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India, Sanitation

India: The Correlation Between Vulnerability, Malnutrition, and Poor Sanitation

Multifarious rich cultures and long-standing traditions call India their home, and with almost 20,000 dialects spoken and a variety of religions practiced, it's clear that India is also home to an expansive range of ideologies, thinking styles, and convictions (The Indian Express). Industries flourish due to India's perfect combination of land and labor. But threatening future innovation and health is its dire sanitation and malnutrition crisis, claiming the lives of many, children and women being especially vulnerable. About 68% of the 1.04 million deaths of children under five years old in India in 2017 can be attributed to malnutrition (NDTV). Numerous factors feed into India's sanitation crisis, with the deadly habit of open defecation being a critical reason. This paper discusses the link between poor sanitation and malnutrition and explains that the array of causes, including gender disparity, the lasting effect of the caste structure, and community vulnerability, boils down to prove that the social determinants of health exacerbate the problem. To enforce a long-term solution that protects India's most vulnerable, a combination of improved existing programs and revolutionary educative material must be created.

One of two countries to have surpassed a population of one billion, India is projected to overtake China as the most populous country by 2024 (United Nations). This devastatingly high population has impacted the function of many institutions, including the ability to source clean water, competitiveness in education, and overcrowding of urban residential areas. In the last ten years, the population density of India's slums has spiked by 25%. This statistic characterizes a large scale move into urban areas by rural populations, mainly for the purpose of job-seeking. The move into slums rather than other housing is explained by the demographic of the people moving; those who have exhausted opportunities in rural areas and cannot provide for their families move to cities to work in manual labor (Nijman).

India's current GDP per capita stands at 2,099 USD (The World Bank), and its projected growth is 12.5% for the 2021-2022 fiscal year. This projected growth is one of the highest in 2021, because India's lockdown was eased and its economies worked around international shipping restrictions (Business Today). The government has created a new comparative measure for income: Net Value Added (NVA), which measures the individual contribution to a state in a year. In rural areas, the NVA is 40,925 Rupees (550.05 USD), and in urban areas, the NVA is 98,435 Rupees (1323.02). The income disparity between rural and urban India is constantly growing, and with 70% of the population living in rural areas, this divide does not bode well for the future of industries in rural India (Financial Express).

Arable agricultural land makes up 60.45% of land in India, while industrial and residential land makes up the remaining 39.55% (Trading Economics). Urbanization has caused agricultural land to be converted into non-agricultural land each year to make way for businesses and residential areas. This pressures rural workers to move to cities, aiding in the overpopulation problem that is a factor in food insecurity. Agriculture is the largest sector of the Indian economy, with 60% of the population working in it, and 18% of the economy being attributed to it (Statista). Because the agrarian sector is so important, many jobs revolve around farming, which also explains the low income of rural areas. India's notable landmarks include the Taj Mahal, the Pillars of Ashoka, the Himalayas, as well as a plethora of rivers stemming from the mountain range, including the Ganges and the Yamuna. India's seasons are winter, summer, and the intense monsoon season, but not all areas of the expansive country feel this intensity. This explains the seemingly low rainfall per annum statistic of 300-650 millimeters.

While India is a Democratic Republic with a Parliamentary government, the social and political atmosphere of the country revolves around the party in power of the Parliament, Prime Minister, and the Council of Ministers (National Portal of India). Currently, the Bharatiya Janata Party (BJP) is in power, with Prime Minister Narendra Modi in office for his second term. Seen by some as a right-wing Hindu Nationalist party, the party has seen its share of human rights controversies. The recent decision to deploy troops in the conflicted area of Kashmir was an expected choice for the party, as was its handling of the

hate crimes against religious minorities (Human Rights Watch). Prime Minister Narendra Modi enacted the cleanliness initiative Swachh Bharat (Clean India) in 2014 that aimed to improve sanitation and access to clean water in both urban and rural areas of India.

India has made strides in education in recent years, with many initiatives to increase female education and career prospects. Approximately 59% of the illiterate population is female as of 2018, showing that there is still much work to be done (Chandra). Gender inequality is one of the indirect causes of poor menstrual health, because it causes female illiteracy and it makes menstruation a taboo topic. When people are uninformed about the harms of poor sanitary practices, and when male dominated households view menstruation as "dirty", those practices become unintentional habit (Stromquist). Increased literacy in the female population increases the amount of women in the workforce, helping the economy and lessening the opportunity gap between the sexes.

Low literacy rates for women indicate the gender roles they are expected to fulfill. Women do most of the cooking in Indian households. Typical meals include mostly non-processed food, although Western food has become popularized in urban centers. Traditional meals are made up of various flatbreads or rice, with vegetables being the main component. Up to 42% of Indians follow a vegetarian diet, so meat is not regularly found in meals, especially in rural areas, where people have limited access to meats. Many Indians have a low purchasing power of food in general, so meat is seen as a luxury for those who are non-vegetarian (Devi et al.). Clean water is a struggle to find in rural areas and poorer urban areas, which intersects with poor sanitation in those same places.

A multitude of factors feed into India's growing food security issue. Upadhyay and Palanivel's summary of the First Millennium Development goal categorizes these factors into three sectors: the traditional concept, the socio-demographic concept, and the politico-developmental concept. First, the traditional concept details the tangible unavailability of food in markets (both urban and rural) and the inability to purchase available food due to low income. This concept tackles the obvious factors of food insecurity. Second, the socio-demographic concept covers the factors contributing to a person's financial, social, and environmental standing, which in turn contribute to their food security. This sector focuses on individual social standing and its effects on ability to source food, rather than broadly identifying groups that are less easily able to obtain food. Occupation (if any), literacy rates, area of residence, and gender feed into this standing, and in part determine social eligibility for nutrition. Third, the politico-developmental concept outlines broad governmental, political, and infrastructural fallacies that exacerbate the existing problem. These include poorly organized committees that were created to aid people in need and structural problems with food allocation (Upadhyay and Palanivel). India's food security problem stems from many roots, which suggests that its solution must be multi-faceted to account for the broad scope of factors.

Possessing food security, if tangible, boils down to having a healthy life sin malnutrition. Poor sanitation has been linked to malnutrition though bacterial exposure, and a devastating one in ten deaths in India is linked to inadequate sanitation (New York Times). Clearly, poor sanitation complicates health and makes it nearly impossible to lead a salubrious life. Access to food alone cannot cure malnutrition when bacteria-borne diseases account for 300,000 deaths every year. The scale of the impacts of poor sanitation should not be understated; being one of the most populous countries in the world with one of the highest population densities, India's sanitation crisis has created a cesspool of disease, malnutrition, and growth stunting. 910 million people of 1.3 billion lack access to adequate sanitation (The World Bank).

This growing problem paved the way for the COVID-19 pandemic, which hit India with force (Water.org). Clean water, access to adequate toilets, sanitary living arrangements, and proper disposal of bodily fluids have become critical in stopping the spread of COVID-19. While arguments have been made that intense exposure to pathogens on a daily basis actually proved to be beneficial for protection against the virus, severe infrastructural deficits more than overwhelmed this hypothetical advantage (Biswas). COVID-19 has decimated the Indian population, and the University of Pennsylvania's study conducted in semi-rural areas of Tamil Nadu helps explain why. First, respondents were asked about their access to private toilets. The results were as follows: 60% had access to a private toilet, 11% had access to a public or community toilet, and 29% had no access to toilets at all. Second, among those who had access to a private toilet, the majority responded that there was an uptick in hand washing and other sanitary practices in the household. This shows a stark contrast to those who did not have access to private

facilities, among whom 27% reported leaving the household to defecate during pandemic lockdown measures (Ashraf et al.). According to Professor Victoria Beard of Cornell University, “The recent rise in coronavirus cases in Indian cities underscores problems that existed before the current health crisis. For example, a lack of access to quality core urban services, especially water and sanitation.” (Beard). Existing issues like a lack of adequate sanitation has caused people living in less developed areas of India to “move backwards” in relation to COVID-19 protocols.

As India’s population increases, the problem of inadequate sanitation grows in tandem. However, the population is not affected equally, with class and gender being the two main distinguishing factors in the intensity of the impact of poor sanitation. Like any highly populated country, India’s wealth is concentrated in urban and suburban areas. Rural populations in India consist mainly of poor individuals. Unlike other highly populated countries, India’s urban population is mostly made up of economically disadvantaged people who live in slums, and the other part is made up by the wealthy, with virtually no middle class (Nijman). The absence of a middle class makes it difficult for less advantaged people to find adequate sanitation when they simply do not have the funds to match the facilities of the wealthy, and do not have adequate access to community sanitation facilities because for the most part, wealthy families have private facilities.

Gender is instrumental in the disparity between different groups in access to sanitation facilities. Measured by the metric of facilities available, Indian schools reported that 22% did not have appropriate latrines for girls (Unicef). Furthermore, most women are uncomfortable defecating in plain sight during the day, meaning that private and community toilets are a viable solution. However, those who must defecate outside the home choose to wait until nightfall to avoid embarrassment, but venturing outside the home leaves women vulnerable to violence and harrassment (The World Bank). In a choice that compromises excretory health, waiting to defecate between nightfall and dawn increases the risk of urinary tract infections and further damages women’s health (Das et al.). Not only does poor sanitation pose a threat to women’s safety, but it also complicates menstrual health. Many Indian women use cloth pads due to unavailability of disposable ones, but unhygienic cleaning methods including dirty water and indoor drying that promotes the growth of mold and bacteria cause infection (Das et al.).

To solve its sanitation crisis, India must implement a plan that addresses the multitude of factors that initially caused the problem. Simply not having access to sanitation facilities is a clear factor leading to an increased spread of disease, increase in youth malnutrition, and most severely, death. But even in households that do have access to private toilets, years of public defecation has caused a pattern, even preference, for defecating outside. In 40% of households with a working private toilet, at least one family member preferred to defecate outside, showing that making sanitation facilities available is only one part of the solution (Economist).

Additionally, although ignored in many conversations about open defecation in India, the lasting effects of the caste system serve to deepen a splinter between classes and their attitudes towards adopting private toilets. Despite the fact that caste separation is illegal in modern India, caste discrimination is very present. Some Hindu members of higher castes believe that people who were in the lower castes (ie. untouchables) are better suited to jobs like sanitation and cleaning. In the home, this attitude translates into not wanting a private toilet for fear that it will disrupt the purity of the household (Khatarker). Inciting a change in behavior is a difficult but necessary step in improving Indian sanitation, and improved education in both slums and villages is the path to take. Children are the most affected population by the bacteria-borne diseases that public defecation spurs, and educating them to understand the gravity of such a choice on their own health will change behavior. Government funded plans to improve sanitation have included educative material in the past, but focusing on children would be more effective (Rubin and Kapur-Gomes).

An incredibly important obstacle to fulfilling the goal of improved sanitation and decreased malnutrition is the impact that public defecation and poor sanitation has on women. Poor sanitation is tied to poor menstrual health, and the inability to birth children in a sanitized fashion greatly increases the chance of newborn death by exposure to harmful bacteria. The WASH (safe water, sanitation, and hygiene) method includes building hand washing stations, community toilets, and education for women about menstrual

hygiene (Lifewater). These steps decrease the risk of infection and empower women to be sanitary when menstruating.

A cumulation of increased access to adequate sanitation facilities, increased access to education, and female-specific improvements are made to existing plans to solve India's sanitation problem, and by extension, help stabilize India's food security. This can be done by combining the Swachh Bharat initiative with the WASH method and implementing subsidies and educative measures by considering the impact poor sanitation has on women. These three measures correspond to the three categories of factors contributing to poor sanitation. The Swachh Bharat initiative addressed the obvious issue of a lack of facilities and the ability to access them, which corresponds to the traditional concept. The WASH method serves to close the gap between different groups of people by underlining hygiene, hand washing facilities, and clean water as basic needs, thus creating a platform of health to grow from. Therefore, this corresponds to the socio-demographic concept, because the ability to source food and lead a healthy life directly corresponds to the opportunities enabled by hygiene and proper sanitation. Finally, the implementation of subsidies and prioritizing education, especially in regards to women's struggles, corresponds to the politico-developmental concept by pushing government-led initiatives with strong infrastructure.

The first phase of the Swachh Bharat plan was implemented in 2014 by Prime Minister Narendra Modi. The initiative aimed to increase the cleanliness of India by building more facilities and increasing access to them, re-educating the population to prioritize hygiene and health standards, and inevitably produce a long-term solution to India's sanitation crisis. Recently, the plan was honored because its target numbers for sanitation facilities and endorsements by celebrities were fulfilled, which is not an inherently bad thing, but when the shortcomings of this plan relate to the maintenance of said facilities, considering the plan finished serves to undermine what the true goal should be: offering safe, clean, well-maintained facilities, and encouraging the use of them. Swachh Bharat was an effective start in raising awareness of combatting malnutrition and food insecurity caused by poor sanitation and providing people with facilities. To improve this plan, two changes must be made. First, as defined by the official Swachh Bharat Mission, phase one was to build facilities for those in need, focusing on Solid and Liquid Waste Management projects, which dispose of biohazard material in a safe and efficient way. In addition, the plan enacted procedures to maintain the newly built facilities, but local governments were unable or unwilling to pick up the task of maintenance (Hindustan Times). Where Swachh Bharat failed in providing a long-term solution, the new plan must prioritize training people to keep facilities clean and working. Since the failure was at the local level, heavy incentives must be implemented. This could include subsidizing public health workers' wages, providing financial incentives for local governments to train workers, or as in the plan implemented in Ghana evaluated in 2020, government-funded subsidies directed to individual families. Ghana's population has suffered bacteria-borne malnutrition, just as in India, and the government's response was to distribute vouchers for free concrete bases of toilet and sanitation systems in the poorest neighborhoods (Globalwaters.org). This plan proved effective because people did not have to carry out the most intensive part of building a sanitation system themselves, and once a complimentary base was in place, the rest of the station came soon after.

The second phase of Swachh Bharat was educative material meant to normalize Western sanitation in rural areas of India. Sanitation initiatives in the past failed because facilities built were going unused due to the long-standing habit of open defecation. This phase included endorsements by celebrities like actress Priyanka Chopra and cricketer Sachin Tendulkar who promoted the cleanliness cause as an overall welfare cause, emphasizing individual change (The Times of India). Continuing this pattern of using celebrity endorsements would prove productive, but the initiative should include celebrities more relevant to the most vulnerable population and their interests: children. Instead of actors popular with adults, this phase should use TikTok stars and YouTube content creators popular with Indian youth, like Riyaz Ali, who has almost 50 million followers, in an effort to influence children to change their behavior while they are still impressionable and have not built the habit of public defecation yet. Additionally, this education must include a conversation about the lasting effects of caste on sanitation. It must break down the stigma surrounding public health workers, manual waste sanitation workers, and other jobs mostly occupied by people considered to be in the lowest caste: the Untouchables. Because changing people's mindsets about

caste discrimination is nearly insurmountable, emphasizing that private toilets inside the home does not correlate to impurity could be effective.

The aims of the 2012 Water, Sanitation, and Hygiene (WASH) program (improving sanitation and hygiene techniques, educating people on the risks of poor sanitation, and ensuring clean water and facilities) should be added to the aforementioned improved Swachh Bharat plan. Gender-neutral hygienic techniques must be mentioned in educative material, including hand washing with soap and water, rather than the sand or ash rub that many people rub their hands with after defecation. Understanding that water should not be consumed directly from outdoor sources like wells and rivers without purification is critical, as contaminated water is a huge risk of infection (Shreshtha et al.). While complex purification systems may be unable to be budgeted for, teaching the boiling of water before consumption is a necessary starting point. In a quantitative analysis and baseline study, concerning factors specific to women were brought up. In this study, 97% of women reported open defecation, sanitary napkins were not readily available or known about, and so women used cloth which was then thrown in rivers or buried at sites outside the village. Access to reusable sanitary napkins over the more cleanly disposable napkins is necessary for the situation because introducing a new source of contamination and pollution into villages that already have a low capacity for trash removal is not a good idea.

The third component to the solution to India's sanitation crisis is female-specific solutions. As discussed, there is a large disparity between sanitation for males and sanitation for females, including walking long distances at nighttime to defecate, problems with pregnancy caused by poor sanitation, risk of urinary tract infections from the long periods in between defecation, harassment during defecation, poor menstrual health, and more. The first and most widely recognized action to take is to increase the amount of private facilities available for women. To expand that action, female only facilities in the community could help reduce harassment and embarrassment, and could prevent women from having to wait until nightfall to safely defecate. Second, one of the reasons for poor menstrual health is that women are often not allowed in the sanitation facilities shared by men or in rooms in the house shared by men (Hindawi). This drastically reduces the chance of a hygienic menstrual cycle. Thus, education about menstrual health and hygiene must also be aimed at men to combat the stigma of impurity surrounding it. Low income and a low importance given to menstrual health (and by extension, menstrual products) cause women to resort to using old cloth, which is neither comfortable nor hygienic. Subsidizing menstrual products, especially reusable ones that are more culturally acceptable, would improve menstrual hygiene in villages, but also in urban areas where cultural norms may not be an issue, but income is. Kenya, another developing country, has resolved to begin subsidizing menstrual products in the future. A consideration that Kenya has made in the availability of menstrual products is the cultural acceptance of the product. Disposable sanitary napkins, while an ideal choice to maximize comfort and hygiene and minimize absences at school, are not as culturally accepted as cloth napkins. Thus, a new material that is softer than traditionally used old cloth scraps has been tested. Falalin, an absorbent cloth, decreased school absences substantially, and many girls reported preferring the cloth to disposable sanitary napkins (Kuhlmann).

India has the population and technological power to become a more advanced industrial powerhouse, but it will never reach its full potential if it is losing a generation of thinkers and innovators because of poor sanitation. Through addressing the three concepts feeding into India's sanitation crisis, India's most vulnerable populations will be able to thrive. The future of India's youth should not be sacrificed due to malnutrition caused by inadequate sanitation, and India's girls and women deserve to be safe and comfortable in both menstrual hygiene and defecation. People whose families belonged to lower castes deserve adequate compensation for their work, and people whose families belonged to higher castes cannot sacrifice cleanliness for the sake of "purity". India must combine the Swachh Bharat program with the WASH initiative to create a viable long-term solution for the sanitation crisis, main points including an increased number of facilities, incentives to maintain said facilities, educative material addressing class disparities in relation to hygiene, educative material that informs women of the harms of poor sanitation and poor menstrual health, and subsidizing necessary health products. India must force its local governments to take accountability for a crisis that seemed to have no end in sight, because when a solution is presented, it must be enforced to be effective. Incentive programs and harsh penalties for not following through with programs and not maintaining cleanliness per the guidelines will curb this fear. Only through targeted programs and education can India cleanse itself of the sanitation crisis.

Works Cited

"Why It Is so Hard to Fix India's Sanitation Problem." *The Economist*, The Economist Newspaper, 25 Sept. 2017, www.economist.com/the-economist-explains/2017/09/24/why-it-is-so-hard-to-fix-indias-sanitation.

Ashraf, Sania et al. "Sanitation Practices during Early Phases of COVID-19 Lockdown in Peri-Urban Communities in Tamil Nadu, India." *The American journal of tropical medicine and hygiene* vol. 103,5 (2020): 2012-2018. doi:10.4269/ajtmh.20-0830

"Agriculture in India." *Statista*, 8 Jan. 2021, www.statista.com/topics/4868/agricultural-sector-in-india/.

Ahuja, Aastha. "68 Per Cent Of Child Deaths Under Five Years In India Caused By Malnutrition In 2017: Study." Edited by Sonia Bhaskar, *NDTV*, 25 Oct. 2019, 4:36 PM, swachhindia.ndtv.com/68-per-cent-of-child-deaths-under-five-years-in-india-caused-by-malnutrition-in-2017-study-39470/.

Beard, Victoria. "India's COVID-19 Surge Reflects Lack of Sanitation, Infrastructure." *Cornell Chronicle*, Cornell University, 8 Sept. 2020, news.cornell.edu/media-relations/tip-sheets/indias-covid-19-surge-reflects-lack-sanitation-infrastructure.

Biswas, Soutik. "Coronavirus: Are Indians More Immune to Covid-19?" *BBC News*, BBC, 2 Nov. 2020, www.bbc.com/news/world-asia-india-54730290.

Chandra, Tanushree. "Literacy in India: The Gender and Age Dimension", *ORF Issue Brief No. 322*, October 2019, Observer Research Foundation.

Das Gupta, Moushumi, and Brajesh Kumar. "One Year on, PM Modi's Swachh Bharat Drive Fails to Leave a Mark." *Hindustan Times*, 1 Oct. 2015, www.hindustantimes.com/india/one-year-on-pm-modi-s-swachh-bharat-drive-fails-to-leave-a-mark/story-6qbSpatYxPCfs0b7unu7hI.html.

Das P, Baker KK, Dutta A, Swain T, Sahoo S, et al. (2015) Menstrual Hygiene Practices, WASH Access and the Risk of Urogenital Infection in Women from Odisha, India. PLOS ONE 10(6): e0130777. https://doi.org/10.1371/journal.pone.0130777

Devi, Subramaniam Mohana et al. "An Outline of Meat Consumption in the Indian Population - A Pilot Review." *Korean journal for food science of animal resources* vol. 34,4 (2014): 507-15. doi:10.5851/kosfa.2014.34.4.507

"Ending Open Defecation and Achieving a Clean and Healthy Rural India." *World Bank*, 30 Mar. 2016, www.worldbank.org/en/news/feature/2015/12/15/ending-open-defecation-achieving-clean-and-healthy-rural-india.

"FAQs: Swachh Bharat Mission - Gramin, Department of Drinking Water and Sanitation." *Swachh Bharat Mission*, 5 June 2020, swachhbharatmission.gov.in/SBMCMS/faq.htm.

"GDP per Capita (Current US$) - India." *The World Bank*, 2021, data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=IN.

"Governance & Administration". *National Portal of India*, www.india.gov.in/topics/governance-administration.

Harris, Gardiner. “Poor Sanitation in India May Afflict Well-Fed Children With Malnutrition.” *The New York Times*, The New York Times, 13 July 2014, www.nytimes.com/2014/07/15/world/asia/poor-sanitation-in-india-may-afflict-well-fed-children-with-malnutrition.html.

“IMF Raises India's Growth Forecast for FY22 to 12.5%.” *Business Today*, 6 Apr. 2021, www.businesstoday.in/current/economy-politics/breaking-imf-revises-upwards-indias-growth-forecast-for-fy22-to-125/story/435890.html.

“Implementation of a Targeted Toilet Subsidy Study in Ghana: Midline Report.” *Globalwaters.org*, Dec. 2020, www.globalwaters.org/resources/assets/washpals/implementation-targeted-toilet-subsidy-study-ghana-midline-report.

“India - Agricultural Land (% Of Land Area).” *Trading Economics*, 2016, tradingeconomics.com/india/agricultural-land-percent-of-land-area-wb-data.html.

“India's Rural-Urban Divide: Village Worker Earns Less than Half of City Peer.” *The Financial Express*, The Financial Express, 12 Dec. 2019, www.financialexpress.com/economy/indias-rural-urban-divide-village-worker-earns-less-than-half-of-city-peer/1792245/.

Khatarker, Devesh. “The Stumbling Block of Caste in Solving India's Sanitation Crisis.” *The Wire*, 23 Oct. 2019, thewire.in/government/caste-stumbling-block-india-sanitation-crisis.

Kuhlmann AS, Henry K, Wall LL. Menstrual Hygiene Management in Resource-Poor Countries. *Obstet Gynecol Surv*. 2017;72(6):356-376. doi:10.1097/OGX.0000000000000443

“More than 19,500 Mother Tongues Spoken in India: Census.” *The Indian Express*, 1 July 2018, 2:13 PM, indianexpress.com/article/india/more-than-19500-mother-tongues-spoken-in-india-census-5241056/.

Nijman, Jan. “India’s Urban Future: Views From the Slum.” *American Behavioral Scientist*, vol. 59, no. 3, Mar. 2015, pp. 406–423. doi:10.1177/0002764214550304.

Rubin, Ben Fox, and Suruchi Kapur-Gomes. “India Spent $30 Billion to Fix Its Broken Sanitation. It Ended up with More Problems.” *CNET*, 11 Sept. 2020, 8:22 AM, www.cnet.com/news/india-spent-30-billion-to-fix-its-broken-sanitation-it-ended-up-with-more-problems/.

“Sanitation for Women: The Problem and Solution.” *Lifewater International*, 22 Sept. 2020, lifewater.org/blog/sanitation-for-women/.

Shreshtha K, Shahrzad R, Abhishek G, and Madhumita D. 2015.“Improving Sanitation and Hygiene Practices of the Rural Poor through Community Institutions in Uttar Pradesh, India”. Process Documentation, ICRW, New Delhi.

Stromquist, Nelly P. “Women and Illiteracy: The Interplay of Gender Subordination and Poverty.” *Comparative Education Review*, vol. 34, no. 1, 1990, pp. 95–111. *JSTOR*, www.jstor.org/stable/1188557. Accessed 18 July 2021.

“Swachh Bharat Abhiyan.” *PM India*, 2019, www.pmindia.gov.in/en/major_initiatives/swachh-bharat-abhiyan/.

“Swachh Bharat: PM Modi Ropes in Celebrities for His 'Swachh Bharat' Challenge: India News - Times of India.” *The Times of India*, 2 Oct. 2014, 9:08, https://timesofindia.indiatimes.com/india/pm-modi-ropes-in-celebrities-for-his-swachh-bharat-challenge/articleshow44121679.cms#:~:text=NEW%20DELHI%3A%20Prime%20Minister%20Narendra,Swachh%20Bharat'%20a%20people's%20movement.

Upadhyay, R Prakash, and C Palanivel. “Challenges in achieving food security in India.” *Iranian journal of public health* vol. 40,4 (2011): 31-6.

“Water In India - India's Water Crisis & Sanitation Issues In 2020.” *Water.org*, 2020, water.org/our-impact/where-we-work/india/.

“Water, Sanitation and Hygiene.” *UNICEF India*, 24 Mar. 2021, www.unicef.org/india/what-we-do/water-sanitation-hygiene.

“World Population Projected to Reach 9.8 Billion in 2050, and 11.2 Billion in 2100 | UN DESA Department of Economic and Social Affairs.” *United Nations*, United Nations, 21 June 2017, www.un.org/development/desa/en/news/population/world-population-prospects-2017.html.