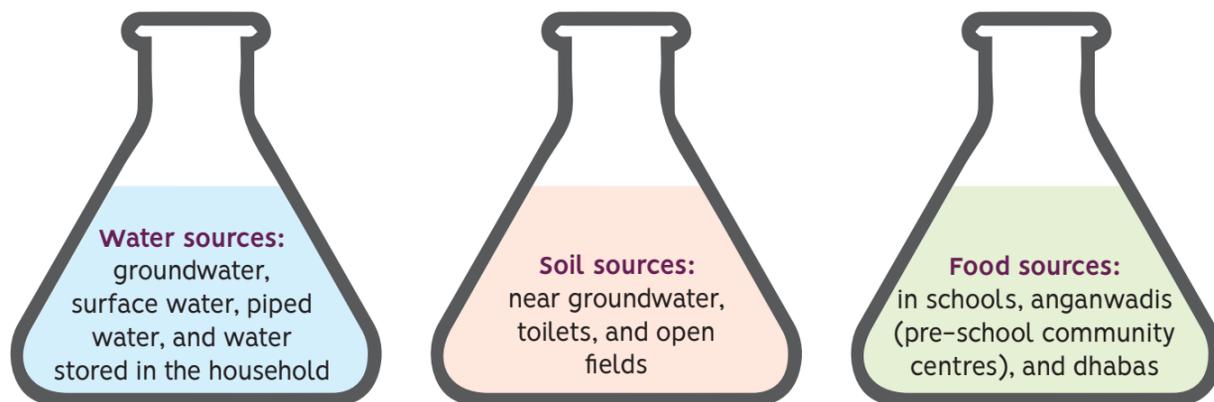
The objective of the quasi-experimental study was to assess the relationship between living in an open defecation free (ODF) environment and the contamination levels of faecal bacteriological indicators found in water, soil and food samples taken from ODF and non-ODF villages.

725 samples collected in total from 12 ODF villages and 12 non-ODF villages, spread across West Bengal, Bihar, and Odisha, and fit the criteria of:

- close proximity to nearest population hub
- had a population of 500 individuals or more
- were not located in extra-ordinary geographic terrains
- if ODF, were so for at least six month prior to the assessment



Samples were collected between December 2018 and January 2018 from the following sources:



Collected samples were preserved at site and transported to laboratory within the maximum permissible time limits as per the guidelines of the Bureau of Indian Standards.

1. Topline findings of the study

ENVIRONMENTAL MEDIUM	FAECAL CONTAMINATION FROM HUMAN ORIGIN (HuBac)	
	KEY FINDINGS	INTERPRETATION / ANALYSIS
<p>WATER</p>	<ol style="list-style-type: none"> Groundwater: The relative risk of faecal contamination of groundwater traceable to humans was 12.7 times more likely in non-ODF villages as compared to ODF villages (35.7 times more in Bihar; 6.5 times more in West Bengal and 5.3 times more in Odisha). Piped water supply: The relative risk of faecal contamination of PWS traceable to humans was 2.40 times more likely in non-ODF villages as compared to ODF villages (1.33 times more in Bihar; 2.73 times more in West Bengal and 1.50 times more in Odisha). Household water (stored): The relative risk of faecal contamination of HH storage water traceable to humans was 2.48 times more likely in non-ODF villages as compared to ODF villages (2.74 times more in Bihar; 4.14 times more in West Bengal and 1.44 times more in Odisha). 	<p>The magnitude of the reduced risk of contamination varies based in site assessed. In Odisha, the sudden onset of rain during sampling resulted in decreased impact, thereby indicating that systems for solid and liquid waste management, including faecal sludge management and drainage need improvement to realize the full benefits of residing in ODF environments. Behaviour change through IEC dissemination and regular messaging may have contributed to the drastic reduction in contamination of stored household water. Surface water sources were also sampled in all of the selected village; however, given the wide range of the results procured within the sample subset from the ODF villages (RR of FIB contamination in non-ODF villages = 1.35 in Bihar, RR = 0.68 in West Bengal, and RR = 0), more in-depth observation and follow-up is required to understand the reason for the high variance.</p>

ENVIRONMENTAL MEDIUM	FAECAL CONTAMINATION FROM HUMAN ORIGIN (HUBAC)	
	KEY FINDINGS	INTERPRETATION / ANALYSIS
<p>SOIL</p>	<p>The relative risk of faecal contamination of soil traceable to humans was 1.10 times more likely in non-ODF villages as compared to ODF villages (1.21 times more in Bihar; 1.39 times more in West Bengal and 0.89 times more in Odisha).</p>	<p>The minimal risk reduction for soil contamination potentially indicates the importance of establishing faecal sludge management together with solid and liquid waste management in more effective ways, to further reduce the risk of disease transmission.</p>
<p>FOOD</p>	<p>The relative risk of faecal contamination of food traceable to humans was 2.16 times more likely in non-ODF villages as compared to ODF villages (6.67 times more in Bihar; 8.47 times more in West Bengal and 1.14 times more in Odisha).</p>	<p>The significant reduction in risk can potentially be attributed to improvements in hygiene practices, as well as awareness around safe practices in terms of food preparation and storage. This finding can further be elaborated upon to assess the health impacts following the reduction in food-based contamination, especially in relation to stunting and diarrhoeal disease.</p>

2. Key highlights

2.1: Topline findings in Bihar

Figure 1: Contamination of environmental medium in Bihar with faecal indicator bacteria of human origin

