Risk Factor	Category	Description	Mosquito Species	Effect on Mosquito Presence	Country	Study Authors and Date	Title
Abandoned and unused infrastructure	Architecture	Unused swimming pools in urban areas	*Anopheles gambiae s.l.*	Increased (42.7% of positive habitats were unused pools)	Kenya	Impoinvil et al. (2008)	The role of unused swimming pools as a habitat for anopheles immature stages in urban Malindi, Kenya
Abandoned and unused infrastructure	Architecture	Ecological habitat diversity in modified landscapes	*An. gambiae s.l., An. funestus, Culex quinquefasciatus*	46,846 larvae: 44.1% goldmines, 30.9% drainage, 22.4% swamps, 2.1% hoof prints	Kenya	Kweka et al., 2015	Assessment of mosquito larval productivity among different land use types for targeted malaria…
Abandoned and unused infrastructure	Architecture	Increasing number of abandoned houses	*Aedes aegypti*	Increased (potential breeding sites)	Puerto Rico	Pérez-Guerra et al. (2023)	Community perceptions on challenges and solutions to implement an Aedes aegypti control project in Ponce, Puerto Rico (USA)
Construction sites	Architecture	Large construction sites in urban areas	*Aedes aegypti*	Increased (higher odds of major cluster expansion)	Singapore	Liang et al. (2018)	Construction sites as an important driver of dengue transmission: Implications for disease control
House construction	Architecture	Variations in house construction influencing mosquito entry and prevalence	*Anopheles darlingi, Anopheles albimanus*	Increased (different house types influenced indoor presence of mosquitoes)	Belize	Roberts et al. (2002)	Spatial distribution of adult Anopheles darlingi and Anopheles albimanus in relation to riparian habitats in Belize, Central America
House construction	Architecture	Houses with mud wall construction	*Anopheles spp.*	Increased (higher vector density compared to other wall types)	Kenya	Ondiba et al. (2018)	Malaria vector abundance is associated with house structures in Baringo County, Kenya
House construction	Architecture	Traditional bamboo houses vs. modern wooden houses	Putative Japanese Encephalitis vectors and Anophelines	Increased (over 2 times higher risk in bamboo houses)	Laos	Hiscox et al. (2013)	Risk Factors for Mosquito House Entry in the Lao PDR
House construction	Architecture	Houses made with wood or slum housing	*Aedes aegypti*	Increased (wood-constructed housing (52% incidence vs. 25% in concrete), slum housing (61% incidence vs. 30% in other housing))	Puerto Rico	Waterman et al. (1985)	Dengue transmission in two Puerto Rican communities in 1982
House construction	Architecture	Houses with mud walls	*Anopheles arabiensis, An. funestus*	Increased (higher indoor densities compared to plastered or brick walls)	Tanzania	Kaindoa et al. (2018)	Housing gaps, mosquitoes and public viewpoints: a mixed methods assessment of relationships between house characteristics, malaria vector biting risk and community perspectives in rural Tanzania.
House construction	Architecture	Rural homes with mud walls, open eaves, windows without screens	*Anopheles species*	Increased (Higher indoor densities than plastered houses or with screens)	Tanzania	Kaindoa et al., 2018	House gaps, mosquito risk & public viewpoint, rural Tanzania
House construction	Architecture	Maitenance and general quality of premises	*Aedes aegypti*	Increased abundance, risk identified in model	Thailand	Rahman et al., 2021	Ecological, social and other environmental determinants of dengue vector abundance, NE Thailand
House construction	Architecture	Houses with walls made of mud blocks	*Culex pipiens s.l., Anopheles gambiae s.l.*	Increased (44% higher odds compared to concrete)	The Gambia	Kirby et al. (2008)	Risk factors for house-entry by culicine mosquitoes in a rural town and satellite villages in the Gambia
House construction	Architecture	Houses constructed with cement	*Culex quinquefasciatus*	Increased (greater mean number of mosquitoes compared to wood or other materials)	Trinidad and Dominican Republic	Howell & Chadee (2007)	The influence of house construction on the indoor abundance of mosquitoes
House construction	Architecture	Houses made of non-modern materials	*Anopheles spp.*	Increased (53% higher human biting rate compared to modern houses)	Uganda	Musiime et al. (2022)	House design and risk of malaria, acute respiratory infection and gastrointestinal illness in Uganda: A cohort study
House construction	Architecture	Houses made of non-cement walls	*Anopheles spp.*	Increased (higher odds of malaria infection and incidence in traditional homes)	Uganda	Wanzirah et al. (2015)	Mind the gap: House structure and the risk of malaria in Uganda
House construction	Architecture	Combined lack of eaves, treated or untreated bed-nets, the number of house occupants, house size, netting over windows, and roof type significantly related ($p < 0.05$) to mosquito house entry	*An. gambiae s.l., An. funestus*	Increased (lack of these features in combination resulting in greater house mosquito entry in both study villages)	Tanzania	Lwetoijera et al, (2013)	A need for better housing to further reduce indoor malaria transmission in areas with high bed net coverage
Indoor bathrooms	Architecture	Bathroom location (indoor)	*Aedes aegypti*	Associated with higher vector abundance	Thailand	Rahman et al., 2021	Ecological, social and other environmental determinants of dengue vector abundance, NE Thailand
Lack of hospitals and clinics	Architecture	Urban hospital/clinic infrastructure, lack of appropriate facilities	*Aedes aegypti*	Lack of hospitals/clinics increases risk of dengue	Pakistan	Shabbir et al., 2020	A spatial-temporal study for the spread of dengue depending on climate factors in Pakistan
Lack of window and door screens	Architecture	Houses without window screens	Not specified	Increased (associated with higher dengue transmission)	Indonesia	Siregar & Makmur (2019)	Social-ecological risk determinant and prediction for dengue transmission
Lack of window and door screens	Architecture	Houses without screens on windows and doors	*Aedes aegypti*	Increased (associated with higher dengue antibody prevalence)	Puerto Rico	Waterman et al. (1985)	Dengue transmission in two Puerto Rican communities in 1982
Lack of window and door screens	Architecture	Houses with unscreened windows	*Anopheles arabiensis, An. funestus*	Increased (higher indoor densities compared to screened windows)	Tanzania	Kaindoa et al. (2018)	Housing gaps, mosquitoes and public viewpoints: a mixed methods assessment of relationships between house characteristics, malaria vector biting risk and community perspectives in rural Tanzania.
Lack of window and door screens	Architecture	Houses without screens for ventilators	Not specified	Increased (94.7% of houses lacked screening in ventilators)	Uganda	Musoke et al. (2018)	Malaria prevention practices and associated environmental risk factors in a rural community in Wakiso district, Uganda
Lack of window and door screens	Architecture	Inadequate screening on windows and doors	*Aedes aegypti*	Increased (higher indoor abundance)	USA	Donnelly et al. (2020)	Quantifying sociodemographic heterogeneities in the distribution of aedes aegypti among California households
New human settlements	Architecture	Recently established urban areas	*Anopheles gambiae*	Initially increased, then decreased with further urbanization	Congo	Trape & Zoulani (1987)	Malaria and Urbanization in Central Africa: The Example of Brazzaville.: Part III: Relationships Between Urbanization and the Intensity of Malaria Transmission
Occupant density / Crowding	Architecture	Higher number of residents per home	*Culex quinquefasciatus*	Increased (correlated with higher mosquito presence)	Brazil	Correia et al. (2012)	Residential characteristics aggravating infestation by Culex quinquefasciatus in a region of Northeastern Brazil
Occupant density / Crowding	Architecture	Houses with more people sleeping	*Anopheles gambiae s.s., An. arabiensis, An. funestus*	Increased (modulated abundance, effect varied with species and sex)	Kenya	McCann et al. (2017)	Explaining variation in adult Anopheles indoor resting abundance: the relative effects of larval habitat proximity and insecticide-treated bed net use.

Risk Factor	Category	Description	Mosquito Species	Effect on Mosquito Presence	Country	Study Authors and Date	Title
Occupant density / Crowding	Architecture	Increased number of people in the house prior to collection	*Anopheles arabiensis, Culex quinquefasciatus*	Increased (significant predictor of mosquito occurrence)	Kenya	Muturi et al. (2008)	Diversity of riceland mosquitoes and factors affecting their occurrence and distribution in Mwea, Kenya
Occupant density / Crowding	Architecture	Higher number of people sleeping in houses	*Anopheles arabiensis, An. funestus*	Increased (direct linear correlation with vector densities)	Tanzania	Kaindoa et al. (2016)	Correlations between household occupancy and malaria vector biting risk in rural Tanzanian villages: Implications for high-resolution spatial targeting of control interventions
Occupant density / Crowding	Architecture	Crowded households (high HCI), poor condition	*Aedes aegypti*	Higher female and immature abundance (GLM significant, p<0.05)	Thailand	Rahman et al., 2021	Ecological, social and other environmental determinants of dengue vector abundance, NE Thailand
Occupant density / Crowding	Architecture	Increased number of people in the house	*Culex pipiens s.l.*	Increased (10-16% higher odds per additional person for Culex)	The Gambia	Kirby et al. (2008)	Risk factors for house-entry by culicine mosquitoes in a rural town and satellite villages in the Gambia
Occupant density / Crowding	Architecture	Houses with more than four people sleeping	Not specified	Decreased (reduced adult abundance)	Trinidad	Howell & Chadee (2007)	The influence of house construction on the indoor abundance of mosquitoes
Occupant density / Crowding	Architecture	Households with more children (6-17 years) in this age group	*Aedes aegypti*	Increased (associated with higher outdoor relative abundance)	USA	Juarez et al. (2021)	The eco-bio-social factors that modulate aedes aegypti abundance in south texas border communities
Open eaves	Architecture	Houses with open eaves and large eaves	*Anopheles arabiensis, Culex quinquefasciatus*	Increased (significant predictor of mosquito occurrence)	Kenya	Muturi et al. (2008)	Diversity of riceland mosquitoes and factors affecting their occurrence and distribution in Mwea, Kenya
Open eaves	Architecture	Houses with open eaves	*Anopheles spp.*	Increased (higher density of malaria vectors)	Kenya	Ondiba et al. (2018)	Malaria vector abundance is associated with house structures in Baringo County, Kenya
Open eaves	Architecture	Houses with open eaves	*Anopheles arabiensis, An. funestus*	Increased (higher indoor densities compared to closed eaves)	Tanzania	Kaindoa et al. (2018)	Housing gaps, mosquitoes and public viewpoints: a mixed methods assessment of relationships between house characteristics, malaria vector biting risk and community perspectives in rural Tanzania.
Open eaves	Architecture	Houses with open eaves	*Anopheles arabiensis*	Increased (46% higher odds of mosquito entry compared to closed eaves)	Tanzania	Mmbando et al. (2022)	The effect of light and ventilation on house entry by Anopheles arabiensis sampled using light traps in Tanzania: an experimental hut study
Open eaves	Architecture	Houses with open eaves	*Culex pipiens s.l., Anopheles gambiae s.l.*	Increased (38-51% higher odds of entry for Culex, and Increased (odds not specified) for Anopheles	The Gambia	Kirby et al. (2008)	Risk factors for house-entry by culicine mosquitoes in a rural town and satellite villages in the Gambia
Open eaves	Architecture	Houses with open eaves provide mosquito entry point	*An. gambiae s.l*	Increased (43.2% less mosquito entered on average when the eaves were closed)	The Gambia	Lindsay & Snow (1988)	The trouble with eaves: house entry by vectors of malaria
Open eaves	Architecture	Houses with open eaves	*Anopheles spp.*	Increased (higher human biting rate in traditional homes with open eaves)	Uganda	Wanzirah et al. (2015)	Mind the gap: House structure and the risk of malaria in Uganda
Open eaves	Architecture	Houses with open eaves	*Anopheles spp.*	Increased (associated with higher malaria transmission)	Various	Tusting et al. (2016)	Building malaria out: Improving health in the home
Outdoor toilets	Architecture	Presence of outdoor toilet providing shaded resting place (note: not breeding site)	*Aedes aegypti*	Increased (44% incidence vs. 35% for indoor)	Puerto Rico	Waterman et al. (1985)	Dengue transmission in two Puerto Rican communities in 1982
Poor ventilation	Architecture	Poorly-ventilated traditional huts	*Anopheles arabiensis*	Increased (99% higher odds of mosquito entry compared to well-ventilated huts)	Tanzania	Mmbando et al. (2022)	The effect of light and ventilation on house entry by Anopheles arabiensis sampled using light traps in Tanzania: an experimental hut study
Presence of used tires or tireshops	Architecture	Presence of used tires that become breeding sites	*Aedes aegypti*	Increased (38.4% infestation rate)	Caribbean	Nathan & Knudsen (1991)	Aedes aegypti infestation characteristics in several Caribbean countries and implications for integrated community-based control.
Presence of used tires or tireshops	Architecture	Presence of tyre shops in the area	*Aedes species*	Increased (responsible for approximately 30% of Aedes developmental sites)	Pakistan	Abbas et al. (2024)	Mitigating dengue incidence through advanced Aedes larval surveillance and control: A successful experience from Pakistan
Presence of used tires or tireshops	Architecture	Used-tire sites serve as key breeding site for mosquitoes	*Aedes albopictus, triseriatus*	Increased (Potosi viruses isolated at used-tire sites)	USA	Mitchell et al., 1998	Isolation of La Crosse, Cache Valley, and Potosi viruses from Aedes mosquitoes (Diptera: Culicidae) collected at used-tire sites in Illinois during 1994-1995
Proximity to a man-made dam	Architecture	Proximity of buildings to a man-made dam, which provide breeding sites for mosquitoes	*Anopheles arabiensis, Anopheles pharoensis, and Anopheles funestus s.l.*	Increased (mean monthly malaria incidence & anopheline larval density was higher in the dam villages than in the non-dam villages	Ethiopia	Kibret et al. (2017)	Malaria impact of large dams at different eco-epidemiological settings in Ethiopia
Proximity to cemeteries	Architecture	Presence of cemeteries in urban areas	Various species	Increased (68.9% of collection sites were in cemeteries)	Mexico	Dávalos-Becerril et al. (2019)	Urban and semi-urban mosquitoes of Mexico City: A risk for endemic mosquito-borne disease transmission
Proximity to river bank	Architecture	Houses located ≤1 km from rivers versus >1 km during dry and wet seasons	*Anopheles darlingi, Anopheles albimanus*	Increased (females abundant in houses near rivers; not present in upland areas during dry season)	Belize	Roberts et al. (2002)	Spatial distribution of adult Anopheles darlingi and Anopheles albimanus in relation to riparian habitats in Belize, Central America
Railway infrastructure	Architecture	Railway and new highland habitat creation, facilitating vector spread	*Multiple Anopheles species*	Railway promoted habitat formation, vector and parasite transportation	Ecuador	Pinault & Hunter, 2012	Malaria in highlands of Ecuador since 1900
House elevation	Architecture	Elevated houses built on stilts	Not specified	Decreased (reduced adult abundance)	Trinidad	Howell & Chadee (2007)	The influence of house construction on the indoor abundance of mosquitoes
Roof Type	Architecture	Vegetated rooftops in urban areas	*Culex quinquefasciatus*	Decreased (lower abundance compared to normal control roofs)	Hong Kong	Wong & Jim (2016)	Do vegetated rooftops attract more mosquitoes? Monitoring disease vector abundance on urban green roofs
Roof Type	Architecture	Houses with thatched roofing	*Anopheles spp.*	Increased (higher density of malaria vectors compared to iron sheet roofs)	Kenya	Ondiba et al. (2018)	Malaria vector abundance is associated with house structures in Baringo County, Kenya

Risk Factor	Category	Description	Mosquito Species	Effect on Mosquito Presence	Country	Study Authors and Date	Title
Roof Type	Architecture	Houses with thatched roofs	*Culex pipiens s.l.*	Decreased (30% lower odds in the town only)	The Gambia	Kirby et al. (2008)	Risk factors for house-entry by culicine mosquitoes in a rural town and satellite villages in the Gambia
Roof Type	Architecture	Houses made of non-metal/tile roofs	*Anopheles spp.*	Increased (higher odds of malaria infection and incidence in traditional homes)	Uganda	Wanzirah et al. (2015)	Mind the gap: House structure and the risk of malaria in Uganda
Rural location	Architecture	Houses in rural areas compared to urban	*Anopheles gambiae s.l.*	Increased (7 times higher numbers in villages)	The Gambia	Kirby et al. (2008)	Risk factors for house-entry by malaria vectors in a rural town and satellite villages in the Gambia
Shaded patios	Architecture	Shaded patio areas at home providing resting places	*Aedes aegypti*	Associated with higher dengue infection risk	Ecuador	Lippi et al., 2021	Utility of social-ecological and entomological risk factors for dengue infection, Machala
Temporary and emergency housing	Architecture	Tsunami-created inundated areas that became breeding habitats	*Anopheles sundaicus*	Increased (new breeding habitats created)	India	Kumari et al. (2009)	Management of malaria threat following tsunami in Andaman & Nicobar Islands, India and impact of altered environment created by tsunami on malaria situation of the islands
Temporary and emergency housing	Architecture	Wastewater pools in temporary housing sites	*Culex quinquefasciatus, Cx. tritaeniorhynchus, Aedes albopictus*	Increased (main breeding site in temporary housing)	Sri Lanka	Ohba et al. (2010)	Mosquito breeding sites and people's knowledge of mosquitoes and mosquito borne diseases: A comparison of temporary housing and non-damaged village areas in Sri Lanka after the tsunami strike in 2004
Urban density	Architecture	Urban population density and living condition linked to risk of vector-borne disease	*Aedes (various)*	Chikungunya seroprevalence: 2.0%-70.5%, positively associated with population density ($r=0.2389$, $p<0.02$)	Brazil	Teixeira et al., 2021	Seroprevalence of chikungunya virus and living conditions in Feira de Santana, Bahia-Brazil
Urban density	Architecture	Intra-city heterogeneity, population hotspots	*Anopheles stephensi*	Increased transmission risk correlated with density	India	Santos-Vega et al., 2016	Population Density, Climate Variables and Poverty—Urban Malaria in India
Urban density	Architecture	Urban density linked to increase in aedes mosquitoes	*Ae. aegypti, Ae. mediovittatus*	Increased (both species positively predicted by urban density, however Ae. mediovittatus negatively predicted by large contiguous urban areas)	Puerto Rico	Little et al. (2011)	Co-occurrence Patterns of the Dengue Vector Aedes aegypti and Aedes mediovitattus, a Dengue Competent Mosquito in Puerto Rico
Urban density	Architecture	Higher population density in urban areas	*Aedes albopictus*	Increased (higher gene flow rates in dense urban areas compared to parks and forests)	Singapore	Yeo et al. (2023)	Dense residential areas promote gene flow in dengue vector mosquito Aedes albopictus
Urban density	Architecture	High house density, surrounding house density, urban sites	*Aedes aegypti*	Higher vector abundance in urban sites	Thailand	Rahman et al., 2021	Ecological, social and other environmental determinants of dengue vector abundance, NE Thailand
Urban density	Architecture	Development intensity and urban area coverage	*Aedes albopictus*	Mean 3.21 mosquitoes per trap per day; higher abundance in urban areas	USA	Kache et al., 2020	Environmental determinants of Aedes albopictus abundance at northern limit in USA
Urban density	Architecture	Areas with lower population density	*Aedes aegypti*	Increased (higher indoor abundance)	USA	Donnelly et al. (2020)	Quantifying sociodemographic heterogeneities in the distribution of aedes aegypti among California households
Air-conditioning units	Component	Presence of drainage containers from air conditioners	*Anopheles stephensi*	Increased (identified as larval breeding sites)	Iran	Mehravaran et al. (2012)	Ecology of Anopheles stephensi in a malarious area, southeast of Iran
Air-conditioning units	Component	Presence of evaporative cooling units	*Aedes species*	Increased (responsible for approximately 30% of Aedes developmental sites)	Pakistan	Abbas et al. (2024)	Mitigating dengue incidence through advanced Aedes larval surveillance and control: A successful experience from Pakistan
Air-conditioning units	Component	Presense of water-based evapourative cooling systems	*Aedes aegypti*	Increased (second highest breeding preference ratio)	Pakistan	Mukhtar et al. (2018)	Seasonal distribution and container preference ratio of the Dengue Fever Vector (Aedes aegypti, Diptera: Culicidae) in Rawalpindi, Pakistan
Air-conditioning units	Component	Presence of window mounted AC units	*Aedes aegypti*	Increased (higher risk of female mosquito relative abundance indoors)	USA	Juarez et al. (2021)	The eco-bio-social factors that modulate aedes aegypti abundance in south texas border communities
Cooking location	Component	Wood smoke from cooking fires under the house or indoors	Putative Japanese Encephalitis vectors and Anophelines	Decreased (protective effect compared to cooking in separate room)	Laos	Hiscox et al. (2013)	Risk Factors for Mosquito House Entry in the Lao PDR
Indoor light visible from outside	Component	Light from CDC light trap visible from outside the hut	*Anopheles arabiensis*	Increased (84% increase in odds of collecting mosquitoes indoors)	Tanzania	Mmbando et al. (2022)	The effect of light and ventilation on house entry by Anopheles arabiensis sampled using light traps in Tanzania: an experimental hut study
Indoor potted plants	Component	Hospital indoor containers for water plants	*Aedes aegypti*	Water vase positive rates RMC: 40.69%, TMC: 76.62%, SLH: 80.60%, NCH: 64.06%, EAMC: 40.40%	Philippines	Cruz et al., 2008	Aedes survey of selected public hospitals admitting dengue patients in Metro Manila
Indoor potted plants	Component	Presence of potted plants inside houses	*Aedes aegypti*	Increased (higher indoor abundance)	USA	Donnelly et al. (2020)	Quantifying sociodemographic heterogeneities in the distribution of aedes aegypti among California households
Painted interiors	Component	Houses with painted interior walls	*Culex quinquefasciatus*	Increased (higher abundance of indoor resting mosquitoes)	Trinidad and Dominican Republic	Howell & Chadee (2007)	The influence of house construction on the indoor abundance of mosquitoes
Poor indoor daylight	Component	Insufficient natural light inside houses	*Aedes aegypti*	Increased (127% higher odds of infection)	China	Liu et al. (2019)	Risk factors associated with dengue virus infection in Guangdong province: A community-based case-control study
Poorly fitting doors	Component	Poorly fitting doors providing gaps for mosquito entry	Not specified	Increased (potential for mosquito entry)	Uganda	Musoke et al. (2018)	Malaria prevention practices and associated environmental risk factors in a rural community in Wakiso district, Uganda
Aquatic and water body edge vegetation	Landscape	Areas with Schoenoplectus, mangrove, Sporobolus and Xerochloa vegetation	*Aedes vigilax*	Increased (larval densities 2.3 times greater in Schoenoplectus and mangrove areas, and 8 times greater in areas with porobolus and Xerochloa)	Australia	Jacups et al. (2009)	A comparison of Aedes vigilax larval population densities and associated vegetation categories in a coastal wetland, Northern Territory, Australia.
Aquatic and water body edge vegetation	Landscape	Population studies along vegetation zones of polluted urban drainage canal	*Culex quinquefasciatus*	5.71 females/m^2 density, survival rates 0.60-0.68 per day, population size 28,810/5,040m^2	Brazil	Laporta & Sallum, 2008	Density and survival rate of culex quinquefasciatus at parque ecolgico do Tietê, São Paulo, Brazil

Risk Factor	Category	Description	Mosquito Species	Effect on Mosquito Presence	Country	Study Authors and Date	Title
Aquatic and water body edge vegetation	Landscape	Presence of plants in water bodies	*Anopheles arabiensis*	Decreased (inversely associated with larval abundance)	Ethiopia	Kenea et al. (2011)	Environmental factors associated with larval habitats of anopheline mosquitoes (diptera: Culicidae) in irrigation and major drainage areas in the middle course of the rift valley, central ethiopia
Artificial vs non-artificial water bodies	Landscape	Artificially filled pools from leaking pipes in urban parks had higher mean mosquito densities than naturally filled rain pools	*Culex spp.*	Increased (articial pools had 4.7 times higher mean mosquito densities (92.6 mosquitoes/m^2) than naturally filled rain pools (20.3–47.8 mosquitoes/m^2), with stagnant-water mosquitoes showing further increases (AF: up to 91.6/m^2 vs. NF: 0.05–11.6/m^2))	Argentina	Quiroga et al. (2013)	Immature mosquitoes associated with Urban Parklands: Implications for water and mosquito management
Artificial vs non-artificial water bodies	Landscape	Artificial water bodies such as fish farm pools have higher quantities of mosquito larvae compared with natural water bodies	*Anopheles species*	Increase (Fishponds were four times more infested with anopheline larvae than natural water bodies)	Brazil	Dos Reis et al. (2015)	Contribution of fish farming ponds to the production of immature Anopheles spp. in a Malaria-Endemic Amazonian town
Flood-prone areas	Landscape	Neighborhood flooding, nutrient-enriched water	*Aedes aegypti*	Higher body nitrogen, increased mosquito populations with flooding	Puerto Rico	Yee et al., 2019	Linking Water Quality to Aedes aegypti and Zika in Flood-Prone Neighborhoods
Flood-prone areas	Landscape	Heated, flooded basements with organic pollution	*Culex pipiens pipiens f. molestus*	80-100% autogeny in females, perennial populations in basements	Russia	Vinogradova, 2008	Monitoring of urban Culex pipiens pipiens f. molestus in St. Petersburg
Land use type	Landscape	Areas with less forest coverage	*Aedes aegypti, Aedes albopictus*	Increased (associated with higher dengue incidence)	El Salvador	Joyce et al. (2021)	Forest Coverage and Socioeconomic Factors Associated with Dengue in El Salvador, 2011-2013
Land use type	Landscape	Human land use change, such as deforestation, increases habitat and vector adaptation	*Anopheles minimus*	Comeback in population after decline; linked to changing land use/ecology	India	Dev & Manguin, 2016	Biology, distribution and control of Anopheles (Cellia) minimus in the context of malaria transmission in northeastern India
Land use type	Landscape	Variation in land use types affecting mosquito abundance	*An. gambiae s.l, An. funestus, An. coustani, An. implexus and An. squamosus*	High mean densities of An. gambiae s.l was reported in farmland (20.4) while high mean abundance of An. funestus s.l (8.2) and An. coustani s.l (4.0) were observed in artificial forests	Kenya	Nicholas et al. (2021)	Abundance and Distribution of Malaria Vectors in Various Aquatic Habitats and Land Use Types in Kakamega County, Highlands of Western Kenya
Land use type	Landscape	Density of egg rafts, larvae and adult Culex pipiens mosquitoes in abundant in parks vs residential areas	*Culex pipiens s.l.*	Dependant on life stage (adults almost twice as abundant in parks (6624 captured) vs residential areas (3603), egg rafts and larvae were nearly three times and exclusively more prevalent in residential areas (2067 egg rafts and all 665 larvae))	Netherlands	Krol et al. (2024)	Distribution of Culex pipiens life stages across urban green and grey spaces in Leiden, The Netherlands
Landscape surface	Landscape	Water-holding features created by human activity in landscape surface such as burrow pits, drainage channels, livestock hoof prints, tire tracks	*Anopheles gambiae s.l.*	65% clustered habitats; major driver per landscape analysis	Kenya	Mutuku et al., 2006	Distribution, description, and local knowledge of larval habitats of Anopheles gambiae s.l., Kenya
Non-native planting	Landscape	higher densities of non-native planting (grasses and trees) in wealthier neighborhoods providing microclimates suitable for aedes in otherwise dry hot climate of Arizona	*Aedes aegypti*	Increased (association between increasing land cover by dense trees and trap counts of Ae. aegypti)	USA	Coalson et al. (2023)	Aedes aegypti abundance in urban neighborhoods of Maricopa County, Arizona, is linked to increasing socioeconomic status and tree cover
Properties with large outdoor areas	Landscape	Houses with more extensive yards or gardens	*Aedes aegypti*	Increased (higher outdoor abundance)	USA	Donnelly et al. (2020)	Quantifying sociodemographic heterogeneities in the distribution of aedes aegypti among California households
Properties with large outdoor areas	Landscape	Houses with larger outdoor areas	*Aedes aegypti*	Increased (associated with higher outdoor relative abundance)	USA	Juarez et al. (2021)	The eco-bio-social factors that modulate aedes aegypti abundance in south texas border communities
Proximity to livestock	Landscape	Houses closer to cowsheds	*Anopheles arabiensis, Culex quinquefasciatus*	Increased (significant predictor of mosquito occurrence)	Kenya	Muturi et al. (2008)	Diversity of riceland mosquitoes and factors affecting their occurrence and distribution in Mwea, Kenya
Proximity to livestock	Landscape	Cattle near houses	*Anopheles gambiae s.s., An. arabiensis, An. funestus*	Increased (modulated abundance, effect varied with species and sex)	Kenya	McCann et al. (2017)	Explaining variation in adult Anopheles indoor resting abundance: the relative effects of larval habitat proximity and insecticide-treated bed net use.
Proximity to livestock	Landscape	Presence of cattle near houses	Anophelines	Increased (2.32 times higher risk of house entry)	Laos	Hiscox et al. (2013)	Risk Factors for Mosquito House Entry in the Lao PDR
Temporary ponds	Landscape	Presence of temporary water bodies	Various species	Increased (highest species diversity found in temporary ponds)	Mexico	Dávalos-Becerril et al. (2019)	Urban and semi-urban mosquitoes of Mexico City: A risk for endemic mosquito-borne disease transmission
Tree coverage	Landscape	Tree coverage linked to increase in aedes mosquitoes	*Ae. mediovittatus*	Increased (positively predicted by the number of tree patches, but negatively predicted by large contiguous urban areas)	Puerto Rico	Little et al. (2011)	Co-occurrence Patterns of the Dengue Vector Aedes aegypti and Aedes mediovitattus, a Dengue Competent Mosquito in Puerto Rico
Tree height and shade	Landscape	Presence of tall trees and shaded areas	*Aedes aegypti*	Increased (33% incidence for 20–100 ft trees vs. 24% for 0–5 ft)	Puerto Rico	Waterman et al. (1985)	Dengue transmission in two Puerto Rican communities in 1982
Vegetation cover	Landscape	Containers surrounded by vegetation	*Aedes aegypti*	Increased (significantly associated with presence of immatures)	Brazil	Souza et al. (2023)	Density of Aedes aegypti (Diptera: Culicidae) in a low-income Brazilian urban community where dengue, Zika, and chikungunya viruses co-circulate
Vegetation cover	Landscape	Presence of vegetation surrounding homes	*Culex quinquefasciatus*	Increased (significantly influenced the increase in the number of egg rafts)	Brazil	Correia et al. (2012)	Residential characteristics aggravating infestation by Culex quinquefasciatus in a region of Northeastern Brazil
Vegetation cover	Landscape	Habitat with low tree/deciduous cover	*Aedes albopictus*	Increased abundance, positively associated in models	USA	Kache et al., 2020	Environmental determinants of Aedes albopictus abundance at northern limit in USA
Vegetation management	Landscape	In constructed wetlands, managing emergent vegetation by using heavy equipment to knock down and dry plants before flooding the area in autumn can boost water purification processes but also lead to increased mosquito breeding	*Culex sp., Culiseta sp.*	Increase (abundance of larval mosquitoes that had undergone autumnal vegetation management was significantly higher than in wetlands that remained in continuous operation)	USA	William E. Walton, Joshua A. Jiannino (2005)	VEGETATION MANAGEMENT TO STIMULATE DENITRIFICATION INCREASES MOSQUITO ABUNDANCE IN MULTIPURPOSE CONSTRUCTED TREATMENT WETLANDS
Vegetation type	Landscape	Presence of specific plant species for mosquito breathing and refuge	*Various species*	Increased (shade either required or detrimental depending on species)	Not specified	Rajagopalan et al. (2018)	Environmental and water management for mosquito control

Risk Factor	Category	Description	Mosquito Species	Effect on Mosquito Presence	Country	Study Authors and Date	Title
Water body management	Landscape	Unmanaged ditches, pools, sewage reedbeds and vegetation and incombination with high water table and permanent/seasonal flooding	*Aedes caspius, Aedes detritus, Culex pipiens*	Increase (these factors support high abundance of mosquitoes)	England	Medlock and Vaux (2015)	Impacts of the creation, expansion and management of English wetlands on mosquito presence and abundance: developing strategies for future disease mitigation
Water body management	Landscape	Wetland and agricultural water management, landscape use	*Aedes caspius, Culex modestus, Culex pipiens, Anopheles hyrcanus*	Species population dynamics strongly affected by water management	France	Ponçon et al., 2007	Mosquito population dynamics and human activities in Camargue, France
Water body management	Landscape	Permanent and temporary man-made habitats supporting vector breeding	*Anopheles funestus, An. quadriannulatus*	42.9% habitats permanent, 33.3% seasonal, mostly man-made; 70% An. funestus females anthropophagic	Zimbabwe	Zengenene et al., 2020	Anopheles Species Composition and Breeding Habitat Characterisation in Chiredzi District, Zimbabwe
Water body temporality	Landscape	Water bodies lasting a week or more	*Various species*	Increased (allows complete development from egg to adult)	Not specified	Rajagopalan et al. (2018)	Environmental and water management for mosquito control
Humidity	Other	Higher relative humidity	*Aedes aegypti*	Increased (significantly associated with infestations)	Brazil	Soares et al. (2019)	Spatial distribution of Aedes aegypti (Diptera: Culicidae) in vulnerable areas for the transmission of arboviruses
Humidity	Other	Areas with higher relative humidity	*Aedes aegypti*	Increased (significantly associated with dengue incidence, OR=4.571)	Indonesia	Yudhastuti et al. (2023)	The effect of water storage and humidity on the incidence of dengue hemorrhagic fever in the work area of the Kebayakan Health Center, Central Aceh Regency
Previous infestation	Other	Houses with previous record of infestation	*Aedes spp.*	Increased (199% higher odds of infestation)	Mexico	Monroy-Díaz et al. (2023)	House Condition Scoring Scale as a Risk Indicator of Infestation by Aedes in Two Mexican Localities
Air-conditioner Usage	User	Use of air conditioning	*Aedes aegypti*	Mixed (higher indoor abundance with less frequent use and higher outdoor abundance with more frequent use)	USA	Donnelly et al. (2020)	Quantifying sociodemographic heterogeneities in the distribution of aedes aegypti among California households
Income level	User	Areas with lower socioeconomic levels	*Aedes aegypti*	Increased (associated with higher dengue antibody prevalence)	Puerto Rico	Waterman et al. (1985)	Dengue transmission in two Puerto Rican communities in 1982
Income level	User	Areas with lower socioeconomic status	*Aedes aegypti*	Increased (higher outdoor abundance)	USA	Donnelly et al. (2020)	Quantifying sociodemographic heterogeneities in the distribution of aedes aegypti among California households
Property condition and maintenance	User	Poor house maintenance, untidy yards, and shading of yards	*Aedes spp.*	Increased (64% higher odds of infestation)	Mexico	Monroy-Díaz et al. (2023)	House Condition Scoring Scale as a Risk Indicator of Infestation by Aedes in Two Mexican Localities
Property condition and maintenance	User	Gardens and yards that are not regularly maintained and houses of older construction	*Aedes aegypti*	Increased (higher outdoor abundance)	USA	Donnelly et al. (2020)	Quantifying sociodemographic heterogeneities in the distribution of aedes aegypti among California households
Waste management	User	Presence of waste materials in public areas	*Aedes aegypti*	Increased (productive breeding sites in public areas)	Brazil	Souza et al. (2023)	Density of Aedes aegypti (Diptera: Culicidae) in a low-income Brazilian urban community where dengue, Zika, and chikungunya viruses co-circulate
Waste management	User	Weekly trash collection, household rubbish practices	*Aedes aegypti*	Linked to increased presence in multivariate analysis	Ecuador	Lippi et al., 2021	Exploring the utility of social-ecological and entomological risk factors for dengue infection, Machala
Waste management	User	Coconut shells, plastic containers, open wells, discarded tanks, flower pots	*Aedes albopictus, Aedes aegypti, Anopheles stephensi, Culex quinquefasciatus*	Increased indices: BI 36.02, PI 90.86; high dengue vector risk	India	Jayalakshmi et al., 2020	Distribution of mosquito fauna in Minicoy-Lakshadweep islands, India
Waste management	User	Socioeconomic variation and management influence	*Anopheles stephensi*	Part of synergistic risk for transmission	India	Santos-Vega et al., 2016	Population Density, Climate Variables and Poverty—Urban Malaria in India
Waste management	User	Cleaning of garbage dump less than every 7 days	Not specified	Increased (associated with higher dengue transmission)	Indonesia	Siregar & Makmur (2019)	Social-ecological risk determinant and prediction for dengue transmission
Waste management	User	Discarded plastic, coconut shells, tyres, and metal gardening containers	Aedes aegypti, Ae. bromeliae	Increased abundance and positive indices; 70–83% of all positives in plastic containers	Zanzibar	Kampango et al. (2021)	Risk factors for occurrence and abundance of Aedes aegypti and Aedes bromeliae at hotel compounds in Zanzibar
Waste management	User	Containers for storing water in homes and compounds; all sizes	Aedes aegypti	Major breeding and pupa productivity (>50% pupae)	Zanzibar	Saleh et al. (2018)	Habitat characteristics for immature stages of Aedes aegypti in Zanzibar City, Tanzania
Waste management	User	Metal tanks/buckets, tyres, outdoor and indoor	Aedes aegypti	High productivity; >90% of pupae in plastics, metal, and tyres	Zanzibar	Saleh et al. (2020)	Epidemic risk of arboviral diseases: Determining habitats, spatial-temporal distribution, and abundance of immature Aedes aegypti
Window and door use	User	Closing windows and doors at sunset	*An. Albimanus*	Decreased (this behavior with differences in house construction and insecticide treatments, likely contributed to the lower indoor presence of An. albimanus in northern Belize)	Belize	Roberts et al. (2002)	Spatial distribution of adult Anopheles darlingi and Anopheles albimanus in relation to riparian habitats in Belize, Central America
Algae presence	Water	Presence of algae in water bodies	*Anopheles pharoensis*	Increased (positively associated with larval abundance)	Ethiopia	Kenea et al. (2011)	Environmental factors associated with larval habitats of anopheline mosquitoes (diptera: Culicidae) in irrigation and major drainage areas in the middle course of the rift valley, central ethiopia
Cesspools	Water	Cesspools in rural areas	*Culex pipiens quinquefasciatus*	Increased (major breeding sites)	Kenya	Subra (1982)	The distribution and frequency of Culex pipiens quinquefasciatus Say 1823 (Diptera, Culicidae) breeding places on the Kenya Coast in relation to human sociological factors
Drains	Water	Man-made drainage systems	*Aedes vigilax*	Increased (larval densities almost 10 times greater)	Australia	Jacups et al. (2009)	A comparison of Aedes vigilax larval population densities and associated vegetation categories in a coastal wetland, Northern Territory, Australia.
Drains	Water	Presence of drains, especially with stagnant water	*Anopheles spp., Culex spp.*	Increased (odds of finding larvae 8.8 and 6.3 times larger in stagnant drains for Anopheles and Culex, respectively)	Tanzania	Castro et al. (2010)	The importance of drains for the larval development of lymphatic filariasis and malaria vectors in dares salaam, United Republic of Tanzania

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Gully traps	Water	Presence of gully traps in urban environments	*Aedes aegypti*	Increased (associated with higher abundance in public apartment blocks)	Singapore	Fernandez et al. (2023)	Features of the urban environment associated with Aedes aegypti abundance in high-rise public apartments in Singapore: An environmental case-control study
Interruptions to water service and shortages	Water	Frequent water supply interruptions	*Aedes aegypti*	Strong association with vector presence in households	Ecuador	Lippi et al., 2021	Utility of social-ecological and entomological risk factors for dengue infection, Machala
Interruptions to water service and shortages	Water	Temporary shortage of piped water supply	*Aedes spp.*	Increased (significant increase in water containers during shortage periods)	Thailand	Swaddiwudhipong et al. (1992)	Effect of health education on community participation in control of dengue hemorrhagic fever in an urban area of Thailand.
Irrigation practices	Water	Impact of irrigation methods on mosquito breeding habitats	*Anopheles spp.*	Increased (irrigated ecosystems had more habitats and higher larval densities)	Kenya	Orondo et al. (2023)	Habitat Diversity, Stability, and Productivity of Malaria Vectors in Irrigated and Nonirrigated Ecosystems in Western Kenya
Irrigation practices	Water	Agricultural and diverse water habitats	*Anopheles sinensis*	Key larval sites, no predictor for high density	Korea	Claborn et al., 2002	Environmental factors associated with larval habitats of malaria vectors in northern Kyunggi
Irrigation practices	Water	Large-scale rice irrigation schemes	*Anopheles gambiae s.s.*	Increased (larvae developed mostly in first 6 weeks after rice transplanting)	Mali	Klinkenberg et al. (2003)	The phenology of malaria mosquitoes in irrigated rice fields in Mali
Large volume water storage	Water	Laundry tanks, mostly outdoors and uncovered	*Aedes aegypti*	Increased (86.3% of 17,613 pupae found here)	Colombia	Carrillo et al., 2023	Risk of dengue, Zika, and chikungunya transmission in the metropolitan area of Cucuta, Colombia: cross-sectional analysis, baseline for a cluster-randomised controlled trial of a novel vector tool for water containers
Large volume water storage	Water	Tanks placed on the ground	*Aedes aegypti*	Increased (36.03% positivity)	Cuba	Fernández et al. (2011)	Bioecological studies of Aedes (St) aegypti in an urban area with low vector density in Camagüey province
Large volume water storage	Water	Presence of water storage tanks, particularly uncovered or partially covered	*Aedes aegypti*	Increased (99.03% of sites had at least one water deposit; 91.3% of positive low tanks were uncovered)	Cuba	Marquetti et al. (2007)	Risk factors of pupal infestation with community-based Aedes aegypti in a municipality of Havana City
Large volume water storage	Water	Small cement cistern water storage	*Culex pipiens quinquefasciatus*	Increased (major breeding sites)	Kenya	Subra (1982)	The distribution and frequency of Culex pipiens quinquefasciatus Say 1823 (Diptera, Culicidae) breeding places on the Kenya Coast in relation to human sociological factors
Large volume water storage	Water	Water storage containers on rooftops	*Aedes aegypti*	Increased (highest breeding preference ratio among container types)	Pakistan	Mukhtar et al. (2018)	Seasonal distribution and container preference ratio of the Dengue Fever Vector (Aedes aegypti, Diptera: Culicidae) in Rawalpindi, Pakistan
Low water flow rate and puddling	Water	Presence of puddles in public areas	*Aedes aegypti*	Increased (productive breeding sites in public areas)	Brazil	Souza et al. (2023)	Density of Aedes aegypti (Diptera: Culicidae) in a low-income Brazilian urban community where dengue, Zika, and chikungunya viruses co-circulate
Low water flow rate and puddling	Water	Stagnant or slow-moving water becoming larval breeding sites	*Various species*	Increased (preferred by most vector species)	Not specified	Rajagopalan et al. (2018)	Environmental and water management for mosquito control
Open sewage drainage	Water	Type of sewage drainage (to septic tank or open air)	*Culex quinquefasciatus*	Increased (most frequent aggravating factor in homes)	Brazil	Correia et al. (2012)	Residential characteristics aggravating infestation by Culex quinquefasciatus in a region of Northeastern Brazil
Pit latrines	Water	Presense of pit latrines in rural areas	*Culex pipiens quinquefasciatus*	Increased (major breeding sites)	Kenya	Subra (1982)	The distribution and frequency of Culex pipiens quinquefasciatus Say 1823 (Diptera, Culicidae) breeding places on the Kenya Coast in relation to human sociological factors
Pit latrines	Water	Houses closer to pit latrines	*Culex pipiens s.l.*	Increased (3% higher odds per meter closer)	The Gambia	Kirby et al. (2008)	Risk factors for house-entry by culicine mosquitoes in a rural town and satellite villages in the Gambia
Poor quality sanitation systems	Water	Latrines with damaged or improperly sealed septic tank covers	*Armigeres subalbatus*	Increased (strongly associated with mosquito presence)	Laos	Hiscox et al. (2016)	Armigeres subalbatus colonization of damaged pit latrines: A nuisance and potential health risk to residents of resettlement villages in Laos
Poor quality sanitation systems	Water	Urban sanitation and basic waste management	*Aedes aegypti*	Poor sanitation in metropoles facilitates breeding	Pakistan	Shabbir et al., 2020	A spatial-temporal study for the spread of dengue depending on climate factors in Pakistan
Poor sanitation infratructure	Water	Poor sanitation and waste management	*Aedes aegypti*	Increased (contributes to mosquito breeding)	Brazil	Penna (2003)	A challenge for the public health system in Brazil: dengue control
Sewage treatment reedbeds	Water	Presence of sewage treatment reedbeds	*Culex sp.*	Increased (significantly associated with sewage treatment reedbed system)	England	Medlock & Vaux (2014)	Colonization of a newly constructed urban wetland by mosquitoes in England: Implications for nuisance and vector species
Small volume water storage	Water	Artificial containers with large surface, volume, not covered, used for water/gardening/building	*Aedes aegypti*	Increase (25 of 522 outdoor containers positive)	Argentina	Flaibani et al., 2020	Approaches to characterize Aedes breeding sites using GLMM, Entre Ríos, Argentina
Small volume water storage	Water	Artificial containers outdoors with water, especially out of use or used for specific functions, with large opening surface and volume, without roof cover, and exposed to shadow	*Aedes aegypti, Culex pipiens complex*	High abundance of larvae; greatest risk in containers with large openings, high water volume, unused status, and without roof/sun/shadow cover	Argentina	Flaibani et al., 2020	Different approaches to characterize artificial breeding sites of Aedes aegypti using generalized linear mixed models
Small volume water storage	Water	Indoor containers for water storage on private property	*Aedes aegypti*	Significantly more pupae in indoor containers vs outdoor containers	Taiwan	Lin et al. (2018)	Location, seasonal, and functional characteristics of water holding containers with juvenile and pupal Aedes aegypti in Southern Taiwan

Risk Factor	Category	Description	Mosquito Species	Effect on Mosquito Presence	Country	Study Authors and Date	Title
Small volume water storage	Water	Water-containing containers without covers	*Aedes aegypti*	Increased (significantly associated with presence of immatures)	Brazil	Souza et al. (2023)	Density of Aedes aegypti (Diptera: Culicidae) in a low-income Brazilian urban community where dengue, Zika, and chikungunya viruses co-circulate
Small volume water storage	Water	Presence of water storage containers around homes	*Culex quinquefasciatus*	Increased (associated with higher mosquito densities)	Brazil	Correia et al. (2012)	Residential characteristics aggravating infestation by Culex quinquefasciatus in a region of Northeastern Brazil
Small volume water storage	Water	Presence of water storage drums	*Aedes aegypti*	Increased (33.8% infestation rate)	Caribbean	Nathan & Knudsen (1991)	Aedes aegypti infestation characteristics in several Caribbean countries and implications for integrated community-based control.
Small volume water storage	Water	Outside household containers for water storage	*Aedes aegypti, Aedes albopictus*	BI up to 246 pupae/100 houses; odds ratio adjusted 27.4 for outdoor sites	DR Congo	Wat'senga Tezzo et al., 2021	High Aedes spp. larval indices in Kinshasa, Democratic Republic of Congo
Small volume water storage	Water	Variety of urban water storage containers	*Aedes aegypti, Aedes albopictus*	Breeding peaks in rainy season, all types associated with risk	India	Pandey et al., 2024	Horizontal Distribution and Larval Habitat Potential of Invasive Aedes Mosquitoes in South Delhi, India
Small volume water storage	Water	Human water storage practices (city level)	*Anopheles stephensi*	Linked to hotspot transmission, urban malaria risk	India	Santos-Vega et al., 2016	Population Density, Climate Variables and Poverty—Urban Malaria in India
Small volume water storage	Water	Indoor/outdoor, urban poor locality, water storage	*Aedes aegypti*	Container index: 4.62, House index: 8.27, Breteau index: 9.53 (n=1112 houses & 2295 containers)	India	Poornima et al., 2024	A Descriptive Study on Larval Habitats…Urban Area of Bangalore
Small volume water storage	Water	Presence of water storage containers	*Aedes aegypti*	Increased (significantly associated with dengue incidence, OR=3.328)	Indonesia	Yudhastuti et al. (2023)	The effect of water storage and humidity on the incidence of dengue hemorrhagic fever in the work area of the Kebayakan Health Center, Central Aceh Regency
Small volume water storage	Water	Presence of open water containers	*Aedes spp.*	Increased (peri-urban and rural area, 63.0% and 27.9% of open containers respectively had larvae. No containers had covers)	Indonesia	Wiyata et al. (2023)	The Key Associated Factor of the Emergence of the Dengue Vector in Peri-Urban and Rural Settlements
Small volume water storage	Water	Buckets found to be the most common breeding container especially if not drained weekly indoors	*Aedes species*	Increased (Buckets most common site, risk increased if kept indoors and undrained for >1 week)	Indonesia	Agus Nurjana et al., 2023	Water containers and Aedes egg-laying in Maros Regency, Indonesia
Small volume water storage	Water	Containers holding rainwater with no intended household purpose	*Aedes species*	Increased (55.2% of all immatures found in water containers with no intended purpose; rainwater containers had 95.8% of immatures)	Kenya	Forsyth et al., 2020	Source reduction with a purpose: mosquito ecology and community perspectives, coastal Kenya
Small volume water storage	Water	Household water storage practices affecting mosquito breeding	*Aedes aegypti*	Increased (containers without lids and less frequent cleaning associated with higher infestation)	Laos and Thailand	Vannavong et al. (2017)	Effects of socio-demographic characteristics and household water management on Aedes aegypti production in suburban and rural villages in Laos and Thailand
Small volume water storage	Water	Unused/outdoor containers, small water tanks	*Aedes aegypti*	Productive breeding sites for vectors	Latin America	Quintero et al., 2014	Ecological, biological and social dimensions of dengue vector breeding, Latin America
Small volume water storage	Water	Main potential breeding containers indoors and outdoors (drums, paint cans, reservoirs, sheets)	*Aedes aegypti/albopictus*	Increased (Rural: container index 55, suburban 42, urban 32)	Malaysia	Saifur et al., 2013	Temporal and spatial distribution of dengue vector mosquitoes in Penang, Malaysia
Small volume water storage	Water	Presence of water storage habitats in urban areas	*Anopheles arabiensis, An. pharoensis, An. funestus s.l.*	Increased (permanent productive habitats year-round in urban centers)	Senegal	Ndiaye et al. (2024)	Distribution and dynamics of Anopheles gambiae s.l. larval habitats in three Senegalese cities with high urban malaria incidence
Small volume water storage	Water	Clay pots found as most productive containers for Aedes development	*Aedes aegypti, vittatus*	Increased (in one study town, 17.1% of 44,198 clay pots positive)	Sudan	Hamid et al., 2021	Stegomyia indices of Aedes aquatic stages in El Geneina, Western Sudan
Small volume water storage	Water	Numerous wet containers indoors/outdoors	*Aedes aegypti*	Strong association with abundance of immature stages	Thailand	Rahman et al., 2021	Ecological, social and other environmental determinants of dengue vector abundance, NE Thailand
Small volume water storage	Water	Presence of small volume water containers like outdoor drums, tubs, buckets, and small containers	*Aedes aegypti*	Increased (outdoor drums, tubs, buckets, and small containers, accounted for > 90% of all Ae. aegypti pupae)	Trinidad	Focks & Chadee (1997)	Pupal survey: an epidemiologically significant surveillance method for Aedes aegypti: an example using data from Trinidad.
Small volume water storage	Water	More containers with standing water around houses	*Aedes aegypti*	Increased (higher outdoor abundance)	USA	Donnelly et al. (2020)	Quantifying sociodemographic heterogeneities in the distribution of aedes aegypti among California households
Stormwater infrastructure	Water	Urban aquatic features: drainages, channels, ponds, runoff systems	*Culex quinquefasciatus*	Highest larval densities in managed drainage, 99% of specimens	Argentina	Pires & Gleiser, 2010	Mosquito fauna inhabiting water bodies in Córdoba after SLE outbreak
Stormwater infrastructure	Water	Presence of storm drains containing water	*Aedes aegypti, Aedes albopictus*	Increased (49% of storm drains contained water, serving as larval development and adult resting sites)	Brazil	Paploski et al. (2016)	Storm drains as larval development and adult resting sites for Aedes aegypti and Aedes albopictus in Salvador, Brazil
Stormwater infrastructure	Water	Catch basins and manhole chambers in dense drainage infrastructure	*Aedes albopictus, Culex pipiens complex*	CBs: 43.4% larvae-positive (8.23/dip), MCs: 14.2% (4.09/dip); vertical grate/unsealed lid designs associated	China	Gao et al., 2018	Aedes albopictus production in urban stormwater catch basins and manhole chambers…
Stormwater infrastructure	Water	Presence of street storm sewer catch basins	*Aedes albopictus, Culex pipiens, Culiseta longiareolata*	Increased (32% of water-containing catch basins hosted mosquito larvae)	Italy	Pombi et al. (2003)	Aedes albopictus (Diptera: Culicidae) in Rome: Experimental analysis of important parameters in control strategy
Stormwater infrastructure	Water	Presence of storm sewers	*Aedes aegypti, Culex spp.*	Increased (first record of Ae. aegypti breeding in storm sewers in southeast Mexico)	Mexico	Manrique-Saide et al. (2012)	Storm sewers as larval habitats for aedes aegypti and culex spp. in a neighborhood of Merida, Mexico
Stormwater infrastructure	Water	Urban drainage infrastructure at port, modified for biosecurity response	*Aedes albopictus*	Stormwater sumps "more abundant than expected," 43.4% larvae-positive samples CBs vs 14.2% in MCs	New Zealand	Holder et al., 2010	A biosecurity response to aedes albopictus (diptera: Culicidae) in Auckland, New Zealand
Stormwater infrastructure	Water	Presence of catch basins, especially with organic enrichment	*Culex pipiens s.l., Cx. torrentium*	Increased (more productive breeding habitats with higher concentrations of Na+ and NO3-)	Poland	Rydzanicz et al. (2016)	Assessment of productivity of Culex spp. larvae (Diptera: Culicidae) in urban storm water catch basin system in Wrocław (SW Poland)
Stormwater infrastructure	Water	Retention ponds, wetland complexity, absence of mosquitofish	*Culex erraticus, Cx. territans, Anopheles quadrimaculatus*	Mosquito occurrence in 34% facilities; absence of mosquitofish increases abundance (p<0.01)	USA	Apperson et al., 2005	Occurrence and abundance of mosquitoes in stormwater facilities, North Carolina

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Stormwater infrastructure	Water	Combined sewer systems. Older infrastructure collecting both sewage and stormwater	*Culex quinquefasciatus*	Increased (CSO-affected creek had median mosquito productivity of 7.5 late instar/pupae per sampling, compared to 0 in the control creek)	USA	Lund et al. (2014)	Long term impacts of combined sewer overflow remediation on water quality and population dynamics of Culex quinquefasciatus, the main urban West Nile virus vector in Atlanta, GA
Stormwater infrastructure	Water	Combined sewer and stormwater-only catch basins	*Culex pipiens*	Varied (higher larval abundance in combined sewers, but higher adult abundance in stormwater-only basins)	USA	Marini et al. (2020)	Production of culex pipiens in stormwater and combined sewer catch basins
Wastewater ponds	Water	Untreated wastewater ponds were larval habitats	*Culex spp., Anopheles spp.*	Increased (untreated wastewater ponds were productive habitats for mosquitoes)	Pakistan	Mukhtar et al. (2006)	Importance of waste stabilization ponds and wastewater irrigation in the generation of vector mosquitoes in Pakistan
Wastewater ponds	Water	Urban pools, lagoon, drain water, support broad habitat range	*Anopheles subpictus, others*	Mean DO in wastewater: 3.45 ±0.15 mg/l, An. subpictus: 92% of collection	Sri Lanka	Gunathilaka et al., 2019	A Comprehensive Analysis on Abundance, Distribution, and Bionomics of Potential Malaria Vectors in Mannar District of Sri Lanka
Wastewater ponds	Water	Ponds at dairy farms	*Culex nigripalpus, Culex quinquefasciatus*	Increased (seasonal variations in abundance)	USA	O'Meara et al. (2010)	Seasonal variation in the abundance of Culex nigripalpus and Culex quinquefasciatus in wastewater ponds at two Florida dairies
Water container type	Water	Different storage types and materials effect survival of mosquito eggs	*Aedes albopictus*	Varied (highest survival in sealed flowerpots, lowest in open covered areas)	USA	Jiang (2018)	Survival of overwintering aedes albopictus eggs under natural conditions in North-Central Florida
Water containing organic matter	Water	Containers with water containing organic matter	*Aedes aegypti*	Increased (significantly associated with presence of immatures)	Brazil	Souza et al. (2023)	Density of Aedes aegypti (Diptera: Culicidae) in a low-income Brazilian urban community where dengue, Zika, and chikungunya viruses co-circulate
Water containing organic matter	Water	High levels of organic matter in water	*Culex quinquefasciatus*	Increased (favored by this species)	Not specified	Rajagopalan et al. (2018)	Environmental and water management for mosquito control
Water flow	Water	Presence of water movement	*Anopheles arabiensis*	Decreased (inversely associated with larval abundance)	Ethiopia	Kenea et al. (2011)	Environmental factors associated with larval habitats of anopheline mosquitoes (diptera: Culicidae) in irrigation and major drainage areas in the middle course of the rift valley, central ethiopia
Water quality and temperature	Water	Higher water temperatures	*Anopheles pharoensis*	Increased (positively associated with larval abundance)	Ethiopia	Kenea et al. (2011)	Environmental factors associated with larval habitats of anopheline mosquitoes (diptera: Culicidae) in irrigation and major drainage areas in the middle course of the rift valley, central ethiopia
Water quality and temperature	Water	Influence of water quality and temperature on larval habitats	*Anopheles spp.*	Increased larval abundance associated with warmer temperatures and specific water quality parameters	Ethiopia	Mereta et al. (2013)	Physico-Chemical and biological characterization of anopheline mosquito larval habitats Diptera: Culicidae: Implications for malaria control
Water quality and temperature	Water	Urban polluted water adaptation	*Anopheles subpictus, Anopheles culicifacies*	Increased breeding and malaria risk in urban areas	Sri Lanka	Gunathilaka et al., 2015	Entomological investigations on malaria vectors in Sri Lanka
Water salinity	Water	Presence of salt in water bodies	*Coastal species (Anopheles melas, An. sundaicus)*	Increased (tolerated by these species)	Not specified	Rajagopalan et al. (2018)	Environmental and water management for mosquito control

Intervention Type	Category	Description	Mosquito Species	Effect of Intervention	Country	Study Authors and Date	Article Title
Ceiling design	Architecture	ceilings of papyrus mats and insecticide-treated netting (ITN)	*Anopheles gambiae s.l.,An. funestus*	Papyrus mats ceiling modification reduced house entry by Anopheles gambiae s.l and Anopheles funestus densities by between 78-80% and 86% respectively compared to unmodified houses.	Kenya	Atieli et al. (2009)	House design modifications reduce indoor resting malaria vector densities in rice irrigation scheme area in western Kenya
CFD informed insecticide use	Architecture	Simulation of insecticide vaporizer effectiveness	*Aedes albopictus*	Decreased (knock-down activity observed)	South Korea	Jung et al. (2021)	Comparative efficacy of commercial liquid and mat-type electric vaporizer insecticides against asian tiger mosquito (diptera: Culicidae)
Construction site environmental officer	Architecture	Construction sites in Singapore are mandated to engage with an environmental control officer, tasked with preventing vector disease transmission	*Aedes species*	Collective efforts have reduced by Singapore dengue control programme have reduced the dengue force of infection 10-fold by the 1990s and maintained this ever since	Singapore	Sim et al. (2020)	A greener vision for vector control: The example of the Singapore dengue control programme
Drone-based larval habitat detection	Architecture	Use of drones to identify mosquito breeding sites	*Nyssorhynchus darlingi*	No direct impact on mosquito density, but effective in identifying breeding sites	Peru	Carrasco-Escobar et al. (2019)	High-accuracy detection of malaria vector larval habitats using drone-based multispectral imagery
Eave Closure	Architecture	Closing open eaves of houses	*Anopheles gambiae s.l.*	Decreased (significant reduction in house entry)	Kenya	Mburu et al. (2018)	Impact of partially and fully closed eaves on house entry rates by mosquitoes
Eave Closure	Architecture	Closing open eaves of houses	*Anopheles spp.*	No effect on indoor densities	Kenya	Otambo et al. (2022)	Influence of landscape heterogeneity on entomological and parasitological indices of malaria in Kisumu, Western Kenya
Eave Closure	Architecture	Semi-field trial of insecticide-treated eave screens in huts, Kenya	*An. arabiensis, An. funestus*	Modelled mosquito numbers indoors nearly zero; treated screens cost $180/structure, last >15 years	Kenya	Abongo et al., 2024	Insecticide treated eaves screens provide additional marginal protection compared to untreated eave screens under semi-field conditions in western Kenya
Eave Closure	Architecture	Closing open eaves of houses	*Anopheles gambiae s.l.,Culex spp.*	Decreased forAn. gambiae, no effect forCulex spp.	The Gambia	Kirby et al. (2009)	Importance of eaves to house entry by anopheline, but not culicine, mosquitoes
Green roofs	Architecture	Installation of vegetation on rooftops	*Culex quinquefasciatus*	Decreased (lower abundance on green roofs compared to normal control roofs)	Hong Kong	Wong & Jim (2016)	Do vegetated rooftops attract more mosquitoes? Monitoring disease vector abundance on urban green roofs
House improvements	Architecture	Screening doors and windows, installing ceilings, closing holes	*Anopheles gambiae s.l.,An. funestus*	Decreased (reduced indoor densities and malaria transmission)	Cameroon	Nguela et al. (2020)	The effect of improved housing on indoor mosquito density and exposure to malaria in the rural community of Minkoameyos, Centre Region of Cameroon
House improvements	Architecture	Closing eaves, screening windows, use of wire mesh via community workshops, collective action	*Malaria vectors*	Community-based organizational structure, education, and voluntary action in multi-year intervention	Malawi	Van Den Berg H et al., 2018	Community-based malaria control in southern Malawi A description of experimental interventions of community workshops, house improvement and larval source management
House improvements	Architecture	Closing eaves, screening windows, and doorway modifications via community-led intervention	*Malaria vectors*	Incremental cost $27.04/person/year (HI-only); improved house structure protects against mosquitoes	Malawi	Phiri MD et al., 2021	Cost of community-led larval source management and house improvement for malaria control a cost analysis within a cluster-randomized trial in a rural district in Malawi
House improvements	Architecture	metal-roofed house, screened and ventilated	*Anopheles gambiae*	Decreased (lower indoor densities in improved houses)	The Gambia	Jatta et al. (2018)	How house design affects malaria mosquito density, temperature, and relative humidity: an experimental study in rural Gambia
House improvements	Architecture	Cement, wood, or metal walls, tiled or metal roof, and closed eaves	*Anopheles gambiae s.l.,An. funestus*	Decreased (reduced indoor densities and malaria incidence)	Uganda	Rek et al. (2018)	Rapid improvements to rural Ugandan housing and their association with malaria from intense to reduced transmission: a cohort study
House improvements	Architecture	screening of windows, doors, eaves, ceilings, or any combination of these; this was either alone, or in combination with roof modification or eave tube installation	*Various Anopheles species*	Mixed results depending on specific modifications	Various	Fox et al. (2022)	House modifications for preventing malaria
House improvements	Architecture	Modern homes with combinations of including closed eaves,, brick walls, tiled or metal roofs, or ceilings	*Various Anopheles species*	Decreased (lower risk of malaria infection in modern houses)	Various	Tusting et al. (2015)	The evidence for improving housing to reduce malaria: A systematic review and meta-analysis
House lure	Architecture	Using the house as a lure to attract mosquitoes and trap them in eaves tubes	*Anopheles gambiae s.l.*	Decreased (reduced entry and increased mortality)	Côte d'Ivoire	Barreaux et al. (2019)	Semi-field evaluation of the cumulative effects of a "lethal House Lure" on malaria mosquito mortality
Improved ventilation	Architecture	Assessing impact of ventilation on mosquito entry (in combination with indoor light and closed eaves)	*Anopheles arabiensis*	Decreased (99% fewer mosquitoes in well-ventilated huts)	Tanzania	Mmbando et al. (2022)	The effect of light and ventilation on house entry by Anopheles arabiensis sampled using light traps in Tanzania: an experimental hut study
Improved ventilation	Architecture	Effect of increased ventilation through screened windows on indoor temperature and mosquito density	*Anopheles gambiae s.l.*	Decreased (95% reduction with three windows)	The Gambia	Jatta et al. (2021)	Impact of increased ventilation on indoor temperature and malaria mosquito density: An experimental study in the Gambia
Improved ventilation	Architecture	Impact of ventilation on insecticide longevity in different hut types	*Anopheles quadrimaculatus*	Decreased insecticide effectiveness with increased ventilation	USA	Schoof et al. (1963)	DICHLORVOS AS A RESIDUAL FUMIGANT IN MUD, PLYWOOD AND BAMBOO HUTS.
Lighting design	Architecture	Indoor light visible from outside is an attractant of mosquitoes	*Anopheles arabiensis*	When indoor light was visible outside the huts, there was an 84% increase in the odds of collecting mosquitoes indoors compared with when it was not	Tanzania	Mmbando et al. (2022)	The effect of light and ventilation on house entry by Anopheles arabiensis sampled using light traps in Tanzania: an experimental hut study
Novel house design	Architecture	Novel house design with improved ventilation, screening and testing double storey variations	*Anopheles arabiensis, Anopheles gambiae, Culex quinquefasciatus, Mansonia species*	Decreased (96% reduction in mosquitoes in double-storey buildings; 77% in single-storey)	Tanzania	von Seidlein (2017)	Affordable house designs to improve health in rural Africa: a field study from northeastern Tanzania
Raising buildings	Architecture	Evaluating impact of raised houses on mosquito entry	*Anopheles gambiae*	Decreased (50% fewer mosquitoes in raised houses)	São Tomé and Príncipe	Charlwood et al. (2003)	Raised houses reduce mosquito bites
Raising buildings	Architecture	Testing effect of physical barriers under raised houses	*Anopheles gambiae s.l.,Mansonia spp.,Culex spp.*	Decreased forAn. gambiaeandMansonia, no effect forCulex	The Gambia	Carrasco-Tenezaca et al. (2024)	The effect of physical barriers under a raised house on mosquito entry: an experimental study in rural Gambia
Raising buildings	Architecture	Testing effect of house height on mosquito entry	*Anopheles gambiae*	Decreased (84% reduction in An. gambiae house entry at 3 m height compared to ground level)	The Gambia	Carrasco-Tenezaca et al. (2021)	The relationship between house height and mosquito house entry: an experimental study in rural Gambia
Screening	Architecture	Installation of screens on windows and doors	*Aedes aegypti*	Decreased (reduced indoor densities and exposure to vector bites)	Burkina Faso	Ouedraogo et al. (2017)	The first community-based intervention to prevent dengue fever in Burkina Faso: an impact evaluation study
Screening	Architecture	Installation of screens on windows, considering house location and characteristics	*Anopheles gambiae s.l., An. coluzzii, An. funestus*	Decreased (reduced indoor densities associated with screened windows)	Cameroon	Ngadjeu et al. (2020)	Influence of house characteristics on mosquito distribution and malaria transmission in the city of Yaoundé, Cameroon
Screening	Architecture	screening doors and windows with wire meshes	*Anopheles arabiensis*	Decreased (48% reduction in indoor density, 61% in malaria incidence)	Ethiopia	Getawen et al. (2018)	Exploring the impact of house screening intervention on entomological indices and incidence of malaria in Arba Minch town, southwest Ethiopia: A randomized control trial
Screening	Architecture	Installation of metal mesh screens on windows and doors, closing eave openings	*Anopheles arabiensis*	Decreased (40% reduction in overall indoor densities)	Ethiopia	Massebo & Lindtjørn (2013)	The effect of screening doors and windows on indoor density of Anopheles arabiensis in south-west Ethiopia: A randomized trial
Screening	Architecture	Installation of screens on windows and doors	*Anopheles gambiae s.l., An. funestus s.l.*	Study protocol, no results reported	Ethiopia	Belay et al. (2024)	Vectorial drivers of malaria transmission in Jabi Tehnan district, Amhara Regional State, Ethiopia
Screening	Architecture	Installation of wire-gauze or muslin screens on windows, doors, chimneys	*Anopheles*	Decrease in malaria incidents. 10/207 persons in intervention homes contracted malaria	Italy	Angelo Celli (1900)	The New Prophylaxis Against Malaria: Experiments in Latium
Screening	Architecture	Strong muslin screens on windows and regular destruction of indoor mosquitoes in convict dormitories	*Anopheles spp., Culex pipiens*	No cases of primary malaria on the island during intervention (prior year: 99 cases, of which 40 originated on island); dormitories free of Anopheles	Italy	Fermi & Tonsini, 1900	The Prophylaxis Of Malaria And The Destruction Of Mosquitoes In The Island Of Asinara
Screening	Architecture	Evaluating insecticide-treated netting for house screening	*Aedes aegypti*	Decreased (significant reductions in indoor mosquito presence)	Mexico	Che-Mendoza et al. (2018)	House screening with insecticide-treated netting provides sustained reductions in domestic populations of Aedes aegypti in Merida, Mexico
Screening	Architecture	Evaluating long-lasting insecticidal screens with targeted breeding site treatment	*Aedes aegypti*	Decreased (significant reductions in vector indices)	Mexico	Che-Mendoza et al. (2015)	Long-lasting insecticide-treated house screens and targeted treatment of productive breeding-sites for dengue vector control in Acapulco, Mexico
Screening	Architecture	Testing house screening against indoorAedes aegypti	*Aedes aegypti*	Decreased (44% reduction in indoorAe. aegyptiabundance)	Mexico	Manrique-Saide et al. (2021)	Protective effect of house screening against indoor Aedes aegypti in Mérida, Mexico: A cluster randomised controlled trial
Screening	Architecture	Installation of insecticide-treated screens on windows and doors	*Aedes aegypti*	Decreased (reduced indoor densities)	Mexico	Manrique-Saide et al. (2015)	Use of insecticide-treated house screens to reduce infestations of dengue virus vectors, Mexico
Screening	Architecture	Use of wide-mesh gauze impregnated with lambda-cyhalothrin covering wall openings in huts as a vector control method	*Anopheles darlingi*	Decreased (99-100% reduction in biting activity during first 5 months)	Suriname	Voorham et al. (1997)	The use of wide-mesh gauze impregnated with lambda-cyhalothrin covering wall openings in huts as a vector control method in Suriname
Screening	Architecture	Installation of window screens in combination with eave baffles treated with insecticides	*Anopheles funestus, An. arabiensis*	Decreased (greater proportions killed compared to IRS)	Tanzania	Killeen et al. (2017)	Control of malaria vector mosquitoes by insecticide-treated combinations of window screens and eave baffles

Intervention Type	Category	Description	Mosquito Species	Effect of Intervention	Country	Study Authors and Date	Article Title
Screening	Architecture	Testing insecticide-treated eave nets and window screens	*Not specified*	Study protocol, no results reported	Tanzania	Odufuwa et al. (2022)	Insecticide-treated eave nets and window screens for malaria control in Chalinze district, Tanzania: a study protocol for a household randomised control trial
Screening	Architecture	Partial mosquito-proofing of houses with screens and ceilings to reduce indoor densities of malaria mosquitoes	*Anopheles gambiae*	Decreased (reduced indoor densities of malaria vectors)	Tanzania	Ogoma et al. (2010)	Screening mosquito house entry points as a potential method for integrated control of endophagic filariasis, arbovirus and malaria vectors
Screening	Architecture	Installation of window screens	*Anopheles gambiae complex, Anopheles funestus group*	Decreased (significant reduction in biting densities)	Tanzania	Killeen et al. (2019)	Suppression of malaria vector densities and human infection prevalence associated with scale-up of mosquito-proofed housing in Dar es Salaam, Tanzania: re-analysis of an observational series of parasitological and entomological surveys
Screening	Architecture	Evaluation of security steel mesh for mosquito prevention in screen doors and windows	*Aedes aegypti*	Decreased (security steel mesh effective against mosquito entry)	Thailand	Chanbang et al. (2012)	Testing of security steel mesh on mosquito prevention
Screening	Architecture	Testing full screening vs screened ceilings	*Anopheles gambiae s.l.*	Decreased (59% reduction with full screening, 47% with ceilings)	The Gambia	Kirby et al. (2009)	Effect of two different house screening interventions on exposure to malaria vectors and on anaemia in children in The Gambia: a randomised controlled trial
Screening	Architecture	Testing combination of house screens with LLINs	*Anopheles funestus,An. arabiensis*	Decreased (68% fewer An. funestus, 63% fewer An. arabiensis)	Zambia	Saili et al. (2024)	House Screening Reduces Exposure to Indoor Host-Seeking and Biting Malaria Vectors: Evidence from Rural South-East Zambia
Trap positioning and distance optimization	Architecture	Placement of Biogents Sentinel traps in relation to premises condition	*Aedes aegypti*	N/A (study on trap efficacy, not intervention)	Australia	Staunton et al. (2019)	Trap Location and Premises Condition Influences on Aedes aegypti (Diptera: Culicidae) Catches Using Biogents Sentinel Traps during a 'Rear and Release' Program: Implications for Designing Surveillance Programs
Trap positioning and distance optimization	Architecture	Evaluation of Biogents Sentinel traps at varying distances from human-occupied huts for dengue vector control	*Aedes aegypti*	Decreased entry into huts; traps at portals of entry reduced entry by 69% compared to 31% in corners or vertices of huts	Thailand	Salazar et al. (2018)	Influence of location and distance of biogents sentinele traps from human-occupied experimental huts on Aedes aegypti recapture and entry into HutS
Zooprophylaxis (Separated livestock)	Architecture	Deliberation seperation of livestock from human dwellings	*An. arabiensis, An. pharoensis*	Decreased (HBR: 4.64 (separate), 8.45 (mixed); mean parasitemia: 15.0% (separate), 26.7% (mixed))	Ethiopia	Seyoum et al. (2012)	Impact of livestock on the abundance of malaria vectors, sporozoite rate, and malaria incidence in Ethiopia
Zooprophylaxis (Separated livestock)	Architecture	Deliberation seperation of livestock from human dwellings	*An. arabiensis, An. funestus*	Decreased (P. falciparum infection aOR 0.13 (95%CI 0.03–0.56) when cattle shed separated from house)	Zambia	Bulterys et al. (2009)	Risk factors for malaria infection and seropositivity in an area with declining malaria transmission: Zambia
3D screens	Components	Double-layer screens with 3D geometric structures that trap mosquitoes	*Anopheles stephensi*	Decreased (92% trapped, 100% blocked escape)	Not specified	Khattab et al. (2017)	3D mosquito screens to create window double screen traps for mosquito control
3D screens	Components	Three-dimensional window screens creating a double-screen trap	Anopheline mosquitoes	Decreased (effective in capturing malaria vectors in semi-field conditions)	Tanzania	Kathet et al. (2023)	Efficacy of 3D screens for sustainable mosquito control: a semi-field experimental hut evaluation in northeastern Tanzania
Acoustic ultrasonic to kill larvae	Components	Larvasonic device using ultrasonic waves	*Aedes aegypti*	Decreased (100% larval mortality at 60 cm distance after 180 seconds exposure)	Laboratory study	Kalimuthu et al. (2020)	Ultrasonic technology applied against mosquito larvae
Attractive targeted sugar bait (ATSB) stations	Components	Evaluation of ATSB stations for killing malaria vectors	*Anopheles gambiae s.s. (Kisumu strain)*	Decreased (high bioefficacy maintained over 7 months, with 83.9% combined mortality)	Zambia	Mwaanga et al. (2024)	Residual bioefficacy of attractive targeted sugar bait stations targeting malaria vectors during seasonal deployment in Western Province of Zambia
Bednet fan	Components	Effects of indoor air movement and ambient temperature on mosquito behavior around bed nets	*Anopheles gambiae*	Altered mosquito behavior (reduced activity on net roof with air movement)	Laboratory study	Sutcliffe & Yin (2021)	Effects of indoor air movement and ambient temperature on mosquito (Anopheles gambiae) behaviour around bed nets: implications for malaria prevention initiatives
Ceiling design	Components	Installation of ceilings or closing eaves to reduce mosquito entry into huts	*Anopheles gambiae, Mansonia spp.*	Decreased (59-80% reduction in entry depending on ceiling type)	The Gambia	Lindsay et al. (2003)	Changes in house design reduce exposure to malaria mosquitoes.
Ceiling design	Components	Impact of the presence of ceilings in bedrooms on malaria mosquitoes	*Anopheles gambiae*	Descreased (A smaller proportion ofbedrooms with ceilings (14/IOO) had malaria vectors than did roomswithout ceilings (11/34))	The Gambia	Lindsay et al. (1990)	Malaria in a peri-urban area of The Gambia
Designing with mosquito resting preference	Components	Mapping indoor resting behavior of mosquitoes and treating lower wall zones with insecticides in urban areas for dengue control in Recife, Brazil	*Aedes aegypti*	Decreased; up to 85% cumulative mortality recorded after treating bottom walls	Brazil	Facchinelli et al. (2023)	Mapping Aedes aegypti indoor resting behavior reveals a preference vulnerable to householder-led vector control
Designing with mosquito resting preference	Components	Assessment of mosquito resting preferences on different wall colors and fabrics inside houses	*Anopheles gambiae complex*	White walls most preferred, followed by red, yellow, black, blue, and green fabrics; cloth-covered walls attracted more mosquitoes than bare walls	Kenya	Mutinga et al. (1995)	Choice of resting sites by Anopheles gambiae (Diptera: Culici) in Mwea Rice Irrigation Scheme, Kirinyaga District, Kenya.
Double door screened entrance	Components	Installation of portable mosquito-proof hut with double door entrance	*Anopheles gambiae*	Decreased (100% protection in semi-field and field settings)	Tanzania	Swai et al. (2016)	Studies on mosquito biting risk among migratory rice farmers in rural south-eastern Tanzania and development of a portable mosquito-proof hut
Eave Baffles	Components	Insecticide-treated eave baffles in combination with window screening	*Anopheles funestus, An. arabiensis*	Decreased (greater proportions killed compared to IRS)	Tanzania	Killeen et al. (2017)	Control of malaria vector mosquitoes by insecticide-treated combinations of window screens and eave baffles
Eave Baffles	Components	Modified eave gaps with baffles to funnel mosquito entry and reduce escape rates in experimental huts	*Anopheles arabiensis, Culex quinquefasciatus*	Reduced escape rates by 50%; validated assumptions about traditional hut designs	Tanzania	Oxborough et al. (2015)	Modified veranda-trap hut for improved evaluation of vector control interventions.
Eave ribbons	Components	Hessian ribbons treated with transfluthrin and wrapped around eaves	*Anopheles arabiensis, Anopheles funestus*	Decreased (>99% reduction in indoor and outdoor biting for An. arabiensis, 42-40% for An. funestus)	Tanzania	Mmbando et al. (2018)	Eave ribbons treated with the spatial repellent, transfluthrin, can effectively protect against indoor-biting and outdoor-biting malaria mosquitoes.
Eave tubes	Components	PVC pipes with insecticide-treated netting inserted into house walls at eave level	Not specified (study protocol)	Study protocol, no results reported	Côte d'Ivoire	N'Guessan et al. (2023)	EaveTubes for control of vector-borne diseases in Côte d'Ivoire: study protocol for a cluster randomized controlled trial
Eave tubes	Components	PVC pipes with insecticide-treated netting inserted into house walls at eave level	*Anopheles gambiae s.s., Anopheles arabiensis*	Decreased (significant reductions in house entry for both species)	Kenya	Snetselaar et al. (2017)	Eave tubes for malaria control in Africa: Prototyping and evaluation against Anopheles gambiae s.s. and Anopheles arabiensis under semi-field conditions in western Kenya Lucy Tusting, Jo Lines
Electric Fields	Components	Insulated conductor wires generating electric fields to repel mosquitoes indoors	*Aedes aegypti*	Decreased (over 50% repellency at EF strengths ≥3.66 kV/cm)	Laboratory study	Jobe et al. (2024)	Repelling Aedes aegypti mosquitoes with electric fields using insulated conductor wires
Electric Fields	Components	Electric field screens using charged conductor wires as physical barriers against mosquitoes entering houses through open windows or doors with airflow maintained indoors via ICWs setup configurations tested under variable wind speeds	*Aedes albopictus (Asian tiger mosquito) and Culex pipiens (house mosquito)1*	Decreased (100% capture of mosquitoes at ≥1.2 kV, despite wind speeds of 7 m/s)1	Not specified	Matsuda et al.(2015).	Safe housing ensured by an electric field screen that excludes insect-net permeating haematophagous mosquitoes carrying human pathogens
Improved doors	Components	Prototype screened doors and windows to reduce mosquito entry and improve indoor climate	Not specified (Plasmodium falciparum vectors targeted indirectly via reduced exposure indoors)	Reduced house-entering mosquitoes by 59–77% across different prototypes	The Gambia	Jawara et al. (2018)	New prototype screened doors and windows for excluding mosquitoes from houses: A pilot study in rural Gambia
Insecticidal paint	Components	Insecticide paint containing organophosphates and insect growth regulator	*Anopheles gambiae, Culex quinquefasciatus*	Decreased (90-100% mortality for up to 9 months in field conditions)	Benin	Mosqueira et al. (2010b)	Efficacy of an insecticide paint against malaria vectors and nuisance in West Africa--part 2: field evaluation.
Insecticidal paint	Components	Spatial mortality assessments of organophosphate-based insecticide paint in experimental huts	*Anopheles gambiae, Culex quinquefasciatus*	Decreased (96-100% mortality up to 12 months at 1 m distance from treated surfaces)	Benin	Mosqueira et al. (2013)	Proposed use of spatial mortality assessments as part of the pesticide evaluation scheme for vector control
Insecticidal paint	Components	Entomopathogenic fungus Beauveria bassiana applied to window netting	*Culex quinquefasciatus*	Decreased (reduction in blood feeding, no significant mortality increase)	Benin	Howard et al. (2010)	The entomopathogenic fungus Beauveria bassiana reduces instantaneous blood feeding in wild multi-insecticide-resistant Culex quinquefasciatus mosquitoes in Benin, West Africa
Insecticidal paint	Components	Organophosphate-based insecticide paint combined with LLINs for pyrethroid-resistant vectors	*Anopheles coluzzii*	Decreased (99.9-100% mortality for 6 months; reduced efficacy after 12 months)	Burkina Faso	Mosqueira et al. (2015)	Pilot study on the combination of an organophosphate-based insecticide paint and pyrethroid-treated long lasting nets against pyrethroid resistant malaria vectors in Burkina Faso
Insecticidal paint	Components	Organophosphate-based insecticide paint applied on windows and doors	*Anopheles coluzzii*	Decreased (100% mortality for 1 month, efficacy reduced afterwards)	Burkina Faso	Poda et al. (2018)	Targeted application of an organophosphate-based paint applied on windows and doors against Anopheles coluzzii resistant to pyrethroids under real life conditions in Vallée du Kou, Burkina Faso (West Africa)
Insecticidal paint	Components	Transfluthrin-based insecticide paint for community-based dengue and Zika control	*Aedes aegypti*	Decreased (effective for one year in lab and semi-field conditions, 98% perceived reduction by residents)	Cabo Verde	Gómez et al. (2024)	Insecticide paints: a new community strategy for controlling dengue and zika mosquito vectors in Cabo Verde
Insecticidal paint	Components	Insecticide paints as a community strategy for controlling dengue and zika vectors	*Aedes aegypti*	Decreased (effective against wild Ae. aegypti for one year; high resident satisfaction reported)	Cabo Verde	Gómez et al. (2024)	Insecticide paints: a new community strategy for controlling dengue and zika mosquito vectors in Cabo Verde
Insecticidal paint	Components	Slow-release insecticidal paint with excito-repellency and toxicity effects	*Aedes aegypti, Anopheles stephensi, Culex quinquefasciatus*	Decreased (strong excito-repellency and behavioral avoidance)	India	Dhiman et al. (2021)	Behavioural response of mosquito vectors Aedes aegypti, Anopheles stephensi and Culex quinquefasciatus to synthetic pyrethroid and organophosphorus-based slow-release insecticidal paint

Intervention Type	Category	Description	Mosquito Species	Effect of Intervention	Country	Study Authors and Date	Article Title
Insecticidal paint	Components	Review of insecticidal paint as an integrated vector management strategy in India	*Anopheles, Aedes, Culex species (general review)*	Review article, no specific results reported yet for field efficacy	India	Singh et al. (2024)	Insecticidal paint: An alternate integrated vector management strategy for mosquito control
Insecticidal paint	Components	Insecticide paint containing organophosphates and insect growth regulator	*Culex quinquefasciatus*	Decreased (high mortality rates against susceptible and resistant strains)	Laboratory study	Mosqueira et al. (2010a)	Efficacy of an insecticide paint against insecticide-susceptible and resistant mosquitoes - part 1: laboratory evaluation.
Insecticidal paint	Components	Insecticidal paints made with mineral powders or conventional acrylic paint binder	Not specified	Decreased (extended efficacy comparable to DDT under accelerated aging conditions)	Not specified	Sibanda et al. (2011)	Degradation of insecticides used for indoor spraying in malaria control and possible solutions
Insecticidal paint	Components	Water-based paint with java citronella oil	*Aedes aegypti*	Decreased (80% repellency with 20% citronella oil composition)	Not specified	Abd Manaf et al. (2014)	Water based paint with java citronella oil as mosquito repellent agent
Insecticidal paint	Components	Measured efficacy and environmental impacts of transfluthrin-based insecticidal paints	Non-biting aquatic insects (Smicridea fasciatella)	Effective under indirect UV exposure; coarse textures maintained high efficacy over time	USA	Cavallaro et al. (2022)	Measured efficacy, bioaccumulation, and leaching of a transfluthrin-based insecticidal paint: a case study with a nuisance, nonbiting aquatic insect
Insecticide treated ceiling nets	Components	Insecticide-treated ceiling nets	Anopheline mosquitoes	Decreased (53% reduction in malaria prevalence, 59% reduction in vector density)	Kenya	Minakawa et al. (2022)	Effectiveness of screened ceilings over the current best practice in reducing malaria prevalence in western Kenya: a cluster randomized-controlled trial
Insecticide treated ceiling nets	Components	Installation of Olyset®Plus ceiling nets to reduce malaria prevalence	Not specified (Anopheles vectors)	Study protocol, no results reported yet	Kenya	Kagaya et al. (2023)	Evaluation of the protective efficacy of Olyset®Plus ceiling net on reducing malaria prevalence in children in Lake Victoria Basin, Kenya: study protocol for a cluster-randomized controlled trial
Insecticide treated ceiling nets	Components	Insecticide-impregnated ceiling nets to prevent mosquito entry through ceilings and eaves	Not specified (Anopheles vectors)	Decreased (reduced mosquito densities indoors for 9 months)	Kenya	Kawada et al. (2012)	Preliminary evaluation of insecticide-impregnated ceiling nets with coarse mesh size as a barrier against the invasion of malaria vectors.
Insecticide treated curtains	Components	Insecticide-treated curtains for malaria control and child mortality reduction over six years	Not specified (Plasmodium falciparum vectors)	Decreased child mortality by 19-24% over six years of use	Burkina Faso	Diallo et al. (2004)	Child mortality in a West African population protected with insecticide-treated curtains for a period of up to 6 years
Insecticide treated curtains	Components	Comparative evaluation of carbosulfan- and permethrin-treated curtains for reducing indoor mosquito densities in houses near Ouagadougou, Burkina Faso	*Anopheles gambiae s.l. (An. arabiensis, M- and S-forms of An. gambiae s.s.)*	Decreased; carbosulfan-treated curtains were three times more effective than permethrin-treated ones but raised safety concerns for use in malaria control	Burkina Faso	Fanello et al. (2003)	Comparative evaluation of carbosulfan- and permethrin-impregnated curtains for preventing house-entry by the malaria vector Anopheles gambiae in Burkina Faso
Insecticide treated curtains	Components	Permethrin-impregnated curtains	*Anopheles gambiae s.l., Anopheles funestus*	Decreased (prevention of indoor-resting mosquitoes for about a year)	Burkina Faso	Majori et al. (1987)	Efficacy of permethrin-impregnated curtains for malaria vector control
Insecticide treated curtains	Components	Long-lasting insecticide-treated curtains and water container covers	*Aedes aegypti*	Decreased (significant reduction in dengue vector density)	Colombia	Quintero et al. (2015)	Effectiveness and feasibility of long-lasting insecticide-treated curtains and water container covers for dengue vector control in Colombia: A cluster randomised trial
Insecticide treated curtains	Components	Insecticide treated curtains in cluster randomized trial (Guantanamo, Cuba)	*Aedes species*	No significant impact—HI rate ratio 1.15 (95% CI: 0.57–2.34); coverage 97.4% after 18 months	Cuba	Toledo ME et al., 2015	No effect of insecticide treated curtain deployment on aedes infestation in a cluster randomized trial in a setting of low dengue transmission in Guantanamo, Cuba
Insecticide treated curtains	Components	Insecticide-treated curtains and targeted interventions on productive breeding sites	*Aedes aegypti*	Decreased (significant reductions in total pupae and House index)	Guatemala	Rizzo et al. (2012)	Dengue vector management using insecticide treated materials and targeted interventions on productive breeding-sites in Guatemala
Insecticide treated curtains	Components	Evaluation of deltamethrin-treated curtains for controlling mosquitoes and domestic pests in urban settings	*Anopheles stephensi, Aedes aegypti*	Decreased; 87.9-93.7% reduction in target species densities; malaria incidence reduced by 95.4%	India	Ansari & Razdan (2001)	Concurrent control of mosquitoes and domestic pests by use of deltamethrin-treated curtains in the New Delhi Municipal Committee, India
Insecticide treated curtains	Components	Use of insecticide-treated nets and curtains to reduce malaria incidence in rural villages	*Anopheles stephensi, Anopheles subpictus s.l., vectors of Plasmodium vivax and P. falciparum*	Decreased; higher reductions in malaria cases and mosquito densities compared to control villages	India	Mohanty & Kanojia (2023)	Decline of Malaria Incidence in Three Villages of Thar Desert, India: the Impact of Use of Insecticide-Treated Nets
Insecticide treated curtains	Components	Alphacypermethrin-treated jute curtains installed on windows, doors, and eaves	*Anopheles stephensi, Aedes aegypti, Culex quinquefasciatus*	Decreased (significant reduction in indoor resting mosquitoes and malaria incidence)	India	Ansari & Razdan (2002)	Operational Feasibility and Bio-efficacy of Alphacypermethrin (Fendona) Treated Jute Curtains to Control Urban Malaria in a Slum Settlement of Delhi, India
Insecticide treated curtains	Components	Permethrin-impregnated bed nets and curtains for malaria control	*Anopheles gambiae s.l., An. funestus*	Decreased (40-48% reduction in P. falciparum infections with bed nets, 10-33% with curtains)	Kenya	Beach et al. (1993)	Effectiveness of permethrin-impregnated bed nets and curtains for malaria control in a holoendemic area of western Kenya
Insecticide treated curtains	Components	Insecticide-treated curtains for dengue vector control	*Aedes aegypti*	Decreased (reduced indoor densities in rural areas, less effective in urban/suburban areas)	Mexico	Loroño-Pino et al. (2018)	The Use of Insecticide-Treated Curtains for Control of Aedes aegypti and Dengue Virus Transmission in "Fraccionamiento" Style Houses in México
Insecticide treated curtains	Components	Insecticide-treated curtains and water container covers	*Aedes aegypti*	Decreased (significant reduction in entomological indices)	Mexico and Venezuela	Kroeger et al. (2006)	Effective control of dengue vectors with curtains and water container covers treated with insecticide in Mexico and Venezuela: Cluster randomised trials
Insecticide treated curtains	Components	Insecticide-treated curtains for dengue vector control	*Aedes aegypti*	No consistent effect on entomological indices; lower oviposition during wet season	Thailand	Lenhart et al. (2013)	A cluster-randomized trial of insecticide-treated curtains for dengue vector control in Thailand
Insecticide treated curtains	Components	Insecticide-treated window curtains, cluster-randomized trial	*Aedes species*	ITM arms always had lower indices than external control; longevity of effect depends on coverage	Venezuela	Lenhart A et al., 2022	Evaluation of insecticide treated window curtains and water container covers for dengue vector control in a large-scale clusterrandomized trial in Venezuela
Insecticide treated curtains	Components	Long-lasting insecticide treated curtains and water jar-covers	*Aedes aegypti*	Decreased (significant reductions in vector indices with sufficient coverage)	Venezuela	Vanlerberghe et al. (2011)	Evaluation of the effectiveness of insecticide treated materials for household level dengue vector control
Insecticide treated eaves ribbons	Components	Use of hessian ribbons treated with insecticide around eaves for malaria vector control in low-income communities	*Anopheles arabiensis, Anopheles funestus*	Decreased (>99% reduction in biting for An. arabiensis, significant reduction for An. funestus)	Tanzania	Kaindoa et al. (2021)	Insecticide-treated eave ribbons for malaria vector control in low-income communities
Insecticide treated eaves screens	Components	Installation of insecticide-treated eave screens	*Anopheles funestus, An. arabiensis*	Decreased (significant reduction in indoor mosquito densities)	Kenya	Abong'o et al. (2022)	Screening eaves of houses reduces indoor mosquito density in rural, western Kenya
Insecticide treated materials and ornaments	Components	Evaluation of ACTELLIC 50 EC (pirimiphos methyl) for indoor residual spraying	*Anopheles gambiae s.l.*	Decreased (susceptible to the insecticide for 15 weeks on painted cement surfaces)	Ghana	Fuseini et al. (2011)	The efficacy of ACTELLIC 50 EC, pirimiphos methyl, for indoor residual spraying in Ahafo, Ghana: Area of high vector resistance to pyrethroids and organochlorines
Insecticide treated materials and ornaments	Components	Use of vertical mesh barriers along house perimeters to reduce mosquito biting rates near houses in rural settlements	*Culex perexiguus, other mosquito species not specified fully (Cx. pipiens)*	Decreased (Cx. perexiguus reduced significantly near protected houses; no significant effect on other species like Cx. pipiens)	Israel	Faiman & Warburg (2012)	Insecticide-treated vertical mesh barriers reduce the number of biting mosquitoes
Insecticide treated materials and ornaments	Components	Transfluthrin-treated sisal decorative baskets and hessian wall decorations	*Anopheles arabiensis, Culex spp.*	Decreased (86-89% reduction for An. arabiensis, 56-66% for Culex spp.)	Tanzania	Masalu et al. (2017)	Efficacy and user acceptability of transfluthrin-treated sisal and hessian decorations for protecting against mosquito bites in outdoor bars
Insecticide treated wall linings	Components	Evaluation of organophosphate-treated wall linings combined with LLINs against pyrethroid-resistant mosquitoes in experimental huts	*Anopheles gambiae s.s. (pyrethroid-resistant population)*	Decreased (>95% mortality with p-methyl DL/NWH alone; reduced biting rates when combined with LLINs)	Burkina Faso	Ngufor et al. (2014a)	Combining organophosphate treated wall linings and long-lasting insecticidal nets for improved control of pyrethroid resistant Anopheles gambiae
Insecticide treated wall linings	Components	Field evaluation of pyrethroid-treated plastic sheeting combined with LLINs in experimental huts	*Anopheles gambiae s.s. (S and M molecular forms)*	Decreased (inferior to LLINs alone; limited additional protection with combination)	Burkina Faso	Chandre et al. (2010)	Field efficacy of pyrethroid treated plastic sheeting (durable lining) in combination with long lasting insecticidal nets against malaria vectors
Insecticide treated wall linings	Components	Evaluation of organophosphate-treated wall linings combined with LLINs against multiple insecticide-resistant mosquitoes in experimental huts	*Anopheles gambiae s.s. (resistant population)*	No additional control benefit over LLINs alone; resistance management not achieved with combination treatments	Côte d'Ivoire	Ngufor et al. (2014b)	Combining organophosphate-treated wall linings and long-lasting insecticidal nets fails to provide additional control over long-lasting insecticidal nets alone against multiple insecticide-resistant Anopheles gambiae in Côte d'Ivoire: an experimental hut trial.
Insecticide treated wall linings	Components	Evaluation of permethrin-impregnated wall cloth (Mbu cloth) for mosquito control	*Anopheles gambiae s.l., Culex quinquefasciatus, Aedes aegypti*	Decreased (effective for 6 months against An. gambiae, 4 months for Cx. quinquefasciatus, and 10 months for Ae. aegypti)	Kenya	Mutinga et al. (1992)	Evaluation of the residual efficacy of permethrin-impregnated screens used against mosquitoes in Marigat, Baringo District, Kenya
Insecticide treated wall linings	Components	Permethrin-impregnated nylon-netting wall-curtains	*Anopheles gambiae s.l., An. funestus*	Decreased (lowered biting rates inside curtained houses, reduced parasitemia in children)	Mozambique	Crook & Baptista (1995)	The effect of permethrin-impregnated wall-curtains on malaria transmission and morbidity in the suburbs of Maputo, Mozambique
Insecticide treated wall linings	Components	Durable wall lining containing insecticides, experimental hut evaluation	*An. gambiae, An. funestus*	40–50% mortality in field trial, 90% mortality with 30 min bioassay; effect limited by resistance	Tanzania	Malima et al., 2017	Experimental hut evaluation of a novel long-lasting non-pyrethroid durable wall lining for control of pyrethroid-resistant Anopheles gambiae and Anopheles funestus in Tanzania
Insecticide treated wall linings	Components	Evaluation of non-pyrethroid ITWL for malaria vector control in experimental huts	*Anopheles gambiae s.l., Anopheles funestus*	Decreased (40-50% mortality; low efficacy attributed to pyrethroid resistance)	Tanzania	Malima et al. (2017)	Experimental hut evaluation of a novel long-lasting non-pyrethroid durable wall lining for control of pyrethroid-resistant Anopheles gambiae and Anopheles funestus in Tanzania.
Insecticide treated wall linings	Components	Assessment of non-pyrethroid ITWL on the age structure of malaria vectors	*Anopheles gambiae s.l., Anopheles funestus*	Limited impact on age structure; higher proportions of parous mosquitoes in intervention clusters observed unexpectedly	Tanzania	Emidi et al. (2017)	Impact of non-pyrethroid insecticide treated durable wall lining on age structure of malaria vectors in Muheza, Tanzania
Insecticide treated wall linings	Components	Experimental hut study evaluating net wall hangings treated with organophosphate insecticides for malaria vector control	*Anopheles gambiae, Anopheles funestus*	Decreased (>90% mortality with pirimiphos-methyl-treated NWH compared to pyrethroid-treated NWH)	Tanzania	Ngufor et al. (2014)	Insecticide-treated net wall hangings for malaria vector control: An experimental hut study in north-eastern Tanzania
Insecticide treated wall linings	Components	Non-pyrethroid insecticide-treated durable wall liners	*Anopheles gambiae s.l., An. funestus*	Baseline study, no intervention results reported	Tanzania	Mugasa et al. (2015)	The effectiveness of non-pyrethroid insecticide-treated durable wall liners as a method for malaria control in endemic rural Tanzania: a cluster randomized trial in Northern Eastern Tanzania: results of the baseline survey
Insecticide-treated eave curtains	Components	Installation of insecticide-treated curtains in eaves	*Anopheles funestus,An. arabiensis*	Decreased (reduced indoor densities)	Kenya	Odhiambo et al. (2016)	Supplementary effect and durability of prototype insecticide-treated eave curtains on indoor resting mosquitoes in Kadibo division, Western Kenya.

Intervention Type	Category	Description	Mosquito Species	Effect of Intervention	Country	Study Authors and Date	Article Title
Material impact on insecticide performance	Components	Evaluation of bendiocarb WP, lambda-cyhalothrin CS, and deltamethrin WG on different wall surfaces	*Anopheles gambiae s.l.*	higher efficacy on mud walls compared to concrete, with 100% mosquito mortality on mud for 9 months versus 6 months on concrete	Cameroon	Etang et al. (2011)	Variations of insecticide residual bio-efficacy on different types of walls: Results from a community-based trial in south Cameroon
Material impact on insecticide performance	Components	Deltamethrin spraying on different wall surfaces	*Anopheles minimus, An. sinensis, Culex pipiens quinquefasciatus*	Lasted over 40 days on bamboo and wood, cement with lime (50% mortality by day 20), and only 40% mortality on the spraying day mud walls	China	Zaixing & Cangjiang (1996)	Application of deltamethrin-impregnated bednets for mosquito and malaria control in Yunnan, China
Material impact on insecticide performance	Components	Pirimiphos-methyl CS formulation for indoor residual spraying	*Anopheles gambiae*	Decreased (effective against resistant strains on various substrates)	Côte d'Ivoire	Fodjo et al. (2024)	Efficacy of Pirikool® 300 CS used for indoor residual spraying on three different substrates in semi-field experimental conditions
Material impact on insecticide performance	Components	Residual bio-efficacy of insecticides sprayed on common wall surfaces against leishmaniasis and filariasis vectors in rural homes	*Phlebotomus papatasi, Culex pipiens*	Decreased (>80% mortality for up to 10-12 weeks depending on surface type)	Egypt	Kassem et al. (2019)	Residual efficacy of insecticides sprayed on different types of surfaces against leishmaniasis and filariasis vectors in Egypt
Material impact on insecticide performance	Components	Residual efficacy of Fludora Fusion against insecticide-susceptible malaria vectors in huts with various surface types	*Anopheles arabiensis*	Decreased (over 80% mortality) for 12 months on painted, dung, smooth mud, and rough mud surfaces, with slight variations in performance depending on the wall type	Ethiopia	Animut & Horstmann (2022)	Residual efficacy of Fludora Fusion against Anopheles arabiensis in simple huts in Ethiopia
Material impact on insecticide performance	Components	Testing propoxur on different wall surface types	*Anopheles gambiae s.l.*	higher efficacy on concrete walls compared to mud walls, maintaining >80% mosquito mortality for 8 months on concrete versus 7 months on mud, with a more rapid decline in efficacy on mud surfaces	Ethiopia	Desalegn et al. (2018)	Wall-type and indoor residual spraying application quality affect the residual efficacy of indoor residual spray against wild malaria vector in southwest Ethiopia
Material impact on insecticide performance	Components	Residual efficacy of deltamethrin sprayed on different surfaces against malaria vectors	*Anopheles culicifacies*	varied by surface: thatch (most effective, 12 weeks), mud (8 weeks), cement (7 weeks), and brick (least effective, 3 weeks) at 12.5 mg/m2	India	Ansari et al. (1997)	Residual efficacy of deltamethrin 2.5 WP (k-othrin) sprayed on different types of surfaces against malaria vector Anopheles culicifacies
Material impact on insecticide performance	Components	Residual efficacy of clothianidin against pyrethroid-resistant dengue vectors in experimental houses and WHO bioassays on various substrates	*Aedes aegypti*	Decreased (>80% delayed mortality up to 7 months post-treatment; low acute mortality observed)	Mexico	Che-Mendoza et al. (2023)	Residual efficacy of the neonicotinoid insecticide clothianidin against pyrethroid-resistant Aedes aegypti
Material impact on insecticide performance	Components	Clothianidin-based indoor residual spray formulation	*Anopheles arabiensis*	Decreased (residual efficacy 1.5 to ≥12.5 months depending on various factors)	Mozambique	Marti-Soler et al. (2021)	Effect of wall type, delayed mortality and mosquito age on the residual efficacy of a clothianidin-based indoor residual spray formulation (SumiShield™ 50WG) in southern Mozambique
Material impact on insecticide performance	Components	Pirimiphos-methyl CS formulation for indoor residual spraying	*Anopheles funestus s.l., An. gambiae s.l.*	Decreased (effective for 196-222 days, longer on mud walls than cement)	Mozambique	Montoya et al. (2022)	The realized efficacy of indoor residual spraying campaigns falls quickly below the recommended WHO threshold when coverage, pace of spraying and residual efficacy on different wall types are considered
Material impact on insecticide performance	Components	Lambda-cyhalothrin spraying on daub wall substrates	*Anopheles arabiensis, Cimex lectularius*	Varied effectiveness (2-14 weeks for An. arabiensis, 4-10 weeks for C. lectularius)	South Africa	Le Sueur et al. (1993)	Assessment of the residual efficacy of lambda-cyhalothrin. 1. A laboratory study using Anopheles arabiensis and Cimex lectularius (Hemiptera: Cimicidae) on treated daub wall substrates from Natal, South Africa.
Material impact on insecticide performance	Components	Long-lasting insecticide treatment for various polymer materials like nets and fabrics	*Anopheles spp.*	Decreased (met WHO criteria for efficacy after 20 washes on synthetic materials)	Tanzania	Tungu et al. (2021)	Bio-efficacy and wash-fastness of a lambda-cyhalothrin long-lasting insecticide treatment kit (ICON® Maxx) against mosquitoes on various polymer materials
Material impact on insecticide performance	Components	Bendiocarb (Ficam VC) spraying on different wall surfaces	*Anopheles gambiae s.s.*	Painted plaster performed best (100% mortality for 6 months), followed by plain brick (100% mortality for 4 months), and mud and wattle (98% mortality at 3 months)	Uganda	Kirunda et al. (2017)	Assessment of ficam VC (Bendiocarb) residual activity on different wall surfaces for control of anopheles gambiae s.s. (Diptera: Culicidae) in Northern Uganda
Material impact on insecticide performance	Components	Evaluation of DDT spray residual effectiveness in huts over time	*Anopheles arabiensis*	Decreased (94% mortality at 3 months, 19% at 18 months)	Zimbabwe	Mpofu et al. (1988)	An evaluation of the residual lifespan of DDT in malaria control.
Novel screening systems	Components	Novel grip devices for hoisting/removing nets on windows, especially in high-rise buildings	Not specified (Anopheles, Aedes mosquitoes tested experimentally indoors only)	Prevented entry of >1,000 mosquitoes over a week-long trial period indoors	Nigeria	Ugwu (2011)	Novel malaria control by strategic net-hoisting with S/O channel/grip devices.
Resting boxes	Components	Pyriproxyfen-treated polypropylene sheets and resting boxes for mosquito control in livestock shelters	*Anopheles subpictus, An. vagus, Culex gelidus, Cx. tritaeniorhynchus, Cx. vishnui*	Decreased (significant reductions in oviposition, egg hatchability, pupation, and adult emergence rates)	Thailand	Khemrattrakool et al. (2019)	Pyriproxyfen-treated polypropylene sheets and resting boxes for controlling mosquitoes in livestock operations
Self-closing doors	Components	Self closing doors used to prevent mosquito entry, used in combination with screening and white washing walls	*Anopheles*	Decrease in malaria incidents. 10/207 persons in intervention homes contracted malaria	Italy	Angelo Celli (1900)	The New Prophylaxis Against Malaria: Experiments in Latium
Wall colour	Components	White washing walls to make seeing mosquitoes inside easier	*Anopheles*	complemented other interventions by supporting rapid detection and removal of Anopheles mosquitoes	Italy	Angelo Celli (1900)	The New Prophylaxis Against Malaria: Experiments in Latium
Buffer zones	Landscape	Study on the dispersal of Aedes vigilax from urban estuarine wetlands	*Aedes vigilax*	Increased (dispersal up to 3 km from release point; impractical for effective buffer zones)	Australia	Webb & Russell (2019)	Dispersal of the Mosquito Aedes vigilax (Diptera: Culicidae) from Urban Estuarine Wetlands in Sydney, Australia
Disease suppressor species habitats	Landscape	Study found that although there is active West Nile Virus transmission among birds and mosquitoes in urban Atlanta, human cases are lower than other cities with similar conditions. The reason appears to be a combination of local habitat conditions and the dominance of Northern Cardinals in the avian host community, which may play an important role in suppressing transmission to humans, particularly where viremic birds are absent from areas of high human activity	*Culex mosquitoes*	Presence of Northern Cardinals linked to reduced tranmission of WNV to humans and observations may suggest a possible transmission reduction effect of urban old-growth forests	USA	Levine RS, Mead DG, Kitron UD (2013)	Limited Spillover to Humans from West Nile Virus Viremic Birds in Atlanta, Georgia
Drainage	Landscape	Habitat modification through drainage systems to reduce mosquito breeding	*Culex annulirostris*	Decreased (significant reduction in mosquito numbers; no human infections reported post-intervention)	Australia	Jacups et al. (2011)	Habitat modification for mosquito control in the Ilparpa Swamp, Northern Territory, Australia
Drainage	Landscape	Drainage canals cleared (in combination with: improved roads, modified septic tanks, improved water pump stations and Slow-Release Bacillus sphaericus Granules.	*Culex quinquefasciatus, Anopheles gambiae*	Decreased (effective mosquito control with environmental improvements and larvicide application)	Burkina Faso	Skovmand et al. (2011)	Cost of integrated vector control with improved sanitation and road infrastructure coupled with the use of slow-release Bacillus sphaericus Granules in a tropical urban setting
Drainage	Landscape	drainage ditches were constructed to intercept the leaking water from the canals that had created water logging	*Anopheles arabiensis*	Decreased (49% reduction in adult mosquitoes near dam areas post-intervention)	Ethiopia	Yohannes et al. (2005)	Can source reduction of mosquito larval habitat reduce malaria transmission in Tigray, Ethiopia?
Drainage	Landscape	Environmental management to reduce mosquito breeding through drainage improvement	*Anpheles*	Decreased (source reduction interrupted malaria transmission within one year)	India	Dua et al. (1988)	Bio-environmental control of malaria in an industrial complex at Hardwar (U.P.), India.
Drainage	Landscape	Improving flow rates in water channels to control mosquitoes	*Culex pipiens pallens*	Decreased (higher flow rates associated with mosquito-free segments)	Japan	Mogi & Motomura (1996)	Possibile Culex pipiens pallens control by improvement of flow rates in water channels of Saga City, southwest Japan
Drainage	Landscape	Drainage of canals (in combination with: levelling or by filling ditches, shading with plants, application of Bacillus thuringiensis var israelensis (Bti) and the use of predatory fish)	*Anopheles spp., Culex spp.*	Varied results; significant reduction in Anopheles early instars in managed habitats	Kenya	Imbahale et al. (2012)	Integrated mosquito larval source management reduces larval numbers in two highland villages in western Kenya.
Drainage	Landscape	Town-scale drainage, earthen bunds, tidal gates/culverts, vegetation clearing and oiling	*An. umbrosus, An. sundaicus*	Substantial elimination of indigenous malaria after 23 years	Malaysia	Konradsen et al. 2004	Engineering and malaria control: learning from the past 100 years
Drainage	Landscape	Repair/maintenance of irrigation channels, clearing vegetation, creating drainage, oiling, filling depressions, anti-larval measures	*Anopheles culicifacies*	Reduction in local breeding of An. culicifacies; impact on adult abundance limited, area-wide effect not conclusive	India	Konradsen et al. 2004	Engineering and malaria control: learning from the past 100 years
Dry belting / edge clearing	Landscape	Vegetation and debris removal from waterbody edges	*Anopheles species*	Reduced larval habitats, implemented for ecological sound malaria control	India	Sharma et al., 1991	The Kheda malaria project: case for environmental control
Dry belting / edge clearing	Landscape	Grading and managing reservoir edges so water recedes rapidly and leaves edges dry between cycles	Not specified	Alternating wet/dry destroys eggs/larvae; habitat loss	Not specified	WHO 1982	Manual on Environmental Management
Improved roads	Landscape	Roads were leveled and given either simple gutters on each side or a concrete channel on one side to drain runoff water (in combination with: drainage, modified septic tanks, improved water pump stations and Bacillus sphaericus.)	*Culex quinquefasciatus, Anopheles gambiae*	Decreased (no new breeding sites observed for at least 3 years along improved roads and water stations)	Burkina Faso	Skovmand et al. (2011)	Cost of integrated vector control with improved sanitation and road infrastructure coupled with the use of slow-release Bacillus sphaericus Granules in a tropical urban setting

Intervention Type	Category	Description	Mosquito Species	Effect of Intervention	Country	Study Authors and Date	Article Title
Insecticide treated outdoor Furniture	Landscape	Use of transfluthrin-treated chairs and ribbons to reduce outdoor mosquito exposure	*Anopheles arabiensis, Anopheles funestus*	Decreased; outdoor-biting densities reduced by up to 85%, with significant mortality among pyrethroid-resistant vectors	Tanzania	Masalu et al. (2020)	Creating mosquito-free outdoor spaces using transfluthrin-treated chairs and ribbons
Leveling and filling	Landscape	Puddles and abandoned water pools dug in the river or streambed for drinking purposes were filled with earth	*Anopheles arabiensis*	Decreased (49% reduction in adult mosquitoes near dam areas post-intervention)	Ethiopia	Yohannes et al. (2005)	Can source reduction of mosquito larval habitat reduce malaria transmission in Tigray, Ethiopia?
Leveling and filling	Landscape	Removing standing water through earthworks	*Anopheles species*	Reduced mosquito habitats; impact observed in multiple interventions within Kheda project	India	Sharma et al., 1991	The Kheda malaria project: case for environmental control
Leveling and filling	Landscape	Leveling and filling (in combination with: Layer of polystyrene balls (in combination with Larvivorous fish in storm water drains, effluent ponds, and drains; source reduction; biolarvicides; improved surveillance and treatment)	*Not specified*	Decreased (significant reduction in vector density and malaria incidence: 190 cases in 1995 compared to 3,049 cases in 1985)	India	Dua et al. (1997)	Bioenvironmental control of industrial malaria at Bharat Heavy Electricals Ltd., Hardwar, India - Results of a nine-year study (1987-95)
Leveling and filling	Landscape	Land levelling or by filling ditches with soil (in combination with drainage, shading with plants, application of Bacillus thuringiensis and use of predatory fish).	*Anopheles spp., Culex spp.*	Varied results; significant reduction in Anopheles early instars in managed habitats	Kenya	Imbahale et al. (2012)	Integrated mosquito larval source management reduces larval numbers in two highland villages in western Kenya.
Leveling and filling	Landscape	Land-filling and reclamation by-products of drainage	*Various anophelines*	Large-scale malaria reduction (no precise numbers given)	Malaysia	Konradsen et al. 2004	Engineering and malaria control: learning from the past 100 years
Minising tillage	Landscape	Minimal tillage and intermittent flooding to reduce mosquito proliferation in rice fields	*Anopheles spp.*	Decreased (80% reduction in larval density with intermittent flooding compared to continuous flooding)	Benin	Djègbè et al. (2020)	Minimal tillage and intermittent flooding farming systems show a potential reduction in the proliferation of Anopheles mosquito larvae in a rice field in Malanville, Northern Benin
Predator habitats	Landscape	Use of indigenous larvivorous fish species for mosquito control in drainage ditches	*Culex pipiens*	Decreased (100% consumption of larvae at low densities; eradication achieved in 17 days in high-density ditches)	Argentina	Marti et al. (2006)	Predation efficiency of indigenous larvivorous fish species on Culex pipiens L. larvae (Diptera: Culicidae) in drainage ditches in Argentina
Predator Habitats	Landscape	Maintaining/introducing mosquito predators to aquatic habitats	*Anopheles spp., Aedes spp.*	Descrease (Probability of anopheline larvae present reduced (p=0.04) due to predators)	Malawi	Gowelo et al., 2020	Characterisation of anopheline larval habitats in southern Malawi
Predator Habitats	Landscape	Urban/forest containers with aquatic predators (Toxorhynchites splendens)	*Aedes spp., Culex spp.*	Descrease (mosquito larvae lower in predator-present containers)	Thailand	Weterings et al., 2014	Container-breeding mosquitoes and predator community dynamics along an urban-forest gradient: The effects of habitat type and isolation
Predator habitats	Landscape	Midge larvae (Metriocnemus knabi) in Sarracenia purpurea pitcher plants actively attack and kill mosquito larvae	*Ae. aegypti, An. stephensi*	Decreased (presence of Metriocnemus knabi larvae in pitcher plant leaves reduces survivorship of Aedes aegypti and Anopheles stephensi larvae to less than 2%)	USA	Raymond et al (2000)	Foreign mosquito survivorship in the pitcher plant Sarracenia purpurea – the role of the pitcher-plant midge Metriocnemus knabi
Predator habitats	Landscape	Creating an aquatic ecosystem to control mosquitoes in acid mine drainage swamps	*Aedes sollicitans*	Decreased (mosquito problem now under control of thriving aquatic ecosystem)	USA	Spencer et al. (1974)	NATURAL BIOLOGICAL CONTROL OF THE SALT MARSH MOSQUITO IN THE ACID MINE DRAINAGE SWAMPS OF WESTERN KENTUCKY.
Predator introduction in landscape and water features	Landscape	Introduction of larvivorous fish in oxidation ponds and contaminated drainage ditches	*Culex quinquefasciatus*	Decreased (mosquito larvae eliminated after 2.5 months)	Cuba	García Avila et al. (1991)	The introduction of the larvivorous fish Poecilia reticulata (Peters, 1895) (Cyprinodontiformes: Poeciliidae), a bioregulator of culicids in oxidation ponds and contaminated drainage ditches on the Isla de la Juventud
Predator introduction in landscape and water features	Landscape	Application of Bacillus thuringiensis var israelensis (Bti) and the use of predatory fish, Gambusia affinis (in combination with: drainage, land levelling or by filling and shading with plants).	*Anopheles spp., Culex spp.*	Varied results; significant reduction in Anopheles early instars in managed habitats	Kenya	Imbahale et al. (2012)	Integrated mosquito larval source management reduces larval numbers in two highland villages in western Kenya.
Predator introduction in landscape and water features	Landscape	Assessing predation behavior of Toxorhynchites splendens on different mosquito species	*Aedes aegypti, Aedes albopictus, Anopheles sinensis*	Decreased (Tx. splendens showed preference for Ae. aegypti, suggesting its suitability as a biocontrol agent)	Not specified	Zuharah et al. (2015)	Risky behaviors: Effects of toxorhynchites splendens (Diptera: Culicidae) Predator on the Behavior of Three Mosquito Species
Predator introduction in landscape and water features	Landscape	Comparison of arroyo chub (Gila orcutti) and mosquitofish (Gambusia affinis) for larval control	*Not specified*	Decreased (similar efficacy between fish species; arroyo chub preferred for sensitive watersheds)	USA	Van Dam & Walton (2007)	Comparison of mosquito control provided by the arroyo chub (Gila orcutti) and the mosquitofish (Gambusia affinis)
Predator introduction in landscape and water features	Landscape	Introduction of Toxorhynchites rutilus rutilus larvae into containers to control mosquito larvae	*Aedes aegypti, Culex quinquefasciatus*	Decreased (74% reduction in mosquito emergence; cannibalism among predators had minimal impact)	USA	Focks et al. (1982)	Field experiments on the control of Aedes aegypti and Culex quinquefasciatus by Toxorhynchites rutilus rutilus (Diptera: Culicidae)
Predator introduction in landscape and water features	Landscape	Predator fish in rice fields	*Anopheles spp.*	Decreased (a pooled analysis of three CTSs showed an overall 82% reduction in anopheline larvae compared to no fish)	Various	Chan et al. (2022)	The control of malaria vectors in rice fields: a systematic review and meta-analysis
Predator introduction in landscape and water features	Landscape	Evaluation of dragonfly and damselfly naiads as biological control agents for mosquitoes	*Aedes, Anopheles, Culex*	Decreased (45% reduction in mosquito larvae per day; effective across larval stages and mosquito genera)	Various (Global)	Priyadarshana & Slade (2023)	A meta-analysis reveals that dragonflies and damselflies can provide effective biological control of mosquitoes
Recreational water body management	Landscape	Weekly Bti (Bacillus thuringiensis israelensis) treatment of ponds and regular removal of floating vegetation	*Aedes species*	Collective efforts have reduced by Singapore dengue control programme have reduced the dengue force of infection 10-fold by the 1990s and maintained this ever since	Singapore	Sim et al. (2020)	A greener vision for vector control: The example of the Singapore dengue control programme
Selective planting	Landscape	Distribution of Culex species in vegetation bands of constructed wetlands	*Culex spp.*	Varied (hot spots of mosquito production found within wide bands of bulrush; effectiveness influenced by band width)	USA	Walton et al. (2013)	Distribution of culex species in vegetation bands of a constructed wetland undergoing integrated mosquito management
Shading	Landscape	Shading with papyrus and other reeds that were allowed to grow in the seepage area and planted in the gully and in areas that were difficult to drain	*Anopheles arabiensis*	Decreased (49% reduction in adult mosquitoes near dam areas post-intervention)	Ethiopia	Yohannes et al. (2005)	Can source reduction of mosquito larval habitat reduce malaria transmission in Tigray, Ethiopia?
Shading	Landscape	Community-led source reduction involving habitat filling, draining, and shading	*Anopheles arabiensis*	Decreased (49% reduction in adult mosquitoes near dam areas post-intervention)	Ethiopia	Yohannes et al. (2005)	Can source reduction of mosquito larval habitat reduce malaria transmission in Tigray, Ethiopia?
Shading	Landscape	Development of environmental tools for anopheline larval control using shading and biological agents	*Anopheles gambiae*	Decreased (man-made habitats with plant shade produced significantly fewer larvae)	Kenya	Imbahale et al. (2011)	Development of environmental tools for anopheline larval control
Shading	Landscape	Shading from arrow root plant (in combination with: drainage, land levelling and filling, application of Bacillus thuringiensis and the use of predatory fish.	*Anopheles spp., Culex spp.*	Varied results; significant reduction in Anopheles early instars in managed habitats	Kenya	Imbahale et al. (2012)	Integrated mosquito larval source management reduces larval numbers in two highland villages in western Kenya.
Shoreline straightening	Landscape	Engineering reservoir edges to create linear, non-convoluted shorelines to eliminate stagnant coves/inlets.	Not specified	Reduces shallow, stagnant breeding pools	Not specified	WHO 1982	Manual on Environmental Management
Soil treatment	Landscape	Use of entomopathogenic fungi (Lecanicillium muscarium) to reduce adult mosquito survival	*Aedes aegypti, Anopheles arabiensis, Culex quinquefasciatus*	Decreased (fungus pathogenic to adults; potential for domestic mosquito control)	Tanzania	Luz et al. (2010)	A new resting trap to sample fungus-infected mosquitoes, and the pathogenicity of Lecanicillium muscarium to culicid adults
Vegetation Removal	Landscape	Cultural control of larval mosquito production through unplanned removal of brush and trees	*Culex nigripalpus, Aedes vexans*	Decreased (overall decline in larval production, but species diversity remained the same)	USA	Scott Taylor et al. (1999)	Cultural control of larval mosquito production in a fallow citrus grove used for disposal of secondary-treated sewage effluent
Waste and container removal	Landscape	Environmental sanitation removing water containers (in combination with: ULV spraying)	*Aedes aegypti, Aedes pseudoscutellaris, Culex quinquefasciatus, Culex annulirostris*	Decreased (significant reductions in mosquito indices through environmental sanitation)	Fiji	Goettel et al. (1980)	The urban mosquitoes of Suva, Fiji: Seasonal incidence and evaluation of environmental sanitation and ULV spraying for their control
Waste and container removal	Landscape	Distribution of plastic bags for all households to collect all discarded water containers	*Aedes aegypti*	Decreased (reduced Aedes aegypti pupae per person index by 11-fold in intervention areas compared to fourfold in controls)	Uruguay	Basso et al. (2017)	Scaling Up of an Innovative Intervention to Reduce Risk of Dengue, Chikungunya, and Zika Transmission in Uruguay in the Framework of an Intersectoral Approach with and without Community Participation
Citizen Science	Users	Monitoring mosquito nuisance for malaria vector surveillance	*Anopheles gambiae s.l., Culicidae*	Mixed results (correlation between perceived nuisance and mosquito density varied across years and sectors)	Rwanda	Murindahabi et al. (2021)	Monitoring mosquito nuisance for the development of a citizen science approach for malaria vector surveillance in Rwanda
Citizen science	Users	Engaging residents in mosquito control through yard surveys and nuisance evaluation	Not specified	Decreased (citizen scientists accurately collected data reflecting trends in researcher-generated database)	USA	Jordan et al. (2017)	Citizen Science as a Tool for Mosquito Control
Community biological control	Users	periodic treatment of Culex breeding sites with the entomopathogen Bacillus sphaericus	*Culex species*	Decreased (vector population density reduced and maintained at low levels for over two years)	Brazil	Regis et al. (1996)	Integrated control of the filariasis vector with community participation in an urban area of Recife, Pernambuco, Brazil
Community biological control	Users	Combination of biological control (copepods, turtles, tilapia) with community participation	*Aedes aegypti*	Decreased (reduction of Ae. aegypti larvae to 0.1-2.4% of baseline, pupae to 0-0.6% of baseline, and no recognizable dengue cases after June 2018)	Honduras	Marten et al. (2022)	Proof of concept for eliminating Aedes aegypti production by means of integrated control including turtles, copepods, tilapia, and community participation in Monte Verde, Honduras
Community biological control	Users	Use of copepods and community participation for Aedes aegypti eradication	*Aedes aegypti*	Decreased (Ae. aegypti eradicated from 400 houses in treated village)	Vietnam	Nam et al. (1998)	Eradication of Aedes aegypti from a village in Vietnam, using copepods and community participation

Intervention Type	Category	Description	Mosquito Species	Effect of Intervention	Country	Study Authors and Date	Article Title
Community task forces	Users	Creation of neighborhood-level task forces for dengue control	*Aedes aegypti*	Decreased (reduction in uncovered water storage containers from 49.3% to 2.6%, 75% reduction in positive containers, and significant decrease in house index)	Cuba	Toledo et al. (2007)	Towards active community participation in dengue vector control: results from action research in Santiago de Cuba, Cuba.
Community waste management	Users	Waste management through community participation, including cleaning, composting and waste management, selection of household representatives, coordination with authorities for waste collection	*Aedes spp.*	Decreased (significant reduction of pupal indices as a proxy for adult vector densities)	Sri Lanka	Abeyewickreme et al. (2013)	Community mobilization and household level waste management for dengue vector control in Gampaha district of Sri Lanka; an intervention study
Community water infrastructure cleaning	Users	Development and promotion of "La Untadita" method for cleaning water containers	*Aedes aegypti*	Decreased (significant reduction in pupae and 3rd/4th instar larvae in intervention neighborhoods)	Honduras	Fernández et al. (1998)	Trial of a community-based intervention to decrease infestation of Aedes aegypti mosquitoes in cement washbasins in El Progreso, Honduras
Community water infrastructure cleaning	Users	Community drainage cleaning	*Anopheles spp.*	Decreased (significant reduction in malaria infection prevalence and Anopheles larval presence)	Tanzania	Castro et al. (2009)	Community-based environmental management for malaria control: Evidence from a small-scale intervention in Dar es Salaam, Tanzania
Community-based approach combining multiple vector control methods	Users	workshops; clean-up campaigns, covering the elevated containers and in-house rubbish disposal without larviciding, mobilisation of schoolchildren and senior inhabitants; and distribution of information, education and communication (IEC) materials in the community.	*Aedes aegypti*	Decreased (Breteau Index rose from 1.60 to 2.46 in intervention clusters versus 1.03 to 4.32 in controls, and the pupae per person index increased much less in intervention areas (from 0.023 to 0.029) than in controls (from 0.010 to 0.054))	Brazil	Caprara et al. (2015)	Entomological impact and social participation in dengue control: a cluster randomized trial in Fortaleza, Brazil
Community-based approach combining multiple vector control methods	Users	Use of larvivorous fish, sticky traps, and container disposal practices	*Aedes aegypti, Aedes albopictus*	Decreased (51% reduction in adult mosquitoes and 56% reduction in Container Index in intervention arm)	Cambodia	Braack et al. (2020)	Low-cost, community-driven vector-control for dengue suppression in the greater Mekong subregion
Community-based approach combining multiple vector control methods	Users	On top of routine control: organisation and management; entomological risk surveillance; capacity building; and community work for vector control.	*Aedes aegypti*	Decreased (Breteau index remained 53% lower in intervention clusters compared to control clusters)	Cuba	Castro et al. (2012)	A community empowerment strategy embedded in a routine dengue vector control programme: a cluster randomised controlled trial
Community-based approach combining multiple vector control methods	Users	eliminating useless containers in the houses and surroundings, covering tanks, and cleaning public and inhabited areas	*Aedes aegypti*	Decreased (significant improvements in knowledge, attitudes, practices, and entomological indices)	Cuba	Sanchez et al. (2005)	Intersectoral coordination in Aedes aegypti control. A pilot project in Havana City, Cuba
Community-based approach combining multiple vector control methods	Users	larviciding, removing containers, improved water container cleaning practices	*Aedes aegypti*	Increased (successful cleaning methods promoted through social mobilization)	Honduras	Fernández et al. (2004)	Social mobilization for dengue control in Honduras
Community-based approach combining multiple vector control methods	Users	Formation of community committees and the vector control and source reduction activities	Not specified (Anopheles vectors)	Decreased (significant reductions in entomological indices)	India	Gopalan et al. (2021)	Community engagement to control dengue and other vector-borne diseases in Alappuzha municipality, Kerala, India
Community-based approach combining multiple vector control methods	Users	Provision of water container covers, clean-up campaigns, and dengue education through schoolchildren	*Aedes aegypti*	Decreased (significant reduction in pupal indices and Stegomyia indices in intervention clusters)	India	Arunachalam et al. (2013)	Community-based control of Aedes aegypti by adoption of eco-health methods in Chennai City, India
Community-based approach combining multiple vector control methods	Users	Approach focusing on environmental management and community participation	*Aedes aegypti*	Decreased (improved community knowledge, increased participation, and refocused vector control efforts)	Indonesia	Tana et al. (2012)	Building and analyzing an innovative community-centered dengue-ecosystem management intervention in Yogyakarta, Indonesia
Community-based approach combining multiple vector control methods	Users	Distribution of LLINs, community-driven mosquito larval source management, application of biolarvicides and community education through neighborhood campaigns and school-based school health clubs.	*Anopheles spp.*	Decreased (significant decline in malaria cases among children from 23.7% in 2006 to 10.47% in 2011 in Malindi)	Kenya	Mutero et al. (2015)	An assessment of participatory integrated vector management for malaria control in Kenya
Community-based approach combining multiple vector control methods	Users	information and health education, environmental management (source reduction, drainage...), use of chemical insecticides.	*Aedes aegypti, Culex quinquefasciatus*	Decreased (global mosquito control program initiated)	Martinique	Yebakima (1996)	Control of mosquitos in Martinique. A collective public health action and improvement of the quality of life
Community-based approach combining multiple vector control methods	Users	Community volunteers, house-to-house visits, simple mosquito control tools, collective elimination of breeding sites , community engagement and outreach	*Aedes aegypti*	Decreased (effective in reducing dengue transmission in cluster-randomised controlled trial)	Nicaragua and Mexico	Ledogar et al. (2017)	Mobilising communities for Aedes aegypti control: The SEPA approach
Community-based approach combining multiple vector control methods	Users	Community sanitation supplemented by larviciding for urban mosquito control	*Anopheles gambiae, A. funestus, Aedes spp., Culex spp.*	Decreased (significant reductions in mosquito densities and indices)	Tanzania	Bang et al. (1975)	Integrated control of urban mosquitoes in Dar es Salaam using community sanitation supplemented by larviciding
Community-based approach combining multiple vector control methods	Users	Source reduction and appropriate technologies applied within transmission foci	Aedes spp.	Decreased (significant reduction of dengue vectors and dengue hemorrhagic fever cases in treated areas)	Thailand	Kittayapong et al. (2006)	Community participation and appropriate technologies for dengue vector control at transmission foci in Thailand
Community-based approach combining multiple vector control methods	Users	households received plastic bags to collect and remove small unused water containers, while large water tanks were either covered or altered to prevent mosquito breeding	*Aedes aegypti*	Descreased (47.4% reduction in container numbers in intervention clusters, and limited the increase in the pupae per person index (PPI) to 2.7 times baseline (compared to an 8.7-fold increase in controls)	Uruguay	Basso et al. (2015)	Improved dengue fever prevention through innovative intervention methods in the city of Salto, Uruguay
Community-based approach combining multiple vector control methods	Users	Area-wide management combining source reduction, larviciding, adulticiding, and public education	*Aedes albopictus*	Decreased (substantial reduction in urban sites, modest reductions in suburban sites; education alone achieved significant reductions in urban areas)	USA	Fonseca et al. (2013)	Area-wide management of Aedes albopictus. Part 2: Gauging the efficacy of traditional integrated pest control measures against urban container mosquitoes
Community-based approach combining multiple vector control methods	Users	Tyre disposal, holes drilling in waste bins, education in the community	*Aedes albopictus*	Decreased (reduction (22.6%) in peridomestic container habitats for Aedes albopictus compared to a 32.3% increase in control areas without education)	USA	Healy et al. (2014)	Integrating the Public in Mosquito Management: Active Education by Community Peers Can Lead to Significant Reduction in Peridomestic Container Mosquito Habitats
Community-based approach combining multiple vector control methods	Users	lid covers for containers to biological control, solid waste management, composting and recycling schemes	*Aedes aegypti*	Decreased (significant impact on vector densities in some sites)	Various Asian countries	Sommerfeld & Kroeger (2013)	Eco-bio-social research on dengue in Asia: A multicountry study on ecosystem and community-based approaches for the control of dengue vectors in urban and peri-urban Asia
Community-based approach combining multiple vector control methods	Users	larval site removal, use of Mesocyclops as a biological control agent	*Aedes aegypti*	Decreased (elimination of Aedes aegypti in 32 of 37 communes, no dengue cases since 2002)	Vietnam	Kay & Nam (2005)	New strategy against Aedes aegypti in Vietnam
Education and training	Users	Educational intervention for high school students and teachers to prevent arboviral diseases	*Aedes aegypti*	Decreased (significant behavioral changes, increased preventive actions among students)	Brazil	Santos et al. (2022)	Prevention and control of mosquito-borne arboviral diseases: lessons learned from a school-based intervention in Brazil (Zikamob)
Education and training	Users	School-based dengue education program for children and a community mobilization "clean patio and safe container" campaign	*Aedes aegypti*	Descreased (85.1% reduction in the pupa per person index (PPI) in intervention clusters (from 0.524 to 0.080), compared to a 47.2% reduction (from 0.817 to 0.353) in control clusters)	Ecuador	Mitchell-Foster et al. (2015)	Integrating participatory community mobilization processes to improve dengue prevention: an eco-bio-social scaling up of local success in Machala, Ecuador
Education and training	Users	Targeted health education for municipal sanitary workers	*Aedes aegypti*	Decreased (significant improvement in knowledge, attitudes, and practices scores post-intervention)	India	Jency et al. (2024)	Anti-Dengue Sanitation Practices: A Health Education Approach for Municipal Sanitary Workers in Puducherry, India.
Education and training	Users	Teaching 4-6 year old children about mosquito control using AMCA video and Touch Table Technique	*Aedes aegypti*	Decreased (significant reduction in entomological indices in experimental districts)	Mexico	Martínez-Ibarra et al. (2012)	Combining two teaching techniques for young children on Aedes aegypti control: Effects on entomological indices in western Mexico
Education and training	Users	Door-to-Door community education program for larval control of Aedes aegypti	*Aedes aegypti*	Decreased (significant reduction in potential breeding areas after visits)	New Caledonia	Noel (2005)	Dengue fever larval control in New Caledonia: assessment of a door-to-door health educators program.
Education and training	Users	Training community members to collect mosquitoes for xenomonitoring of lymphatic filariasis	Not specified	Decreased (CVCs collected large numbers of mosquitoes at lower cost than research team)	Not specified	Pi-Bansa et al. (2018)	Implementing a community vector collection strategy using xenomonitoring for the endgame of lymphatic filariasis elimination
Education and training	Users	Various outreach to building users including domestic helpers and construction workers targeted with behaviour change messaging at dormitories, shopping malls, and other places of congregation.	*Aedes species*	Collective efforts have reduced by Singapore dengue control programme have reduced the dengue force of infection 10-fold by the 1990s and maintained this ever since	Singapore	Sim et al. (2020)	A greener vision for vector control: The example of the Singapore dengue control programme
Education and training	Users	Evaluation of public health education campaign effectiveness on mosquito-larval habitats reduction	*Aedes albopictus*	Mixed results (reduction in container habitats observed, but not significantly different from control)	USA	Bartlett-Healy et al. (2011)	Source reduction behavior as an independent measurement of the impact of a public health education campaign in an integrated vector management program for the Asian tiger mosquito
Education and training	Users	Review of impacts of educational interventions on breeding site control for Aedes mosquitoes	*Aedes aegypti, Aedes albopictus*	Decreased (community-based approaches led to reductions in entomological indicators)	Various	Soria et al. (2024)	Systematic Review of Impacts of Educational Interventions to Control Breeding Sites of Aedes aegypti and Aedes albopictus Mosquitoes
SoMe awareness campaign	Users	WhatsApp-based messaging to improve knowledge and practices	*Aedes aegypti*	Decreased (improvements in knowledge and practices, particularly in cleaning laundry tanks)	Colombia	Carrillo et al. (2024)	WhatsApp-based intervention in urban Colombia to support the prevention of arboviral diseases: a feasibility study
User developed screening	Users	Participatory development and installation of locally available screening materials	*Anopheles arabiensis, Culex quinquefasciatus*	Decreased (≥98% reduction for An. arabiensis, ≤46% for Cx. quinquefasciatus)	Tanzania	Msoffe et al. (2022)	Participatory development of practical, affordable, insecticide-treated mosquito proofing for a range of housing designs in rural southern Tanzania

Intervention Type	Category	Description	Mosquito Species	Effect of Intervention	Country	Study Authors and Date	Article Title
Constructing soakpits	Water and Sanitation	Construction of soak pits to absorb water into the ground	*Anopheles species*	Feasible, cost-effective—long-term reduction, as alternative to insecticides	India	Sharma et al., 1991	The Kheda malaria project: case for environmental control
Floating layers of polystyrene balls	Water and Sanitation	Layer of polystyrene balls (in combination with Larvivorous fish in storm water drains, effluent ponds, and drains; leveling and filling; source reduction; biolarvicides; improved surveillance and treatment)	*Not specified*	Decreased (significant reduction in vector density and malaria incidence: 190 cases in 1995 compared to 3,049 cases in 1985)	India	Dua et al. (1997)	Bioenvironmental control of industrial malaria at Bharat Heavy Electricals Ltd., Hardwar, India - Results of a nine-year study (1987-95)
Floating layers of polystyrene balls	Water and Sanitation	Use of floating balls on water to reduce mosquito breeding	*Anopheles species*	See above, utilized in same context as soakpits, cost-effective environmental control	India	Sharma et al., 1991	The Kheda malaria project: case for environmental control
Floating layers of polystyrene balls	Water and Sanitation	Use of expanded polystyrene balls for mosquito control in pit latrines	*Culex species*	Not specified (study mentioned but details not provided in abstract)	Not specified	Reiter (1985)	A field trial of expanded polystyrene balls for the control of Culex mosquitoes breeding in pit latrines.
Floating layers of polystyrene balls	Water and Sanitation	Use of polystyrene beads in wet pit latrines and soakage pits	*Culex quinquefasciatus*	Decreased (sustainable reduction in vector populations)	Tanzania, India	Curtis et al. (2002)	Use of floating layers of polystyrene beads to control populations of the filaria vector Culex quinquefasciatus.
Floating layers of polystyrene balls	Water and Sanitation	Integration of therapy with vector control using polystyrene beads in wet pit latrines	*Culex quinquefasciatus*	Decreased (significant reduction in mosquito population and filariasis transmission)	Tanzania	Maxwell et al. (1990)	Control of Bancroftian filariasis by integrating therapy with vector control using polystyrene beads in wet pit latrines
Flushing	Water and Sanitation	weekly water flush in combination with other interventions	*Anopheles maculatus*	Streams shaded to prevent sun-loving An. maculatus breeding; success dependent on local ecology	Malaysia	Konradsen et al. 2004	Engineering and malaria control: learning from the past 100 years
Flushing	Water and Sanitation	Using sluice-gated bed-dams to control mosquito breeding in streams	*Anopheles fluviatilis*	Decreased (84.9% reduction in positive dips for larvae/pupae and 98.4% reduction in immature density after weekly flushing)1	India	Sahu et al. (2014)	Environmental management through sluice gated bed-dam: a revived strategy for the control of Anopheles fluviatilis breeding in streams.
Flushing	Water and Sanitation	Siphons and bed-dams to periodically flush streambeds, clear debris, level river substrates	*Anopheles culicifacies, other anophelines*	Decreased (reduction in vector breeding along 8 km of river post-collaborative action)	Sri Lanka	Konradsen et al. 2004	Engineering and malaria control: learning from the past 100 years
Flushing	Water and Sanitation	Mosquito larval source management through water level control	*Various*	Decreased (flushing larvae from reservoirs effectively disrupted breeding cycles)	USA	Juel (2013)	Mosquito larval source management by water level control
Improved catch basins	Water and Sanitation	Installation of filter beds in storm drains to prevent water retention	*Aedes aegypti*	Decreased (90% reduction in mean number of larvae)	Colombia	Ceron-Hernandez et al. (2020)	Randomized trial of a modification of rainwater street catch basins to physically control the Aedes aegyptidengue mosquito vector
Improved drainage system	Water and Sanitation	Use of absorbent membranes in disposable pneumatic tires to prevent water accumulation	*Aedes aegypti*	Decreased (effective water drainage, preventing breeding sites)	Argentina	Mondelo et al. (2014)	Use of a drainage membrane to prevent accumulation of water and the creation of potential breeding sites for Aedes aegypti (Linnaeus 1762) (Diptera: Culicidae) in disposable pneumatic tires
Improved sanitation systems	Water and Sanitation	Integrated interventions targeting diarrhea and dengue risk factors in rural primary schools	*Aedes aegypti*	Mixed results (no effect on primary outcomes, but reduced Breteau Index and improved water quality)	Colombia	Overgaard et al. (2016)	A Cluster-Randomized Controlled Trial to Reduce Diarrheal Disease and Dengue Entomological Risk Factors in Rural Primary Schools in Colombia
Improved sanitation systems	Water and Sanitation	Integrated interventions targeting diarrhea and dengue risk factors in rural schools	*Aedes aegypti*	Mixed results (no effect on primary outcomes; reduced entomological indices in some cases)	Colombia	Overgaard et al. (2012)	Diarrhea and dengue control in rural primary schools in Colombia: Study protocol for a randomized controlled trial
Improved sanitation systems	Water and Sanitation	improving drinking water quality; hand-washing practices; sanitary hygiene and health education	*Aedes aegypti*	Mixed (no effect on primary outcomes, but reduced entomological indices in some cases)	Colombia	Overgaard et al. (2012)	Integrating dengue and diarrhea control in rural schools in colombia: a cluster randomized controlled trial
Improved sanitation systems	Water and Sanitation	Integrated disease management for arboviral infections and diarrheal diseases	*Aedes aegypti*	Proposed integration of sanitation and vector control interventions	Various	Overgaard et al. (2021)	Integrated disease management: Arboviral infections and waterborne diarrhoea
Improved sanitation systems	Water and Sanitation	Low-cost sanitation systems to control flies and mosquitoes	*Culex quinquefasciatus, blowflies*	Proposed physical barriers such as vent pipe screens and floating layers for pit latrines	Various	Curtis (1984)	Low cost sanitation systems and the control of flies and mosquitoes
Improved sanitation systems	Water and Sanitation	Impact of new water supply infrastructure on dengue vector breeding	*Aedes aegypti*	Increased risk due to improper lid maintenance on new water tanks	Vietnam	Tran et al. (2012)	Low entomological impact of new water supply infrastructure in southern Vietnam, with reference to dengue vectors
Improved septic tanks	Water and Sanitation	Septic tanks were modified so that they could be emptied without destroying their lid (in combination with: drainage, improved roads and pump stations, and Bacillus sphaericus.)	*Culex quinquefasciatus, Anopheles gambiae*	Decreased (effective mosquito control with environmental improvements and larvicide application)	Burkina Faso	Skovmand et al. (2011)	Cost of integrated vector control with improved sanitation and road infrastructure coupled with the use of slow-release Bacillus sphaericus Granules in a tropical urban setting
Improved stormwater catch basins	Water and Sanitation	Structural modification of storm drains to prevent mosquito breeding	*Aedes aegypti, Culex spp.*	Decreased (significant reduction in water retention and mosquito larval populations in storm drains)2	Brazil	Souza et al. (2017)	Effect of an intervention in storm drains to prevent Aedes aegypti reproduction in Salvador, Brazil
Improved stormwater catch basins	Water and Sanitation	Community perspectives on sustainable drainage systems to reduce mosquito breeding	*Aedes aegypti*	N/A (study on community perceptions, not intervention effectiveness)	Brazil	Charlesworth et al. (2023)	Sustainable drainage to address Zika in favelas, Brazil: community perspectives
Improved stormwater catch basins	Water and Sanitation	Use of attractive toxic sugar baits (ATSBs) in storm drains to control mosquitoes	*Culex quinquefasciatus*	Decreased (83.7%-86.6% reduction in mosquitoes exiting toxin-treated drains)	USA	Müller et al. (2010)	Control of Culex quinquefasciatus in a storm drain system in Florida using attractive toxic sugar baits
Improved water pump stations	Water and Sanitation	Pump stations rebuilt so that each pump was in the middle of a concrete block with a 5-cm-deep drainage channel at the edge, leading to an underground pit with concrete sides and a base of soil (in combination with: drainage, modified septic tanks, improved roads and Bacillus sphaericus.)	*Culex quinquefasciatus, Anopheles gambiae*	Decreased (no new breeding sites observed for at least 3 years along improved roads and water stations)	Burkina Faso	Skovmand et al. (2011)	Cost of integrated vector control with improved sanitation and road infrastructure coupled with the use of slow-release Bacillus sphaericus Granules in a tropical urban setting
Insect-proof water containers	Water and Sanitation	Distribution and use of fine mesh nets to cover farmers' outdoor water storage buckets used for irrigation	*Aedes aegypti*	Container Index (CI) reduced from 5.88 to 1.63 ($p<0.001$); in Tianliao, from 2.30 to 1.20 ($p<0.001$); 15% net loss rate	Taiwan	Chuang et al., (2009)	The use of fine nets to prevent the breeding of mosquitoes on dry farmland in southern Taiwan
Insect-proof water containers	Water and Sanitation	Garbage containers were installed to provide an alternative to the drainage channels for waste disposal (in combination with: drainage, modified septic tanks, improved roads and pump stations, and Bacillus sphaericus.)	*Culex quinquefasciatus, Anopheles gambiae*	Decreased (effective mosquito control with environmental improvements and larvicide application)	Burkina Faso	Skovmand et al. (2011)	Cost of integrated vector control with improved sanitation and road infrastructure coupled with the use of slow-release Bacillus sphaericus Granules in a tropical urban setting
Insect-proof water containers	Water and Sanitation	Combined use of insecticide-treated materials and targeted interventions on breeding sites	*Aedes aegypti*	Decreased (significant reductions in total pupae numbers and entomological indices; high acceptance of interventions)	Guatemala	Rizzo et al. (2012)	Dengue vector management using insecticide treated materials and targeted interventions on productive breeding-sites in Guatemala
Insect-proof water containers	Water and Sanitation	Insecticide-treated curtains and water container covers for dengue vector control	*Aedes aegypti*	Decreased (significant reduction in entomological indices)	Mexico and Venezuela	Kroeger et al. (2006)	Effective control of dengue vectors with curtains and water container covers treated with insecticide in Mexico and Venezuela: Cluster randomised trials
Insect-proof water containers	Water and Sanitation	Distribution of jar covers made with long-lasting deltamethrin-treated netting for domestic water storage jars (≥200 liters)	*Aedes aegypti*	Mean pupae per house: intervention 6.6 vs. control 31.9 ($p<0.01$); indoor resting females ↓ three-fold vs. controls (16%↓); effect waned over time	Cambodia	Chang Moh Seng et al., 2008	The effect of long-lasting insecticidal water container covers on field populations of Aedes aegypti in Cambodia
Insect-proof water containers	Water and Sanitation	double-layer plastic net covers with wooden and rubber frame placed on ground-level cement tanks to prevent mosquito oviposition	*Aedes aegypti, Aedes albopictus, Ae. vittatus, Ae. macdougalli*	Decreased (Mean monthly tanks positive for Aedes immatures reduced from 10.5 to 1.17 (net tanks), while controls remained ~5.5; 89% reduction, $p<0.001$)	Sri Lanka	Kusumawathie et al., 2009	Effectiveness of net covers on water storage tanks for the control of dengue vectors in Sri Lanka
Insect-proof water containers	Water and Sanitation	Integrated vector control strategies including source reduction and use of screen covers	*Dengue vectors*	Decreased (significant reduction in dengue vectors and cases)	Thailand	Kittayapong et al. (2008)	Suppression of dengue transmission by application of integrated vector control strategies at sero-positive GIS-based foci
Insect-proof water containers	Water and Sanitation	Permanent insecticide-treated water storage jar covers (large CRT, Venezuela)	*Aedes species*	Combined ITC+ITJC arm: 63% lower pupae per person rate vs control; coverage dropped below 60% by 14 months	Venezuela	Lenhart A et al., 2022	Evaluation of insecticide treated window curtains and water container covers for dengue vector control in a large-scale clusterrandomized trial in Venezuela
Insect-proof water containers	Water and Sanitation	Insecticide-treated window curtains and water jar covers for dengue vector control	*Aedes aegypti*	Decreased (63% reduction in pupae per person indices)	Venezuela	Lenhart et al. (2022)	Evaluation of insecticide treated window curtains and water container covers for dengue vector control in a large-scale clusterrandomized trial in Venezuela
Insect-proof water containers	Water and Sanitation	Application of dengue mosquito-proof water containers	*Aedes aegypti*	Decreased (lower larval counts in new containers, but no change in overall indices due to old containers)	Vietnam	Van (2011)	Application of mosquito-proof water containers in the reduction of dengue mosquito population in a dengue endemic province of Vietnam
Insect-proofing sanitation systems	Water and Sanitation	Environmental management to reduce mosquito populations in septic tanks	*Culex quinquefasciatus, Armigeres subalbatus*	Decreased (proposed integrated vector control program targeting septic tank ventilators)	India	Martin et al. (2002)	Environmental management: A case study to control mosquito population in senthiambalam near sawyerpuram
Insect-proofing sanitation systems	Water and Sanitation	Insect-proofing sanitation systems to prevent mosquito breeding	*Culex quinquefasciatus, blowflies*	Proposed interventions include vent pipe screens and improved pit latrine designs	Tanzania	Curtis et al. (2018)	Insect proofing of sanitation systems
Irrigation management	Water and Sanitation	Minimal tillage and intermittent flooding to reduce mosquito proliferation in rice fields	*Anopheles spp.*	Decreased (80% reduction in larval density with intermittent flooding compared to continuous flooding)	Benin	Djègbè et al. (2020)	Minimal tillage and intermittent flooding farming systems show a potential reduction in the proliferation of Anopheles mosquito larvae in a rice field in Malanville, Northern Benin

Intervention Type	Category	Description	Mosquito Species	Effect of Intervention	Country	Study Authors and Date	Article Title
Irrigation management	Water and Sanitation	Impact of irrigation schemes on malaria transmission and potential for canal water management	*Anopheles arabiensis, Anopheles pharoensis*	Increased malaria transmission due to poor canal water management; proper management recommended	Ethiopia	Kibret et al. (2014)	Increased malaria transmission around irrigation schemes in Ethiopia and the potential of canal water management for malaria vector control
Irrigation management	Water and Sanitation	Impact of small-scale irrigation scheme on malaria transmission	*Anopheles arabiensis, An. pharoensis*	Increased (higher malaria prevalence and vector abundance in irrigated areas)	Ethiopia	Kibret et al. (2010)	The impact of a small-scale irrigation scheme on malaria transmission in Ziway area, Central Ethiopia
Irrigation management	Water and Sanitation	Impact of irrigation canal on malaria transmission	*Anopheles species*	Increased (higher malaria incidence and vector densities in irrigated areas)	India	Thapar et al. (2019)	The Study on impact of Ujina irrigation canal on malaria transmission in District Nuh (Erstwhile Mewat), Haryana
Irrigation management	Water and Sanitation	Assessing effects of intermittent irrigation on mosquitoes and predators in rice fields	*Culex tritaeniorhynchus, Anopheles sinensis*	Decreased mosquito abundance initially, but increased percentage of mosquitoes among insects with repeated irrigation; decreased predator abundance2	Japan	Mogi (1993)	Effect of intermittent irrigation on mosquitoes (Diptera: Culicidae) and larvivorous predators in rice fields.
Irrigation management	Water and Sanitation	Intermittent irrigation in rice fields to control Anopheles larvae	*Anopheles arabiensis*	Mixed (attracted more egg-laying but reduced larval survival)	Kenya	Mutero et al. (2000)	Water management for controlling the breeding of Anopheles mosquitoes in rice irrigation schemes in Kenya
Irrigation management	Water and Sanitation	Evaluating water management options to control mosquito breeding in irrigation streams	*Anopheles culicifacies*	Decreased (effective vector control through changes in irrigation water releases)	Sri Lanka	Matsuno et al. (1999)	Control of malaria mosquito breeding through irrigation water management
Irrigation management	Water and Sanitation	Systematic review of malaria vector control in rice fields	*Various Anopheles species*	Decreased (larviciding reduced larval densities by 60-77%; fish reduced anopheline larvae by 82%; intermittent irrigation reduced late-stage anopheline larvae by 35%)2	Various	Chan et al. (2022)	The control of malaria vectors in rice fields: a systematic review and meta-analysis
Large volume Water Storage	Water and Sanitation	Distribution of new ground level water tanks and intensive use of insecticide	*Aedes aegypti*	Temporary decrease followed by increase (lack of community involvement led to short-lived results)	Cuba	Toledo et al. (2008)	The unbearable lightness of technocratic efforts at dengue control
Larval source management	Water and Sanitation	Community-based draining/filling/larviciding using B. thuringiensis israelensis	*Malaria vectors*	Incremental cost $25.06/person/year (LSM-only); reduced larval abundance	Malawi	Phiri MD et al., 2021	Cost of community-led larval source management and house improvement for malaria control a cost analysis within a cluster-randomized trial in a rural district in Malawi
Managed water bodies	Water and Sanitation	Comparing effects of sinking vs. floating harvested vegetation on mosquito abundance in constructed wetlands	*Anopheles spp., Culex spp.*	Mixed results (fewer larvae in ponds with sunken vegetation; effects varied with water turnover rates and presence of natural predators)2	Not specified	Walton et al. (2020)	Evaluation of Two Management Strategies for Harvested Emergent Vegetation on Immature Mosquito Abundance and Water Quality.
Managed water bodies	Water and Sanitation	Design and management of constructed wetlands to minimize mosquito production	*Culex, Anopheles, Aedes, Psorophora*	Varied effects depending on wetland design, organic loading, and vegetation maintenance	USA	Walton (2012)	Design and management of free water surface constructed wetlands to minimize mosquito production
Managing stormwater	Water and Sanitation	Hydrological management of water depth, flow, and surface agitation combined with manipulation of native biota and habitats	*Culex spp.*	Proposed approach (no results reported; integrated management of water depth and biota recommended)	Canada	Jackson et al. (2009)	Culex mosquitoes, West Nile virus, and the application of innovative management in the design and management of stormwater retention ponds in Canada
Predator introduction in water systems	Water and Sanitation	Use of red swamp crayfish as biocontrol agent	*Culex quinquefasciatus*	Decreased (crayfish effectively consumed mosquito larvae, especially 4th instar; gravid females consumed more larvae than males in lab tests)	Egypt	Heikal et al. (2018)	The red swamp crayfish, Procambarus clarkii (Gerard, 1852) an invasive species in Egypt as a biocontrol agent of the mosquito, Culex quinquefasciatus Say, 1823
Predator introduction in water systems	Water and Sanitation	Efficacy of native cyclopoid copepods in biological vector control against Aedes albopictus	*Aedes albopictus, Culex pipiens*	Decreased (high predation efficiency observed against first-instar larvae under lab conditions)	Germany	Pauly et al. (2022)	Efficacy of native cyclopoid copepods in biological vector control with regard to their predatory behavior against the Asian tiger mosquito, Aedes albopictus
Predator introduction in water systems	Water and Sanitation	Larvivorous fish in storm water drains, effluent ponds, and drains in combination with (source reduction; biolarvicides; leveling and filling, improved surveillance and treatment, Polystyrene balls,)	*Not specified*	Decreased (significant reduction in vector density and malaria incidence: 190 cases in 1995 compared to 3,049 cases in 1985)	India	Dua et al. (1997)	Bioenvironmental control of industrial malaria at Bharat Heavy Electricals Ltd., Hardwar, India - Results of a nine-year study (1987-95)
Predator introduction in water systems	Water and Sanitation	Poeciliid fish (guppy and mosquitofish) in indoor cement tanks for vector control	*Aedes aegypti*	Decreased (significant reductions in Aedes densities and chikungunya cases)	India	Ghosh et al. (2011)	Comparative efficacy of two poeciliid fish in indoor cement tanks against chikungunya vector Aedes aegypti in villages in Karnataka, India
Predator introduction in water systems	Water and Sanitation	Testing the biocontrol potential of Stigmatogobius sadanundio against Culex quinquefasciatus larvae	*Culex quinquefasciatus*	Increased predation efficacy; effective biocontrol agent for mosquito larvae under lab conditions	India	Pahari et al. (2020)	First record of the mosquito control potentiality of Stigmatogobius sadanundio (F. Hamilton, 1822) Gobiidae, Perciformes in laboratory condition
Predator introduction in water systems	Water and Sanitation	Evaluation of copepods and fish as biological control agents in sewage wastewater	*Culex quinquefasciatus*	Decreased (predators effective in consuming mosquito larvae)	USA	Mian et al. (1986)	Studies on potential biological control agents of immature mosquitoes in sewage wastewater in southern California.
Repairing water supply	Water and Sanitation	Fixing leaks to reduce water stagnation	*Anopheles species*	Reduced breeding sites, part of holistic environmental interventions for malaria control	India	Sharma et al., 1991	The Kheda malaria project: case for environmental control
Repairing water supply	Water and Sanitation	Leaks in existing water supply repaired	*Aedes aegypti*	Descreased (OR for House Index: 0.7 (regular water), 0.6 (irregular); pupa-positive index OR: 0.5 (regular), 0.5 (irregular))	Nicaragua	Crcamo et al., 2017	Informed community mobilization for dengue prevention in households with and without a regular water supply: Secondary analysis from the Camino Verde trial in Nicaragua
Sewage remediation	Water and Sanitation	Remediation consisted of building a deep storage tunnel to capture and divert sewage overflows to a water reclamation center for treatment, instead of releasing them untreated into the creek during heavy rains	*Culex quinquefasciatus*	Decrease (after remediation, mosquito productivity in the CSO creek dropped from 7.5 7 late instar/pupae per samplingto nearly zero)	USA	Lund et al. (2014)	Long term impacts of combined sewer overflow remediation on water quality and population dynamics of Culex quinquefasciatus, the main urban West Nile virus vector in Atlanta, GA
Water management	Water and Sanitation	Evaluating effects of water level drawdown on mosquito larval abundance in experimental dams	*Anopheles arabiensis, An. pharoensis*	Decreased (larval density reduced by 30-84% depending on drawdown rate; higher drawdown rates associated with lower mosquito larval abundance)	Ethiopia	Kibret et al. (2018)	Can water-level management reduce malaria mosquito abundance around large dams in sub-Saharan Africa?
Water management	Water and Sanitation	Multiple water management techniques for anopheline control	*Various Anopheles species*	Decreased (effective control through drainage, filling, and impounding in various settings)	Multiple countries	Carmichael (1972)	Anopheline control through water management.
Water management	Water and Sanitation	Water management practices to reduce breeding sites for malaria vectors	*Anopheles culicifacies*	Decreased (periodic water releases reduced breeding sites downstream)	Sri Lanka	Konradsen et al. (1998)	Anopheles culicifacies breeding in Sri Lanka and options for control through water management.
Water treatment	Water and Sanitation	Coagulation-flocculation using Poly Aluminum Chloride (PACl) to kill mosquito larvae	*Culex pipiens pallens*	Decreased (high mortality of 1st-2nd instar larvae due to physical effects; LT50 = 2 days)	China	Li et al. (2021)	Coagulation-flocculation: a potential application for mosquito Larval Source Management (LSM)