



3,100  
Liters of sludge treated per day



5170  
People with access to safe FSM.



Environmentally friendly. No added chemical and power supply.



Designed to minimize O&M requirements



Materials locally available



System totally sealed / no smell or exposure



96% reduction of fecal coliform after treatment



99.6% reduction of helminths after treatment

In 2018, the IOM WASH programme in Cox's bazar, Bangladesh designed a new treatment mechanism—the Decentralized Wastewater Treatment System (DEWATS). The treatment mechanism works by solids/liquid separation through settlement and filtration as well as digestion of solids under anaerobic conditions. The plastic DEWATS are composed of two processes: The Anaerobic Treatment System (ATS, in plastic tanks with filter material) and the infiltration process. One system can treat 3100 liters of wastewater per day and can serve 5,170 users with only 65m<sup>2</sup> of land required for the ATS and 52m<sup>2</sup> of land required for infiltration. The main objective of this compact system is to cut suspended solids and organic matter concentration to facilitate a better and sustainable infiltration of the effluent into the soil. IOM and International Centre for Diarrhoeal Research, Bangladesh (ICDDR,B) regularly monitor the quality of the effluent, testing the levels of the Faecal Coliforms (FC), Total Solid (TS), Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), Total Nitrogen (TN), Total Phosphorus (TP), Ammonium and Helminths.

## DEWATS - TREATMENT PERFORMANCE ANALYSIS

Since 2018, IOM has installed 11 DEWATS in different camps: three in Camp 9, two in Camp 12, two in Camp 13, two in Camp 23, two in Camp 24. IOM is running a laboratory in Ukhaia log base which is monitoring basic parameters including FC, TN and COD. ICDDR,B is a health research organisation based in Dhaka and is monitoring the quality of DEWATS effluent every month, testing additional parameters (E.Coli, TS, COD, BOD, TN, TP, Ammonium and Helminths). They are also checking the presence of pathogens such as Salmonella, Shigella and Vibrio cholera. The summary of results is presented in the table below. The reduction of parameters tested between inlet and outlet is significant and demonstrates the effectiveness of the treatment mechanism. The reduction of E. Coli = 96%, TS = 70%, COD = 83%, BOD = 87%, TN = 60%, TP = 77%, and helminths = 99.6%. It also shows that 80% of raw sludge samples tested with presence of vibrio cholera are free of this pathogen after treatment. The average result of FC = 16,880 CFU/100ml. WHO standards for reuse of wastewater in agriculture < 100,000 cfu/100 ml (drip irrigation of high-growing crops). The quality of the effluent after treatment would allow the reuse for irrigation. However the quality of raw sludge is variable, which impacts the consistency of results. And the congestion in the camps cannot allow the reuse for irrigation. Therefore, the infiltration process remains an essential component where the soil characteristic is a key factor (WHO standards for septic tank < 1,000,000 cfu/100 ml). Final disinfection by adding chlorine solution at final stage is also possible (in case of emergency).



Summary of parameters tested by ICDDR,B: average of 12 rounds results in 3 DEWATS in C9 and C23 (2) -including 2 samples (inlet & outlet)

E. Coli reduction	E. Coli (cfu/100ml)	TS reduction	TSS reduction
96%	16880	70%	96%
COD reduction	BOD reduction	TN reduction	TP reduction
83%	87%	60%	77%
Ammonium reduction	Helminths reduction	Salmonella (P/A)	Vibrio cholera (P/A)
38%	99.6%	75%	80%