Table 4 Socio-economic and environmental determinants influencing the persistence of Lymphatic filariasis in West Bengal

Determinant	Mechanism of influence	Evidence from West Bengal/India	Public health implication
Poverty	Limits access to proper housing, sanitation, and healthcare; increases exposure to vector habitats	Higher prevalence reported in low-income districts such as Murshidabad and Malda; strong association between poverty and LF burden	Targeted interventions in economically vulnerable populations; integration with poverty alleviation programs
Poor sanitation	Creates polluted stagnant water (open drains, wastewater), ideal for Culex breeding	Urban slums and rural areas with open drainage show higher vector density and infection rates	Improvement of drainage systems, waste management, and sanitation infrastructure
Low literacy and awareness	Reduces understanding of disease transmission and importance of MDA compliance	Misconceptions about drug side effects lead to poor compliance in several endemic districts	Health education campaigns, school-based awareness, community engagement programs
Urbanization and slum expansion	Unplanned urban growth leads to overcrowding, waterlogging, and poor waste disposal	Kolkata and peri-urban areas identified as emerging transmission hotspots	Urban planning reforms, slum sanitation improvement, vector habitat reduction
Rural housing conditions	Poorly constructed houses (mud, bamboo, no screening) increase exposure to mosquito bites	Rural populations often sleep outdoors or in poorly protected environments	Promotion of mosquito-proof housing, use of bed nets, improved ventilation design
Drainage infrastructure	Open, clogged drains serve as continuous breeding sites for Culex quinquefasciatus	Areas with covered drainage show lower larval density compared to open drainage regions	Development of closed drainage systems and regular maintenance
Climatic factors (temperature, rainfall, humidity)	Favour mosquito breeding, survival, and parasite development within vector	Monsoon and post-monsoon periods associated with increased vector density and transmission	Seasonal vector control planning and surveillance intensification
Human behaviour (night exposure, outdoor activities)	Increases contact with nocturnal biting mosquitoes	Agricultural workers, fishermen, and labourers show higher infection risk	Behavioural interventions, use of bed nets, awareness on personal protection
Migration and population movement	Facilitates spread of infection from endemic to non-endemic areas	Migrant labourers act as reservoirs, contributing to persistence of transmission	Screening of migrant populations, strengthening surveillance in receiving areas
Social stigma	Discourages early treatment and participation in control programs	LF patients often face exclusion and delay seeking care	Community sensitization, inclusion programs, psychosocial support

Source: Compiled and synthesized from World Health Organization (2023), Government of India (2023), Rao and Bandyopadhyay (2022), Sahu et al. (2021), Roy and Dutta (2020), and Mitra et al. (2021).