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Trends in pit-latrines usage in Malawi and their unintended impacts on groundwater quality

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Providing adequate and equitable sanitation to all by 2030 is central to achieving Sustainable Development Goal 6 (SDG6). Pit-latrines provide a low-cost, accessible form of sanitation, there has, therefore, been a significant increase in the rapidly growing Malawian population using pit latrines, largely driven by a reduction in open defecation. Whilst open defecation reduction is critical in managing waterborne pathogens and other contaminants, pit latrines can also result in both microbial and nutrient contamination of groundwater; faecal contamination of groundwater, resulting in contaminated boreholes, has already been documented in Malawi.

To forecast the level of pit-latrines usage in Malawi, we evaluate the trends in Malawian sanitary provision using linear modelling to estimate that currently 500,000 people gain access to sanitation in Malawi every year, requiring approximately 93,000 new pit-latrines to be constructed annually to accommodate this shift. The associated increase in pit-latrines density creates a heightened threat of borehole contamination and a key public health concern.

We also examine the nature of pit-latrines management and usage, presenting the results of a national survey of over 200,000 sanitary facilities. Whilst pit-latrines are usually associated with faecal contaminants, we found that 82.3% of pit-latrines had materials other than faecal waste deposited including rubbish, plastics, and oils; these present a danger of micropollutant contamination. Furthermore, we find that sustainable practises to manage waste deposited in pit-latrines, such as pit-latrines emptying, have low adoption.

Pit-latrines usage is already causing groundwater contamination in Malawi, this will only be exacerbated by our projected increase in pit-latrines usage as Malawi manages a growing population and actively pushes to eliminate open defecation.

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