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KAWAN AGAINST MALARIA

BASELINE MALARIA RISK IN UMALULU, EAST SUMBA

A CROSS-SECTIONAL HOUSEHOLD AND ENVIRONMENTAL SURVEY – FULL REPORT
UMALULU VILLAGE, UMALULU DISTRICT, EAST SUMBA REGENCY

MARCH - JULY 2025

FAIR FUTURE FOUNDATION · Rotary Mandurah Districts · Australian Rotarians Against Malaria · kawan baik

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Some of the participants in this unprecedented study in East Sumba meet for a working session

BASELINE MALARIA RISK ASSESSMENT

Environmental and Socio-Behavioural Survey Findings

This report summarises the **March-to-July 2025** cross-sectional household and environmental risk survey conducted in Umalulu Village, Umalulu Sub-district, East Sumba. Using a **two-module structured questionnaire**—(i) Environmental Monitoring *(demography, housing, sanitation, IRS and LLIN coverage)* and (ii) Malaria Knowledge-Experience—trained village malaria cadres, nurses and Puskesmas staff visited **269 household**s *(target 335)* and interviewed **460 residents**. Data were captured with the mobile **"Kawan Against Malaria"** application, enabling offline collection with later synchronisation and geo-tagged photos.

The survey **quantified self-reported** malaria episodes, treatment-seeking pathways, household-level vector-breeding determinants *(e.g., unscreened ventilation, standing water, livestock proximity)* and the **socio-economic impact** of the disease. Results furnish baseline evidence for targeted **vector-control**, **health-promotion** and **income-protection** interventions.

The study was funded by Australian Rotarians Against Malaria *(ARAM)*, Fair Future Foundation, Rotary International and delivered in partnership with Kawan Baik Indonesia, PERDHAKI, the East Sumba District Health Office, Melolo Puskesmas, the Umalulu Village authorities and community volunteers. Findings will guide **evidence-based malaria prevention** and control planning in Umalulu and surrounding high-transmission clusters.

Sampling note. *Unless otherwise stated, each percentage is calculated against the denominator shown for that specific sub-sample (e.g., 269 households, 460 individual respondents, or the number of net recipients).*

BACKGROUND

According to the **2024 East Sumba Regency Statistics** Agency bulletin, **2,184 clinical**- *and laboratory*-confirmed malaria episodes occurred district-wide; **585 cases** *(26.8%)* originated in Umalulu District. Consultations with the District Health Office and Melolo Puskesmas confirm that Umalulu Village repeatedly serves as the season's primary *"index focus,"* where the **first infections are detected** before spreading to surrounding clusters.

To inform an evidence-based response, Fair Future Foundation led a **five-month household and environmental survey** *(March–July 2025)* that combined digital data capture, cadre-led interviews and geo-tagged risk mapping. The study aligns with Fair Future's commitment to deliver rigorous field research where formal health systems are weakest.

OBJECTIVES

This study establishes a robust baseline to steer data-driven malaria control, operational research and social-behaviour change in Umalulu *(and Sumba Timur)* and neighbouring transmission corridors.

Specific objectives

- Quantify self-reported malaria incidence and chart its household-level spatial distribution.
- Characterise housing, sanitation and peri-domestic factors that favour Anopheles breeding and survival.
- Assess care-seeking pathways—cost, travel time and stock availability—to pinpoint barriers to timely diagnosis and treatment.
- Gauge community knowledge, attitudes and practices, translating findings into Clean and Healthy Living Behaviour *(PHBS)* strategies for sustained prevention.
- Generate actionable recommendations for local cadres, district health authorities and international partners engaged in Fair Future's Kawan Against Malaria programmes.

COORDINATION WITH PARTNERS

A month before the start of the study, Alex, John and Ino meet with the health authorities of East Sumba

Coordination with the East Sumba District Health Office

The East Sumba Health Office assumed a pivotal position, directing and coordinating the Umalulu Village malaria survey. Its contribution encompassed full design, staff training, and on-site supervision. The team upheld robust health protocols, supplied critical materials, and pledged to feed the survey data into the formal reporting pipeline, hastening district malaria-control initiatives.

Coordination with PERDHAKI, Community Health Center, Umalulu Village, and Malaria Cadres

PERDHAKI advances malaria eradication in East Sumba via education, cadre upskilling, and RDT-driven screening. During this survey, **PERDHAKI-trained malaria cadre**s served as enumerators. Collaboration with the Umalulu Village Government and Melolo Health Centre ensured local access and on-site support.

Coordination with the Melolo Community Health Center, Umalulu District

Melolo Health Centre *(Puskesmas)* bolstered the malaria survey by furnishing case records, liaising with community leaders, and joining field data-collection teams. Its health personnel served as enumerators, guaranteeing that all procedures complied with on-site health protocols.

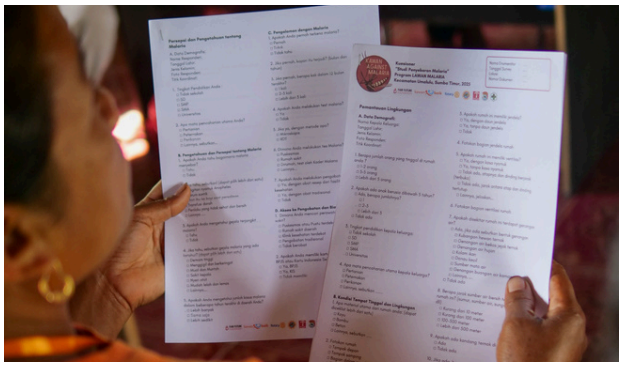
Socialization and Coordination Meeting with Village Government

The Umalulu Village authorities actively supported the malaria survey by facilitating team access, providing local data, encouraging community participation, and coordinating with health centres and cadres to ensure smooth implementation. Their team also arranged village loudspeaker announcements and prepared meeting spaces.

DEVELOPING A SURVEY INSTRUMENT

Designing the questionnaire

To underpin the **Umalulu Malaria Study,** we built a structured questionnaire as the core data-capture tool. It is organised into two complementary modules:



1.Demographic & Environmental Profile

- Living and Environmental Conditions
- Residual Insecticide Spraying *(IRS)*
- Mosquito Net Usage
- Toilet and Sanitation Habits

2. Malaria Knowledge and Experience

- Perceptions and Knowledge of Malaria
- Personal or Household Malaria History
- Access to Treatment and Associated Costs
- Impact of Malaria on Daily Life
- Malaria Prevention Practices

***Offline-first mobile app.** The Kawan Against Malaria platform runs without cellular coverage, then auto-syncs when a signal returns, making data collection resilient and sustainable in ultra-rural settings.*

The form can be completed digitally or on paper; the paper version acts as a contingency when devices or connectivity fail.

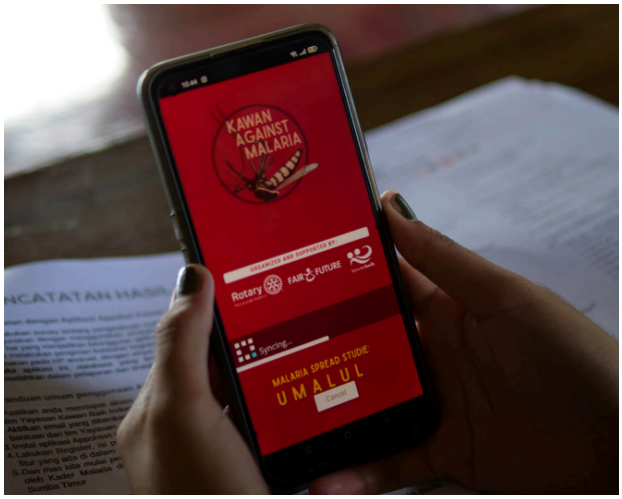
Building the “Kawan Against Malaria” app

To streamline fieldwork, **we developed** the Kawan Against Malaria mobile application*.

The platform works offline first, then **auto-syncs** once a signal returns, preserving **geotagged entries** and **photographs**.

Enumerators reported an intuitive interface, rapid data entry, and filter tools that simplify real-time supervisory checks.

In practice, the app **removed the need for bulk paper forms**, markedly boosting both the speed and accuracy of data processing and subsequent reporting.



SURVEY TEAM RECRUITMENT AND TRAINING

The seven Enumerators who carried out the field study for almost two months

Coordination with the East Sumba District Health Office

For the data collection phase, we partnered with Village Malaria Cadres *(Kader Malaria)* village nurses and staff from the Community Health Centre *(Puskesmas)*. A **total of seven field team member**s were assigned to conduct surveys across **four villages**:

1. **Adriana** Haba Mase, A. Md. Kep
2. **Vinny** Alfionita Ke Lomi
3. **Yus** Tay Kaluki
4. **Maria** Jenine Ata Humba
5. **Diana** Pakadu Ngguna
6. **Delsy** Danga Lila
7. **Mariana** Ana Wulang

Development of the Training Module: Friends Against Malaria

To standardise field practice, a bespoke curriculum titled Friends Against Malaria was delivered to all enumerators. **The module addressed:**

- Malaria epidemiology essentials
- Parasite–vector–host interactions
- Pinpointing environmental breeding hazards
- Standardised community survey techniques
- Digital and paper data-capture workflows
- Cadre-led advocacy for sustained prevention

Most participants already knew these principles, so the course served as a **targeted refresher,** placing special emphasis on hands-on use of the Kawan Against Malaria mobile app for real-time data collection.

Survey Team Training - Implementation

The field team participated in a **two-day workshop** on **April 23–24, 2025**, focusing on deployment logistics, cluster assignments, and supervised drills with the Kawan Against Malaria app.

The interactive sessions included mock interviews, troubleshooting, and data-entry calibration, preparing them for consistent, quality data collection.

IMPLEMENTATION OF MALARIA DATA COLLECTION

Malaria data collection was conducted across 12 hamlets in Umalulu Village. These included:

1. Waimarang
2. Waindingir
3. Mburung
4. Pandir
5. Praiwangga
6. Ramuk
7. Pahomba
8. Lulukawaka
9. Lukumajolung
10. Lukuhua
11. Laitipi
12. Kahembi Katoba

Challenges in Field Data Collection

Despite the team's **strong** commitment, **several** challenges affected the malaria data collection process in Umalulu Village:

Distance Between Households and Weather

Umalulu Village spans **307.90 km²** with a widely dispersed population. While some main hamlets are accessible by vehicles, most homes are spread out—*often **5–10 km** apart*—and many are unreachable by road. As a result, survey teams had to travel on foot. From **May 5 to June 16,** heavy rains frequently disrupted the survey process, delaying visits and requiring teams to work long hours, averaging **8–10 hours** per day.

Environment

The initial target for the household survey was **335 units**; however, **"only" 269** were successfully recorded.

The shortfall reflects real-world obstacles: **24** listed structures proved to be seasonal field huts used only at harvest, **18** houses were under long-term renovation or stood empty, several GPS points lay just outside the Umalulu boundary, and **two** dwellings had been lost to a recent fire.

IMPLEMENTATION OF MALARIA DATA COLLECTION

Knowledge

A minority of participants **experienced communication barriers** stemming from advanced age, illness, or limited literacy. Consequently, some declined the interview or struggled to grasp specific questions fully.

Resident Availability

The knowledge survey ultimately secured **460 completed interviews**—*exceeding the 400*-respondent **target**.

Achieving this figure **required extra effort** because many working-age residents were away **for study** or **seasonal** employment in Waingapu.

To reduce non-response bias, the team scheduled **weekend sessions**, offered interview slots in the sub-district capital, and worked with Village Head **Umbu Jecki Hamanai** to mobilise returnees.

Age Grouping of Umalulu Residents According to Educational Age Range

Age Group	Age Range	Total
0–4 yo	Pre-school Age	141
5-6 yo	Kindergarden School Age	78
7-12 yo	Primary School Age	220
13-15 yo	Junior High School Age	106
16-18 yo	Senior High School Age	81
19-24 yo	College/University Age	158
25-59 yo	Productive / Adult	630
≥60 yo	Elderly	127
TOTAL		**1541**

Age Grouping of Umalulu Residents for Health Statistics Purposes

Age Group	Age Range	Total
0–4 yo	Infants and Toddlers	141
5–9 yo	Children	191
10–14 yo	Early Teens	178
15–19 yo	Late Teens	140
20–24 yo	Youth	134
25–59 yo	Productive / Adult	630
≥60 yo	Elderly	127
TOTAL		**1541**

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

A work that allowed us to learn things we did not suspect

Environmental Monitoring Data

A total of **269 / 355** households *(coverage = 75.8%)* were successfully visited during the environmental-monitoring phase of the study.

Sex distribution of respondents

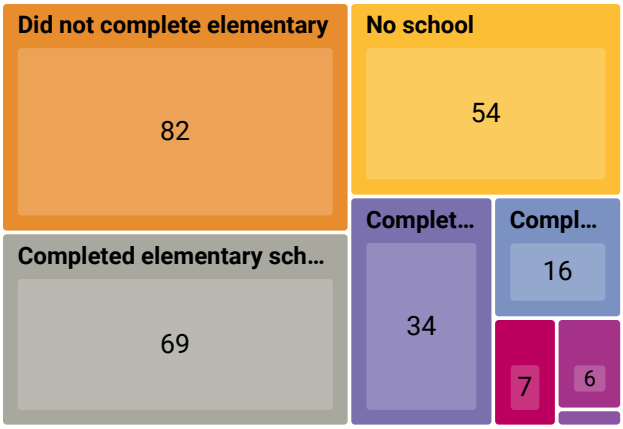
- Male: **177**
- Female: **92**

Men, therefore, made up **about 66%** of interviewees.

This male skew likely reflects the timing of visits, when many women were occupied with **field** labour or **domestic** duties away from the house.

Malaria Distribution Study Survey Data Collection Table

Week	Respondent Total
I	112
II	105
III	29
IV	23
TOTAL	**269**



The majority of respondents in the environmental monitoring survey had low educational attainment, with **82 individuals having not completed** or **only completed elementary school**, followed by **54 individuals who had never attended school.**

76% of the planned environmental monitoring was achieved.

Main Livelihood

Agriculture dominates the local economy: **249 / 269** respondents *(92.6%)* identified farming as their primary livelihood.

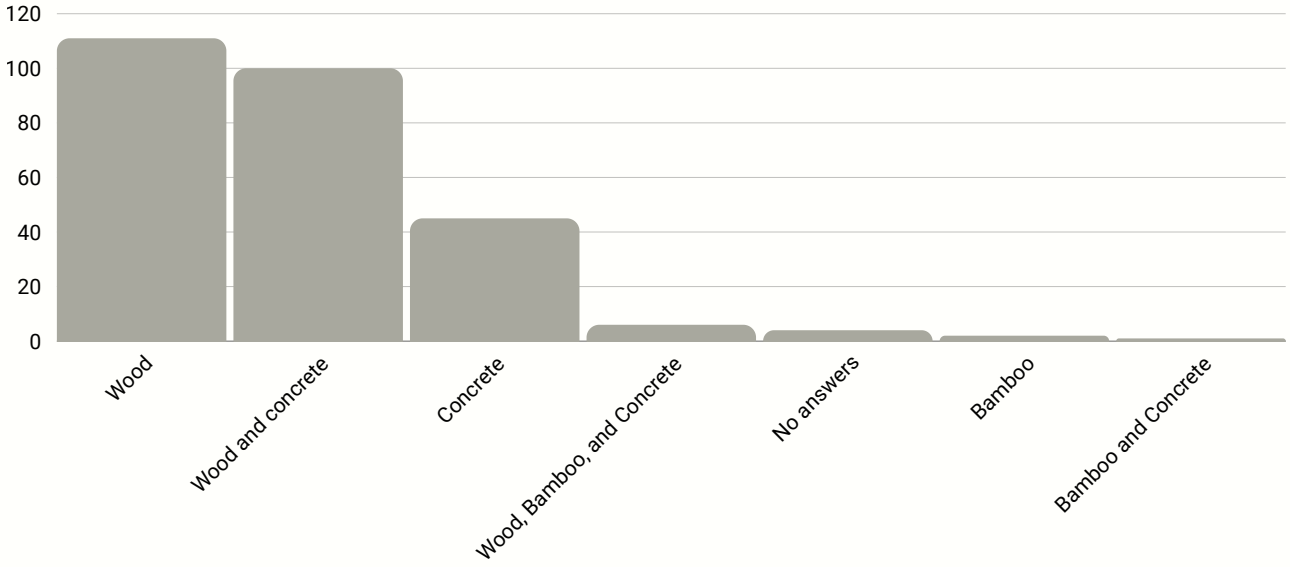
The remainder work as small traders, livestock keepers, motorcycle drivers, teachers, or retirees—underscoring the village's **strong dependence** on rain-fed subsistence farming.

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Overview of Housing Structures in Umalulu Village

Based on the environmental survey, most homes in **Umalulu** Village are made of **wood** *(111 houses)*, followed by **wood** and **bamboo** *(53 houses)*, reflecting **traditional** building practices shaped by local resources and economic conditions.

Primary Building Materials of Houses in Umalulu Village (2025)



Condition of House Windows in Umalulu Village

Based on the environmental survey of 269 houses in Umalulu Village, it was found that:

- **77** houses have windows without shutters,
- **The remaining** houses either have windows with shutters, no windows at all, or the condition was not recorded.

This data reflects variations in home ventilation and security features, which may also relate to comfort and health conditions within the households.

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Air Ventilation in Umalulu Village Homes

Proper airflow helps lower indoor humidity and curtail mosquito entry, yet the survey of 269 houses revealed mixed situations:

- **121** homes *(45.4%)* used wall or eave vents without screening, giving mosquitoes direct access.
- **81** homes *(30.1%)* depended on open roof–wall gaps, also unscreened.
- **24** homes *(8.9%)* had all gaps sealed and no dedicated vents, restricting air exchange.
- **28** homes *(10.4%)* featured screened ventilation that blocks Anopheles while allowing airflow.
- **3** households *(1.1%)* reported atypical ventilation solutions.
- **11** homes *(4.1 %)* provided insufficient information.

These findings emphasise the need for simple structural upgrades—installing insect-screened vents while maintaining airflow—to strengthen household malaria prevention.

Standing Water in Umalulu Village

Of the **269** households assessed, **215** *(≈ 80%)* had no persistent standing water, while **51** *(≈ 19%)* contained stagnant sites such as livestock wallows, rain-filled hoof prints, household drainage pits, small fish ponds, and bathwater spillways.

Residents seldom recognise these micro-habitats as **Anopheles breeding grounds**, so puddles and seepage are rarely drained. Focused **PHBS** outreach and periodic source-reduction drives are essential to disrupt larval development around homes.

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Clean-Water Access in Umalulu Village

While safe water is not a vector, where—and when—people collect it shapes malaria risk. Household distance to the nearest clean-water point (n = 269):

- **69** homes *(25.7%)* ≤ 10 m
- **70** homes *(26.0%)* 10–100 m
- **36** homes *(13.4%)* 100–500 m
- **77** homes *(28.6%)* ≥ 500 m
- **17** households *(6.3%)* gave mixed figures or no answer

Most dwellings sit on hilly terrain; everyday bathing and laundry depend on rivers that thread through forested gullies. Residents commonly walk to these streams **between 17:00 – 18:00**, just as daylight fades and Anopheles mosquitoes begin host-seeking.

This routine inadvertently elevates bite exposure and, therefore, transmission risk. Promoting earlier washing times and on-plot storage of treated water could cut both travel burden and evening vector contact, aligning with **broader PHBS objectives.**

Livestock Proximity to Homes

Domestic animals housed close to sleeping quarters attract zoophilic Anopheles species and create moist micro-habitats for larval development. **Among 269 households:**

- **143** (53%) kept no livestock near the dwelling
- **90** (34%) penned animals within 10 m
- **24** (9%) placed livestock 10–20 m away
- **7** (3%) tethered stock > 20 m from the house
- **5** (2%) provided no distance data

To deter theft, animals are frequently tied beside—*or even beneath*—stilt houses.

During the rainy season, hoof prints and waste retain water, producing **ideal Anopheles breeding spots** and elevating household malaria risk.

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Water Tank Ownership (≥500 L)

- **237** households *(88.10%)* do not have a water tank and rely on direct sources like wells or springs.
- **32** households reported having a water tank, with the following conditions:
  - Closed: **10**
  - Open: **4**
  - Poorly maintained: **1**
  - Clean: **1**
  - Other: **1**
- **15** respondents did not answer.

88.1% of respondents do not own a water tank *(≥500 litres),* indicating a high reliance on direct water sources such as wells, springs, or other open access points.

Anopheles Mosquito Active Times

Anopheles mosquitoes—*the primary vectors of malaria*—are most active at night, in contrast to Aedes mosquitoes, which are active during the day. Their biting behaviour follows a consistent nighttime pattern:

82 respondents reported **frequently** encountering mosquitoes during dusk and nighttime hours, aligning with known Anopheles mosquito activity patterns.

Time of Day & Activity Behavior

Time Period	Activity Description
Dusk *(6:00–8:00 PM)*	Begins seeking hosts (blood meals)
Night *(9:00 PM–2:00 AM)*	Peak biting activity; highest malaria transmission risk
Early Morning *(2:00–5:00 AM)*	Still active; however, with decreasing intensity.
Morning *(after 6:00 AM)*	Mosquitoes rest in dark, damp areas

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Residents' Knowledge of Anopheles Breeding Sites

Survey Results:

Response	Number of Respondents
Know	81
Don't Know	182
No Answer	6
Total	**269**

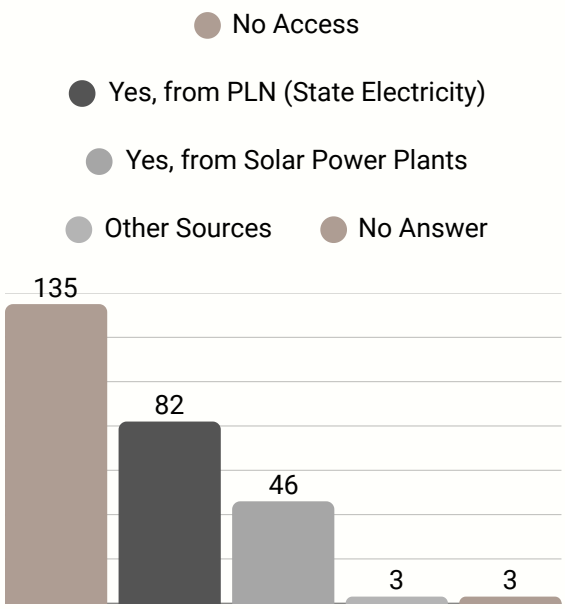
Almost two-thirds of respondents—***182** people (≈ 68%)*—could **not name** common Anopheles breeding sites, underscoring the need for focused **environmental-health education**.

Puddles, **hoof prints** and **grey-water pools** are often viewed as harmless, so residents seldom drain or treat them, allowing vector populations to persist and household malaria risk to rise.

Future PHBS sessions will include hands-on demonstrations such as **tipping out** livestock pans, **covering** laundry basins, and seeding larvivorous fish in unused ponds, empowering every family to spot and neutralise breeding sites around their homes.

Access to Electricity

Survey Results:



Without power, families rely on **costly kerosene**, inhale **smoke**, and children read by **candlelight**. Darkness after 6 pm drives people outdoors, raising mosquito exposure.

Extending PLN lines and village solar kits *—such as SolarBuddy lamps already piloted here—*would cut fuel costs, allow evening study, run fans, and **reinforce night-time malaria protection**.

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Phone Signal and Internet Access

Environmental Monitoring Survey – 2025

Signal and Internet Access	Number of Respondents
No Signal	103
Stable Phone Signal and Internet	33
Phone Signal but Intermittent	101
Phone Signal Only (without Internet)	26
No Answer	6
Total	**269**

More than **75%** of residents experience no or unstable signal, making communication and access to digital services—*including health information and emergency support*—extremely challenging.

Residual Insecticide Spraying (IRS) Coverage

Survey Summary – **269** Households

IRS Spraying Status	Number of Respondents	Percentage (%)
Yes – Sprayed by Government Health Team	3	1%
Never Sprayed	200	74%
No Answer / Don't Know	66	25%
Total	**269**	**100%**

Only 1.1% of households report any IRS, and the last round occurred > 6 months ago.

A further **74.3%** have never been sprayed, while **24.5%** are unsure of their status. Indoor Residual Spraying with **WHO-recommended insecticides** can suppress Anopheles for **4–6 months**; a nearby village that completed two rounds in 2024 documented **a 65%** drop in confirmed cases.

Umalulu *(Sumba Timur)* **still lacks** trained spray teams, pumps, and insecticide stocks, so no campaign has been launched to date.

Mosquito Net Usage

Long-lasting insecticidal nets *(LLINs)* curb malaria by:

- Forming a protective shield during peak night-biting hours
- **Delivering** a lethal dose to mosquitoes landing on treated fibres

Households surveyed: **269** | Sleeping spaces recorded: **693**

Mosquito Net Usage	Number of Households	Percentage (%)
Regular use by all sleeping groups	182	68%
Partial use (not all family members covered)	74	27%
Not using mosquito nets at all	12	4%
No answer	1	1%
Total	**269**	**100%**

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Although most households own and sleep under mosquito nets, nearly **one in three families** still report coverage gaps, leaving members **vulnerable** to infectious bites.

The vast majority of nets in use *(92.9%)* are over one year old; fabric attrition, tears, or waning insecticidal potency can compromise protection.

Most Umalulu residents obtained their nets from the East Sumba Health Office's 2023 mass distribution, a campaign repeated on a three-year replacement cycle.

Damaged or torn nets are often **discarded or repurposed** as crop screens or chicken-coop covers.

Defecation Habits

A total of **269** households were surveyed on their defecation practices:

Defecation Location	Number of Respondents
In the garden/open space	153
Private toilet (outside the house)	90
Public toilet	15
Private toilet (inside the house)	10
No Answer	1
	269

Over one-half of households *(56.9%)* still defecate in the open, usually in gardens or nearby scrub.

Risk awareness: When asked, **125** respondents *(46.5%)* reported no knowledge of dangers.

Others mentioned:

- spread of enteric pathogens
- harm to personal health
- environmental contamination.

Conclusion: parallel investment in household latrines and behaviour-change education is urgently needed to curb open defecation and its related risks.




MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Toilet and Septic Tank Conditions

Of the **269** households surveyed:

Sanitation Condition	Number of Respondents
No toilet	143
Have toilet with septic tank	58
Have toilet without septic tank	42
No answer	26
Total	**269**

Only **58** households possess toilets with **sealed** septic tanks. Another 42 vents raw effluent **onto soil** or into **shallow pits**, creating exposed waste pools and contaminating nearby water.

Alarmingly, *53.2%*—**143** households—**have no toilet at all.**

Self-rated toilet status

- Good: **47**
- Poor: **4**
- No details: **remainder**

Uncontained sewage forms nutrient-rich standing water where Anopheles larvae thrive, while also spreading **diarrhoeal** and **helminth pathogens**.

This **dual threat** underlines the need for household latrines plus community-wide WASH education.

Hanging Clothes Habits

Hanging Location	Number of Respondents
On the terrace	102
In the bedroom	36
In the living room	34
Bedroom and living room	2
Bedroom and terrace	2
Living room and terrace	1
No answer	92
Total	**269**

- **102** respondents *(37.9%)* hang clothes on terraces, the most common spot. These open areas are more accessible to mosquitoes, especially during dusk and nighttime.
- **92** households *(34.2%)* did not specify their hanging habits, highlighting a potential gap in awareness or concern about the malaria-related risks.

Clothes hung indoors *(in the bedroom or living room)* still pose a risk if these areas are not well protected by nets or screened ventilation.

Minimal community awareness of environmental hygiene sustains behaviours that boost vector density.

Example: Many Umalulu households **air-dry** worn garments indoors; the damp, odour-laden fabric offers shaded, bite-ready **resting niches** for Anopheles species, which are strongly drawn to **human-sweat** volatiles.

MALARIA STUDY DATA MANAGEMENT IN UMALULU VILLAGE

Hanging Clothes Habits

This habit is **influenced** by the traditional structure of houses, which often includes numerous **wooden beams** or **crossbars**. Families suspend **both clean and dirty** garments overhead to keep them out of reach of **goats** and **pigs** that roam beneath stilt floors.

Limited cash income and frequent **termite damage** make wardrobes uncommon, so beams double as storage racks, leaving clothes exposed longer and **retaining human odours** that attract resting mosquitoes.

MALARIA PERCEPTION AND KNOWLEDGE QUESTIONNAIRE

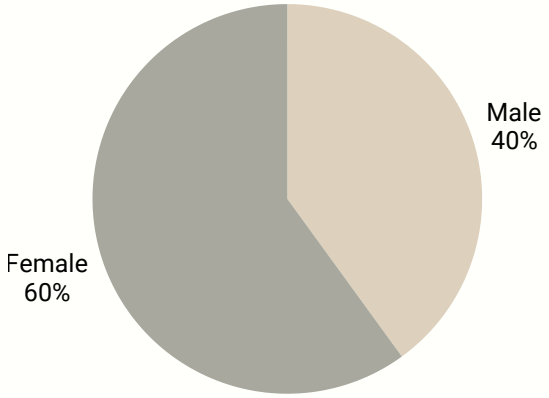
Demographic Overview

115%
achievement

A total of **460** respondents participated in the survey, exceeding the target of **400**.

The gender **ratio was 6:4**, with **276** female and 184 male respondents.

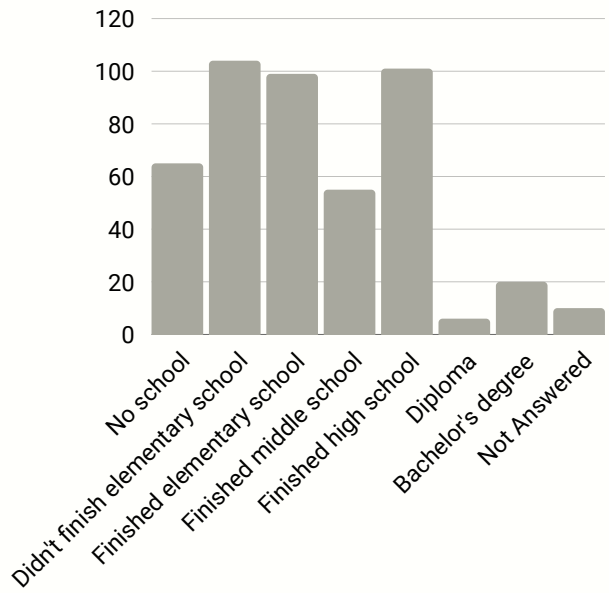
Education data showed that the largest group—**104** respondents—had not completed primary school.



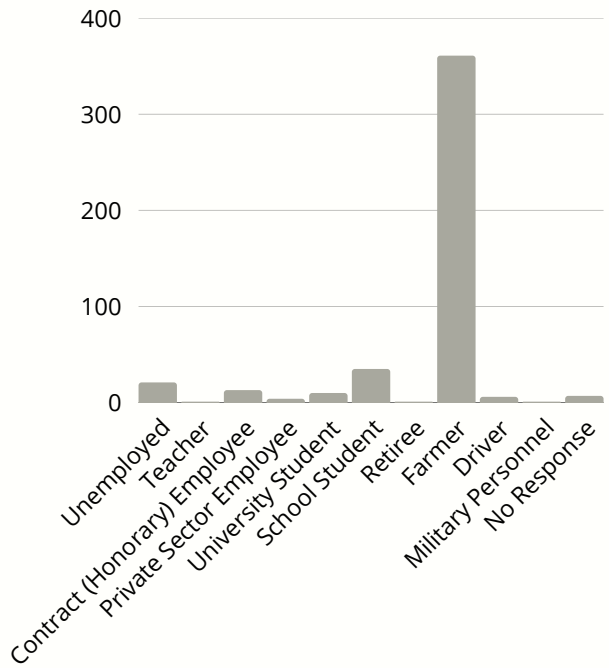
A significant share of Umalulu respondents—***104*** *of* ***460***—never completed elementary school.

Such **educational deprivation** correlates with poor awareness of malaria symptoms, net maintenance and timely care-seeking, fuelling consistently high infection rates in the village.

Early drop-outs often leave for seasonal labour, missing school-based health talks and further widening the knowledge gap.



The majority of respondents in the Malaria Perception and Knowledge survey***—361 out of 460—reported*** farming as their main livelihood, highlighting the community's **dependence on agriculture** and **prolonged exposure** to outdoor environments, which increases malaria risk.



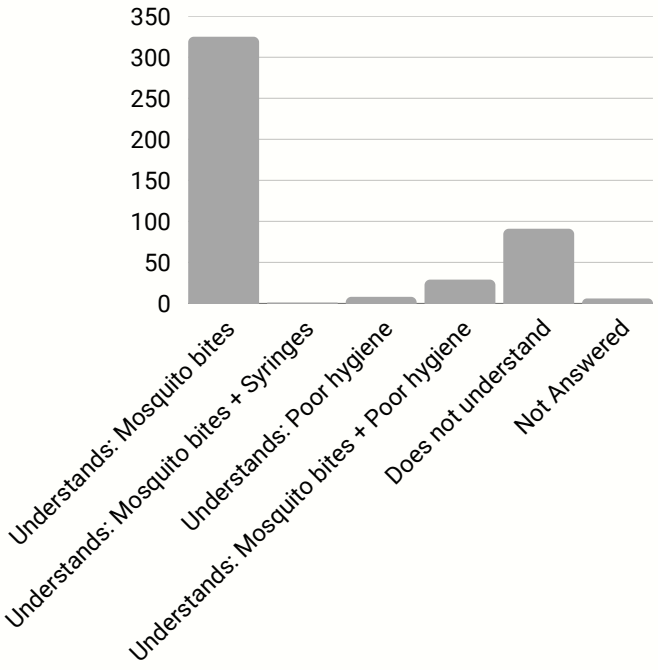
MALARIA PERCEPTION AND KNOWLEDGE QUESTIONNAIRE

Knowledge and Perception of Malaria

Approximately **77%** of interviewees *(325 people)* **correctly stated** that malaria is transmitted by the bite of an infected Anopheles mosquito, reflecting a solid **baseline** of **biological** knowledge built through prior net-distribution drives and local radio spots. Knowing how malaria is spread **is the first step**; consistently applying prevention measures is the next.

Yet almost one-fifth—***91*** *respondents (≈ 20%)* —either did not answer or cited **erroneous** causes such as **dirty water**, **"night air,"** or **witchcraft**. These gaps can erode **trust in IRS** campaigns and reduce consistent LLIN use.

Bridging these needs requires age-specific IEC materials, village dialogues, and school lessons on the mosquito–human cycle, early testing, and treatment.



Malaria Cases in the Past Year

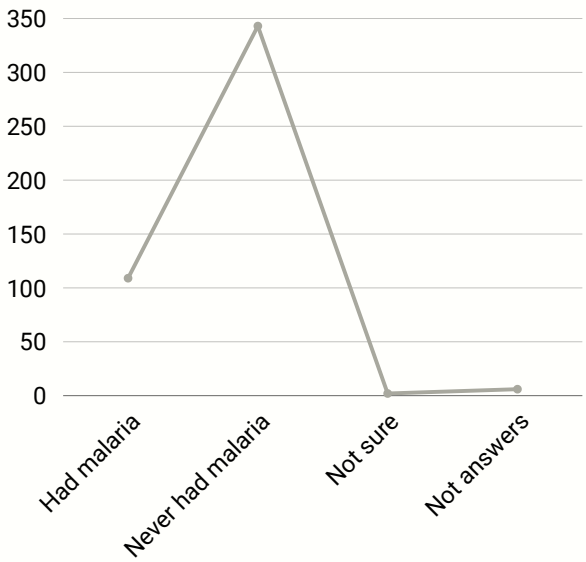
Out of **460** respondents, most *(84.2%)* reported that malaria cases had either decreased *(194)* or remained the same *(193)*, indicating no significant rise.

Only **65** said cases had increased, and **8** gave no answer.

Do you know id the cases is lower or higher?	Number of Respondents
More Cases	65
Less Cases	194
Same Cases	193
Not answered	8
Total	460

Personal Experience with Malaria

Nearly a quarter of respondents *(23.7%)* reported **having contracted malaria** within the past five years, indicating a **high level** of exposure and underscoring the ongoing need for sustained prevention and control efforts in Umalulu.



MALARIA PERCEPTION AND KNOWLEDGE QUESTIONNAIRE

Most respondents *(74.6 % / **343** people)* stated they had never experienced malaria.

Yet **transmission in Umalulu remains high**, boosted by spill-over from neighbouring hotspots such as **Ngaru Kanoru** and **Watu Pudda.**

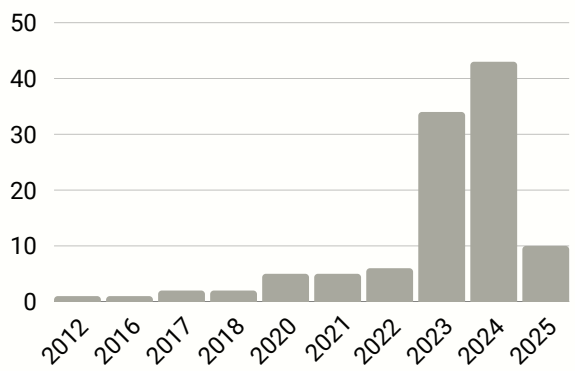
Incidence peaks from August to November, aligning with the **dry-to-wet season shift** that favours vector breeding.

Timing of Malaria Infections

A significant spike in malaria cases occurred between **2023** and **2024**, with **77** out of **109** total reported cases *(70.6%)* happening in just the last two years. This suggests a possible localised outbreak and a concerning upward trend.

The year 2024 recorded the highest number of cases with **43 infections** *(39.4%)*, marking a critical point for intensified prevention and control efforts.

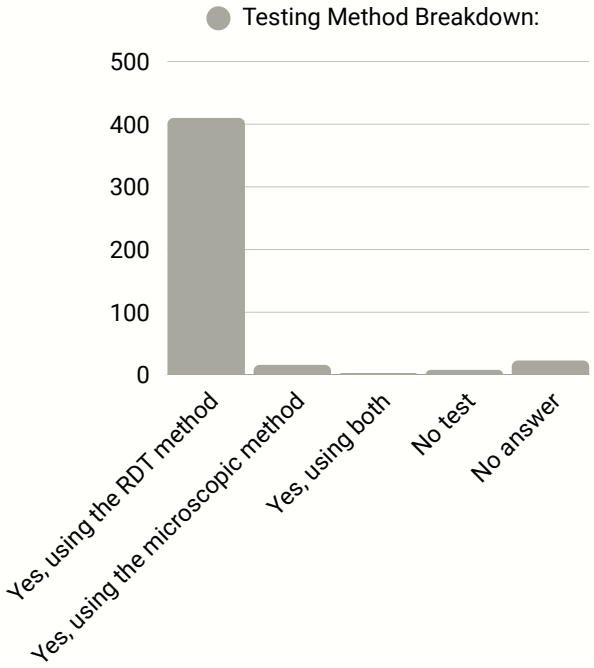
Data for 2025 is partial/year-to-date.



Malaria Examination Method

The survey results indicate that Rapid Diagnostic Tests *(RDTs)* are the most commonly used method for malaria testing in Umalulu Village, with **89.1%** of respondents *(410 people)* reporting they were tested using RDTs.

A smaller portion underwent microscopic testing or a combination of both methods, while some reported no testing experience.



These findings underline **the urgency of keeping RDT stocks** uninterrupted at Puskesmas, Pustu and the cadre level.

The kits are affordable, yield results **within 15 minutes**, and remain the sole diagnostic option where microscopy, stable power or cold-chain storage **are absent**, making them indispensable for timely case detection and treatment initiation

MALARIA PERCEPTION AND KNOWLEDGE QUESTIONNAIRE

Where People Get Tested for Malaria?

Testing Location	Number of Respondents
At home, tested by village malaria cadres	313
Community Health Center	36
Community Health Center & At home by village malaria cadres	81
No answer	26
Hospital	2
Others	2
Total	**460**

Among **460** interviewees, **313** *(68%)* were tested at home by trained village health cadres, while **81** *(17.6%)* received a mix of home and Puskesmas testing.

These proportions confirm **cadres as the frontline** for rapid RDT-based case-finding and validate Umalulu's community-centred surveillance model.

Only **7.8% of tests** were done solely at the Puskesmas and **< 1%** in hospitals—signalling **barriers of distance**, **cost**, and **wait time**, plus the strong community trust **vested in cadres** over formal facilities.

Regular RDT resupply and refresher cadre training will be vital to sustain this coverage.

Malaria Treatment Access

A total of **221** respondents *(48%)* reported receiving malaria treatment with a prescription from a health facility. This reflects a positive level of trust and access to formal medical services for malaria treatment in the Umalulu community.

However, **133** respondents *(28.9%)* indicated not receiving any treatment, and **105** *(22.8%)* did not answer, suggesting potential gaps in access, awareness, or follow-up that may need to be addressed.

Treatment Type	Number of Respondents
Yes, with a prescription from a health facility	221
No	133
No answer	105
Yes, with traditional medicine	1
Total	**460**

MALARIA PERCEPTION AND KNOWLEDGE QUESTIONNAIRE

Preferred Place for Medical Care

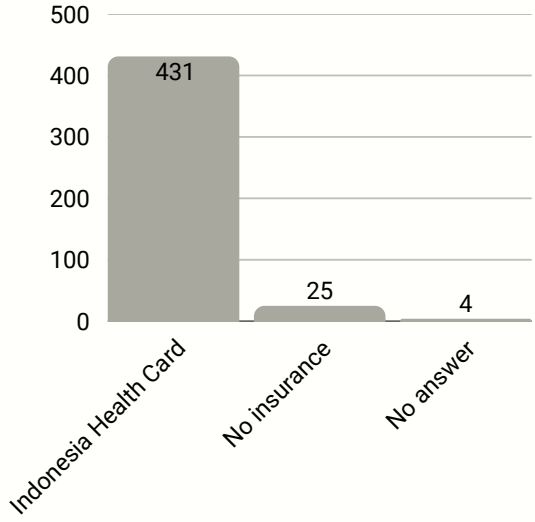
Community Health Centres (*Puskesmas/Pustu*) are the primary choice for healthcare in Umalulu Village, with **446** out of **460** respondents *(97%)* relying on them when sick.

This highlights the **central role of Puskesmas/Pustu** in managing diseases like malaria.

Where People Seek Care – Respondents:	Number of Respondents
Community Health Centre	446
No answer	5
No treatment	4
General hospital	3
Nearest clinic	1
Traditional medicine	1
Total	**460**

Health Insurance Coverage

Most residents report having government-sponsored health insurance:



93.7% of respondents *(431 people)* hold **KIS** or **BPJS** cards, showing broad enrolment in Indonesia's public insurance schemes.

These programmes finance doctor consultations, **RDTs** and first-line antimalarials at Puskesmas, sharply cutting direct medical costs; however, **they do not cover** travel expenses or lost wages, barriers residents still mention **when delaying care**.

Distance to Health Care Facilities

More than half of Umalulu residents live far from health services:

Distance to Health Care	Respondents
More than 5 km	250
1-5 km	188
Less than 1 km	14
No answer	8
Total	**460**

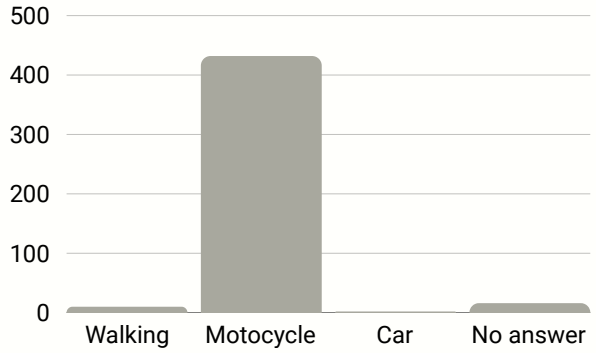
MALARIA PERCEPTION AND KNOWLEDGE QUESTIONNAIRE

Travel Time to Health Care Facilities

As many as **52%** *(239 people)* needed **15 to 30** minutes to reach a health facility. This time is quite normal in rural areas, but in malaria cases requiring rapid treatment, it can still result in delayed diagnosis and treatment.

Travel Time	Respondents
15-30 minutes	239
More than 30 minutes	169
Less than 15 minutes	43
No answer	9
Total	**460**

Access to Health Facilities



Motorcycles are the dominant mode of transportation, with **93.9%** *(432 out of 460 respondents)* relying on them to reach health centres.

This highlights the community's dependence on motorbikes—likely due to poor road infrastructure, affordability, and their ability to navigate rural terrain.

Access to Malaria Medication

Almost half of the respondents *(47.8%)* said obtaining anti-malarial drugs in Umalulu is straightforward.

This suggests the treatment supply chain is working reasonably well—Puskesmas pharmacies stay stocked, village cadres carry reserve doses, and artemisinin-based combination therapy *(ACT)* is dispensed immediately after a positive RDT.

Yet roughly one-third find access only *"sometimes easy,"* and **6.3%** still face difficulty, signalling the need to reinforce last-mile delivery and maintain buffer stocks for people in the most remote hamlets.

Access Level	Number of Respondents	Percentage %
Easy	220	47.8%
Sometimes easy	132	28.7%
Not easy / Difficult	29	6.3%
No Answer	79	17.2%
Total	**460**	**100%**

MALARIA PERCEPTION AND KNOWLEDGE QUESTIONNAIRE

Malaria Treatment Costs

The majority of respondents ***(67.8%)*** did not incur any costs, indicating that access to malaria services and treatment in Umalulu is covered by the state, most likely through **BPJS**, **KIS**, or free services at community health centres.

This is an indicator of the success of the **malaria elimination program** in promoting access to services without the burden of cost.

Treatment Cost	Number of Respondents	Percentage (%)
Free	312	67.8%
No answer	92	20%
Less than IDR 50,000	46	10%
IDR 50,000 – 100,000	5	1.1%
More than IDR 100,000	5	1.1%
Total	**460**	**100%**

The fact that **67.8%** of respondents received malaria treatment free of charge indicates that health financing mechanisms such as BPJS & KIS, or public health subsidies, are effectively reaching the majority of Umalulu's population.

This demonstrates a **positive outcome** of the malaria elimination programme, showing that the community can access essential treatment without financial hardship.

Ownership of Mosquito Nets

Ownership Status	Number of Respondents	Percentage (%)
Don't Have	419	91.1%
Have	26	5.7%
No answer	15	3.3%
Total	**460**	**100%**

Only **5.7%** of residents currently own mosquito nets*, while **91.1%** do not, despite previous distributions by the East Sumba Regency Government.

The main reasons include economic hardship, net damage, and repurposing nets for agriculture.

This highlights the urgent need for both **regular distribution** and **education on maintenance** to ensure mosquito nets are used effectively for malaria prevention.

230 Long Lasting Insecticidal Nets (LLIN)

On this occasion, the enumerator team distributed **230 units** of RELIEFNET **0.18 LLIN** mosquito nets to households identified as still sleeping without protection.

These nets were provided free to families in high-risk groups to support malaria prevention in Umalulu.

***Methodological note.** Net ownership = households (≥1 LLIN); coverage = individual sleeping spaces; a household can protect several beds with multiple nets, hence different percentages."*

NET DISTRIBUTION SUMMARY

A total of **230 malaria mosquito nets** were distributed to **155 respondents'** houses, reaching **704 individuals**. Of the 704 family members, **439 sleeping groups** were identified, with the highest frequency being three sleeping groups per family, recorded in **66** households.

Key highlights:

- **131** households were single-household homes, while the rest housed multiple families.
- **60** children under five and 3 pregnant women lived in the recipient households—both groups at high risk for malaria.
- The highest number of sleeping groups per home was three, recorded in 66 households.

Number of Sleeping Groups per-house	Number of Houses	Total of Sleeping Groups
0	4	4
1	14	14
2	34	68
3	66	198
4	32	128
5	3	15
6	2	12
Total	**155**	**439**

Out of **155** households, **72** received mosquito nets according to the number of sleeping groups, while **83** households did not receive adequate coverage. Three households did not provide a response.

71% *(110 respondents)* of **155** respondents have attended counseling on the use of malaria mosquito nets as a form of prevention.

84.5% *(131 respondents)* of the **155** respondents knew how to install malaria nets properly and correctly.

79.5% *(132 respondents)* of **155** respondents knew how to care for and wash malaria mosquito nets properly and correctly.

230 new malaria nets have been distributed to the **155** homes reached. This means that half of the sleeping population now has new nets.

Out of the **83** respondents, they stated that they still needed **209** new mosquito nets.

IMPACT OF MALARIA ON DAILY ACTIVITIES AND HOUSEHOLD ECONOMY

Disruption of Daily Activities

Malaria has **disrupted** the **livelihoods** and **routines** of many residents in Umalulu Village. According to the survey, **25.7%** *(118 people)* reported having missed **work or school** at least once due to malaria.

Meanwhile, **53.3%** *(245 respondents)* said they had never missed work or school, and **21.1%** *(97 respondents)* did not provide an answer.

These numbers indicate that while not all residents are directly affected in terms of absenteeism, a significant portion of the population **experiences interruptions** in productivity **due to malaria episodes.**

Category	Number of Respondents	Percentage (%)
Never	245	53.3%
Once	**118**	25.7%
No answer	97	21.1%
Total	**460**	**100%**

Economic Impact on Families

Among the **296** respondents who provided information on household financial effects, a striking **83.5%** *(247 people)* reported that malaria had a severe impact on their family's income.

This reflects the heavy economic burden malaria places on low-income households, especially those relying on informal work or daily labour.

Only **5.4%** reported no impact, and **10.1%** felt a moderate effect, emphasising the urgent need for more robust malaria prevention and support interventions.

Category	Number of Respondents	Percentage (%)
Severe impact	**247**	**83,5%**
Moderate impact	30	10.1%
No impact	16	5.4%
Slight impact	3	1.0%
Total	**296**	**100%**

These figures reinforce the importance of continued malaria prevention efforts, timely treatment, and improved access to health services to reduce the burden on families—both in terms of health and income.

IMPACT OF MALARIA ON DAILY ACTIVITIES AND HOUSEHOLD ECONOMY

Malaria Prevention Awareness

Community understanding of malaria prevention in Umalulu Village is relatively high. Out of **460** respondents, **368** people *(80%)* reported knowing how to protect themselves, their families, and their communities from malaria.

This indicates that **our public health messaging** has reached the majority.

Knowledge of Malaria Prevention	Number of Respondents	Percentage (%)
Know	368	80%
Don't know	84	18.3%
No answer	8	1.7%
Total	**460**	**100%**

However, a **worrying 18.3%** of respondents **confessed they lack** any knowledge of malaria prevention, exposing **a critical educational** gap.

This subgroup forms a weak link in community-wide defence, as practical control hinges on full participation from every household.

If **even a small cluster** stays unaware or ignores protective measures, the overall risk of parasite transmission **rises sharply** for all residents.

Qualitative interviews expose persistent gaps in understanding **Anopheles biology**, the village's chief malaria vector.

Many residents **are unaware** that these mosquitoes feed almost exclusively after dusk and hide in cool, humid corners indoors. Misbeliefs—*such as thinking malaria becomes serious only once high fever appears*—delay protective action.

Continuous health education should highlight:

- The strictly night-time biting behaviour of Anopheles.
- Nightly use of intact, insecticide-treated nets, especially for children and expectant mothers.
- Early recognition of fever, chills, and headache, followed by prompt RDT testing.
- Shared responsibility, since a single unprotected household can endanger the entire neighbourhood.

Door-to-door coaching, refresher courses for village cadres, and age-appropriate school programmes will help close this knowledge gap and **build a stronger**, **more malaria-resilient** community.

IMPACT OF MALARIA ON DAILY ACTIVITIES AND HOUSEHOLD ECONOMY

Night time Exposure and Protective Behaviors

The majority of respondents ***(61.5%)*** admitted to frequently engaging in activities at night or early morning. This is when Anopheles mosquitoes are most active, putting them at higher risk of being bitten.

Nighttime or Early Morning Activities	Number of Respondents	Percentage (%)
Yes	283	61,.5%
No	174	37.8%
No answer	3	0.7%
Total	**460**	**100%**

Roughly **61.5%** of interviewees said they routinely work or travel between dusk and dawn—tending **fields**, **hauling water**, or attending village **gatherings**. Because night-biting Anopheles mosquitoes peak-feed during these hours, such mobility greatly **amplifies human-vector** contact and infection risk.

While only four in five respondents practise at least one protective behaviour, this proportion is slightly higher than the **77%** who can state the mode of transmission—showing that some people take protective steps even without precise biological knowledge

Encouragingly, about **80%** reported wearing **long sleeves** or **sarongs** during outdoor night work, a simple yet effective mechanical barrier against bites.

This uptake of personal protection signals a solid baseline of prevention awareness and offers a platform on which to build stronger, community-wide malaria resilience.

Key takeaways

- Although dusk-to-dawn activity keeps exposure high, risk-mitigating habits—*covering arms and legs*—are already widely practised.
- This protective behaviour must reach the remaining ***20%*** who still work after dark with uncovered skin.
- Outreach should highlight a layered defence: combine long clothing, nightly LLIN use, topical repellent, and well-timed IRS to close multiple transmission routes.
- Community champions and school health clubs can model these practices, spreading peer-to-peer motivation through classroom talks and household visits.

The community's baseline compliance is a solid springboard; with **targeted** messaging, regular net **replacement**, cadre-led repellent **distribution**, and timely IRS **campaigns,** Umalulu and East Sumba can drive malaria incidence **downward** and **better shield** its most vulnerable residents.

IMPACT OF MALARIA ON DAILY ACTIVITIES AND HOUSEHOLD ECONOMY

Awareness of Malaria Prevention Campaigns

Community awareness of malaria prevention efforts in Umalulu Village is remarkably high, reflecting the effectiveness of ongoing outreach and education initiatives.

Awareness of Malaria Campaign	Number of Respondents	Percentage (%)
Yes	409	88.9%
No	47	10.2%
No answer	4	0.9%
Total	**460**	**100%**

Almost **89% of survey** respondents recalled receiving at least one malaria-prevention message in their village.

This implies that current IEC/BCC channels—*village assemblies, Posyandu briefings, school health clubs, and NGO roadshows*—are successfully reaching **the majority** of households.

Yet the **11.1% still uninformed** create a critical **blind spot** in the village's herd-protection barrier.

Inclusive, last-mile IEC/BCC must reach remote hamlets and high-risk cohorts—*elderly carers, persons with disabilities, migratory farm families*—so no household is **overlooked**.

Next steps

- Micro-target follow-up visits to that **11%,** using Kawan-app maps to locate gaps.
- Broaden social mobilisation through village champions, youth clubs, women's groups and faith leaders.
- Turn awareness into practice via interactive tools—role-play drills, flip-chart storytelling, live LLIN-installation demos.

The **89%** awareness rate is promising; sustained, multi-channel engagement will convert **knowledge into routine** prevention behaviour and drive malaria incidence ever lower across Umalulu and East Sumba.

Two of our enumerators are at work in one of the 400 houses in Umalulu

HUMAN FACTORS DRIVING MALARIA

Social Conclusions

- **Infrastructure gaps amplify risk.** More than half of households still lack electricity, limiting evening lighting, fan use, and phone charging. Mobile network coverage is unstable for three-quarters of families, blocking timely health messaging and emergency calls.

- **Sanitation is a critical weak link**. Open defecation remains the norm for **56.9%** of residents, and only **21.6%** use toilets with septic tanks, leaving grey-water pools that breed mosquitoes and spread enteric pathogens.

- **Education and income vulnerability**. One in four adults never finished primary school, a factor tied to limited malaria knowledge, and **83%** of families report severe wage loss when illness strikes, deepening poverty cycles.

- **Gendered burden.** Women shoulder most domestic labour and caregiving, yet formed **60%** of interviewees, highlighting their dual role as informal health guardians and the group most affected when farm work is interrupted.

- **Night-time livelihoods heighten exposure**. About **61%** of adults work, collect water, or attend events after dusk—*exactly when Anopheles mosquitoes seek hosts*—linking essential economic routines to elevated infection risk.

John of Rotary International, leaving a coordination session at Puskesmas de Melolo

CLINICAL PORTRAIT OF UMALULU

Medical Conclusions

- **Vector control remains inconsistent**. Only **68%** of sleeping spaces are fully covered by LLINs; 27% are partially covered, and 4% still lack any net*. Over 92 % of nets in use are more than a year old, with diminished insecticidal effectiveness.

- **IRS coverage is minimal.** Only **1.1%** of households recall an indoor-spray round; three-quarters have never been treated.

- **Structural risk factors continue.** Unscreened ventilation in **45%** of homes and livestock tethered beneath stilt floors create ideal resting and breeding sites for Anopheles.

- **Diagnosis is community-led.** Village cadres perform **68%** of all malaria tests at home using RDTs—showing the importance of decentralised case finding.

- **Treatment is free but not equally accessible**. While **68%** of patients pay nothing at the Puskesmas, **29%** still delay or avoid care, citing 30-minute motorbike rides, transport cost, or stock-outs.

- **Behavioural exposure persists.** Night farming, dusk river bathing, and clothes drying on open terraces keep skin exposed just when mosquitoes bite most, maintaining transmission despite basic prevention efforts.

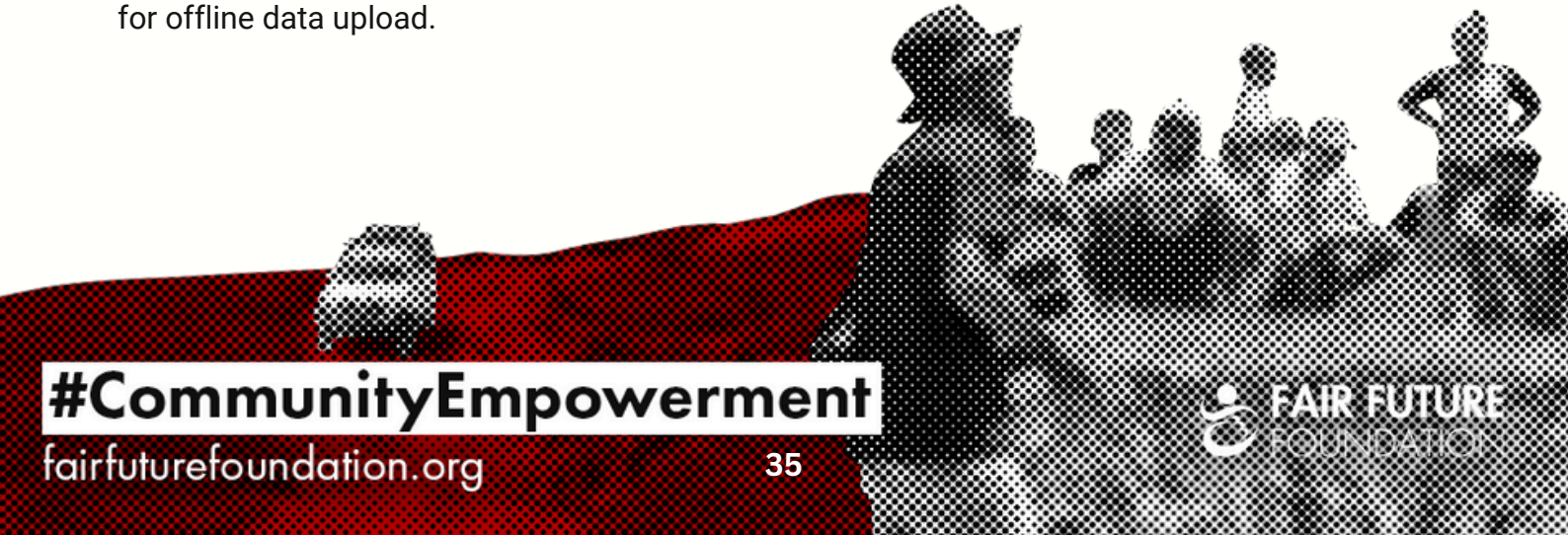
***Methodological note.** Net ownership = households (≥1 LLIN); coverage = individual sleeping spaces; a household can protect several beds with multiple nets, hence different percentages."*

Families in Umalulu receive treated mosquito nets to protect them against malaria

ACTION ROADMAP FOR COMMUNITY CHANGE

Integrated Recommendations

- **Scale proven vector control.** Double LLIN coverage to close the **32%** gap, prioritising children under **5 years** and **pregnant women,** and launch IRS rotations every dry season.
- **Invest in WASH.** Subsidise household latrines and communal rainwater tanks to reduce standing water; pair this with cadre-led hygiene sessions.
- **Engineer safer housing.** Install insect-screened vents, seal gaps between roof and walls, and move livestock pens **at least 20 metres** from dwellings to lower indoor mosquito density.
- **Strengthen the cadre network.** Supply RDTs and ACT stocks, provide annual refresher training, and equip cadres with solar tablets for offline data upload.
- **Target health literacy.** Develop pictorial, low-text modules for adults with low literacy and engage school clubs to promote children as “malaria ambassadors.”
- **Buffer household income shocks.** Pilot a community *“Kassa Malaria”* fund or PKH top-up during peak season to mitigate lost wages and transport costs.
- **Expand off-grid solar access.** Distribute SolarBuddy lamps and promote micro-grids so families can study, operate fans, and receive phone alerts without kerosene smoke.



All participants receive a certificate signed by us and the authorities of East Sumba

ACKNOWLEDGEMENTS

We extend our heartfelt gratitude to all donors and partners who have made **the Malaria Distribution Study** in Umalulu Village possible. Your unwavering support—*through funding, manpower, and cross-sector collaboration*—has been instrumental in the successful implementation of this initiative.

This study would not have been possible without your contribution. Your presence in this shared mission has ensured the smooth execution of activities and the production of meaningful, community-rooted results. We are deeply grateful for your trust, dedication, and commitment.

We look forward to **continued collaboration** in our shared vision of building a healthier, malaria-free Umalulu and entire East Sumba, where every family can live, work, and grow in **dignity** and **well-being**.

Donors

- Australian Rotarians Against Malaria *(ARAM)*
- Rotary International
- Fair Future Foundation
- Kawan Baik Indonesia

Partners

- Kabupaten Sumba Timur
- East Sumba Regency Health Office
- Melolo Community Health Centre *(Puskesmas)*
- Melolo District Government
- Umalulu Village Authorities
- PERDHAKI *(Association of Voluntary Health Services of Indonesia)*

Enumerators

- **Adriana** Haba Mase, A. Md. Kep
- **Vinny** Alfionita to Lomi
- **Yus** Tay Kaluki
- **Maria** Jenine Ata Humba
- **Diana** Pakadu Nguna
- **Delsy** Danga Lila
- **Mariana** Ana Wulang

> *This survey proves that when villagers drive the data collection themselves, the results are more precise and the solutions more readily adopted. Our district will use these findings to guide immediate vector-control and sanitation upgrades in Umalulu.*
>
> ***Jecki Hamanai,*** *Village Head of Umalulu*

A WORD FROM US

From the President - From Alex

Dear Friends and Donors

When we launched this survey five months ago, our goal was simple: to replace assumptions with evidence.

Today's findings are not the first malaria data ever gathered in East Sumba, but they are the first door-to-door baseline for Umalulu, planned and carried out by our teams **working side-by-side with the villagers**, **independently of any government survey**. I walked each track with them, watching their curiosity turn to astonishment as household-level data uncovered silent crises in nutrition, water, sanitation, and lost income. **This report, therefore, offers a double perspective**: the community's own reality, recorded in real time, and a meticulously documented dataset to guide action.

The numbers speak for themselves: transmission is far higher than official figures suggest. When a health system doesn't actively search for cases, the number of *"confirmed"* cases remains low, which is reassuring—helpful for budgets and tourism, but fatal for families. At the same time, drastic budget cuts to public health, education, and infrastructure *(2025)* have left local Puskesmas without rapid tests, insecticides, or fuel. Even the basic coverage of the **BPJS/KIS** now excludes first-line antimalarials in Indonesia.

Yet I remain optimistic. We now have the recipe for change: 269 environmental audits, **460** household interviews, **693** sleeping area inspections, and thousands of geotagged risk points. What we lack are the operational ingredients: mosquito nets, spray pumps, a stock of RDTs, stipends for cadres, and a modest fund to compensate for lost wages. With committed partners, these gaps can be filled.

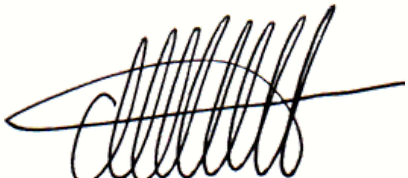
Fair Future Foundation and Kawan Baik Indonesia will use these results to:

- Target vector control where coverage is lowest;
- Scale up WASH interventions that eliminate breeding sites.
- Strengthen village leaders by providing them with supplies, training, and solar technologies;
- Advocate for the reinstatement of reimbursement for essential medicines.

We invite governments, donors, researchers, and local leaders to join this evidence-based movement.

The road ahead is challenging, but the roadmap is clear: together, we can turn the tide on malaria for every child in Umalulu.

Thank you for your support.



Alexandre Wettstein
President and Founder

FAIR FUTURE FOUNDATION

In our work, we perform thousands of microscope tests. Here at Rumah Kambera

GLOSSARY OF KEY TERMS

Below is a ready-to-paste glossary you can drop into the report. Each definition is a single, clear sentence.

- **API** *(Annual Parasite Incidence)* – Number of laboratory-confirmed malaria cases per 1,000 population in a calendar year, used to grade transmission intensity.
- **BPJS-Kesehatan / JKN** – Indonesia's national health-insurance scheme that finances most outpatient and inpatient medical care.
- **BPJS-Ketenagakerjaan** – Social-security programme that offers work-injury and life-insurance coverage to formal and informal workers.
- **BUMDes** – *"Badan Usaha Milik Desa"*; a village-owned enterprise that manages and funds local economic activities.
- **Cadre / Kader** – Trained community health volunteer who supports prevention, data collection, and basic care at the village level.
- **CDC Light Trap** – Battery-powered device that attracts and captures host-seeking mosquitoes for entomological surveys.
- **Clean and Healthy Living Behaviour (PHBS)** – Indonesian health-promotion framework encouraging hygiene, sanitation, and disease-prevention habits.
- **Cluster** – Small geographic unit *(e.g., one subvillage/RT)* treated as a single sampling or intervention area.
- **IRS (Indoor Residual Spraying)** – Periodic application of long-lasting insecticide to interior walls to kill resting mosquitoes.
- **Kawan Against Malaria App** – Offline-first mobile platform built for this study that collects geo-tagged survey data and auto-syncs when online.
- **LLIN** *(Long-Lasting Insecticidal Net)* – Bed net factory-treated with insecticide that remains effective for at least three years without retreatment.
- **PAUD** – *"Pendidikan Anak Usia Dini"*; early-childhood education centres are often used for health outreach activities.
- **PKH** – *"Program Keluarga Harapan"*; a conditional cash-transfer scheme for Indonesia's poorest households.
- **Posyandu** – A Monthly integrated health post where mothers and cadres monitor child growth, vaccination, and nutrition.
- **Pustu** – *"Puskesmas Pembantu"*; auxiliary health post under a main Puskesmas, serving remote hamlets.
- **Puskesmas** – Government community health centre providing primary care, basic laboratory services, and disease surveillance.
- **RDT (Rapid Diagnostic Test)** – A point-of-care blood test that detects malaria antigens in 15–20 minutes without microscopy.
- **Residual Foci** – Localised areas where malaria transmission persists despite control measures, potentially re-seeding infection.
- **Surveillance Cascade** – A Sequential process of case detection, reporting, investigation, and response used in malaria elimination programmes.
- **ACT** *(Artemisinin-based Combination Therapy)* – WHO-recommended first-line treatment pairing artemisinin with a partner drug to clear Plasmodium parasites and slow resistance.
- **Anopheles** – Mosquito genus whose female species transmit malaria; most bite from dusk to dawn and breed in sun-lit, shallow water.
- **IEC / BCC** – *"Information, Education, Communication"* "Behaviour Change Communication"; tailored messages and activities that turn health knowledge into protective action.
- **Kassa Malaria Fund** – Proposed village solidarity fund that offsets transport costs and lost wages for households struck by malaria during peak season.
- **KIS** *(Kartu Indonesia Sehat)* – Government health card granting the poorest households no-fee access to the national insurance scheme *(BPJS-Kesehatan)*.
- **SolarBuddy Lamp** – Portable, solar-powered light distributed to replace kerosene lamps, improve evening study conditions, and reduce indoor smoke.
- **WASH** *(Water, Sanitation and Hygiene)* – Integrated approach combining safe water, latrines, and hygiene practices to cut diarrhoeal disease and remove mosquito larval habitats.

APPENDICES

***Ethics**. The survey protocol was approved by the East Sumba District Health Office ethics board, and verbal informed consent was obtained from every participant before each interview.*

Appendix 1: Malaria Knowledge Questionnaire

Questionnaire on Environment in Umalulu Village:

335 houses will be surveyed, and each Head of the Family will be interviewed

A. Demographic Data:

Name of Head of Family:
Date of Birth:
Gender:

1. How many people live in your house?
□ 1-2 people
□ 3-5 people
□ More than 5 people

2. Are there any children under 5 years old?
□ Yes, how many?
□ 1
□ 2-3
□ More than 3
□ No

3. Educational Levels of the Head of the Family:
□ No School
□ Elementary School
□ Junior High School
□ High School
□ University

4. What is the main livelihood of the Head of Family?
□ Agriculture
□ Animal Husbandry
□ Fishery
□ Others, Name it!

5. How far is the nearest clean water source from this house?
□ Less than 100 meters
□ 100-500 meters
□ More than 500 meters

6. Does this house have access to electricity?
□ Yes
□ No

7. Does this house have access to a mobile phone network (signal)?
□ Yes
□ No

B. Condition of Residence and Environment

1. House type:
□ Wood
□ Bamboo
□ Concrete
□ Others, Name it!

2. Does this house have windows?
□ Yes, with curtains
□ Yes, without curtains
□ No

3. How is the ventilation of this house?
□ Not good
□ A little good
□ Quite good
□ Good
□ Very good

Appendix 1: Malaria Knowledge Questionnaire

4. Are there puddles of water around this house?
□ Yes, if any, state the form of a puddle
□ Livestock puddles
□ Rainwater puddles
□ Fish ponds
□ Small lakes
□ Water sources
□ Bathroom waste puddles
□ Others, Name it!
□ None

5. Does this house have a water tank?
□ Yes, state the condition of the water tank:
□ Closed
□ Open
□ Clean
□ Dirty
□ Airtight
□ Poorly maintained
□ Others, Name it!
□ No

6. When are mosquitoes often seen around this house?
□ Morning
□ Afternoon
□ Evening
□ Night

7. Do you know where mosquitoes breed around your house?
□ Yes
□ No

C. Residual Insecticide Spraying (IRS)

1. Has your house ever been sprayed for Malaria mosquitoes?
□ Yes, done by:
□ Government health team
□ NGO
□ Others, Name it!
□ Never

2. When was the last time this house was sprayed?
□ Less than 3 months ago
□ 3-6 months ago
□ More than 6 months ago

D. Use of Mosquito Nets

1. How many sleeping groups are there in this house?

2. Does each sleeping group use anti-malaria mosquito nets?
□ Use
□ Do not use
□ Use, but not all, specify…

3. Since when have you been using anti-malaria mosquito nets?
□ Less than 6 months
□ 6 months - 1 year
□ More than 1 year

Appendix 1: Malaria Knowledge Questionnaire

4. Do you wash these mosquito nets regularly?
□ Yes, when was the last time it was washed?
□ Less than 1 month ago
□ 1-3 months ago
□ More than 3 months ago
□ No

5. Do you know how to wash this mosquito net?
□ Yes, explain the process!
□ Don't know

E. Defecation Habits and Sanitation

1. Where do residents of this house usually defecate?
□ Private toilet
□ Public toilet
□ In the garden or grass hole

2. If in the garden or grass hole, are you aware of the risks of this habit?
□ Yes, I'm aware
□ No, I'm not

3. What risks are you aware of? (Select all that apply.)
□ Personal health risks
□ Spread of disease in the surrounding environment
□ Negative impact on the environment

4. Does the toilet in your house have a septic tank?
□ Yes, I Have
□ No, I don't have
□ I don't know

5. If you have a toilet, what is the condition of your toilet in your opinion (scale 1-5)? (rate based on the Indonesian Ministry of Health Health Standard)
□ 1 (Very bad)
□ 2 (Quite Bad)
□ 3 (Quite good)
□ 4 (Good)
□ 5 (Very good)

APPENDICES

Appendix 1: Malaria Knowledge Questionnaire

Questionnaire regarding Malaria Education/Knowledge in Umalulu Village:

335 houses will be surveyed, and each Head of the Family will be interviewed

A. Demographic Data:

Name of Head of Family:

Date of Birth:

Gender:

1. Your Education Level:

□ Unschooled
□ Elementary School
□ Junior High School
□ High School
□ University

2. What is your main source of livelihood?

□ Agriculture
□ Livestock
□ Fishery
□ Others, Name it!

3. How far is the nearest clean drinking water source from your house?

□ Less than 100 meters
□ 100-500 meters
□ More than 500 meters

4. Do you have access to electricity?

□ Yes
□ No

5. Do you have access to a mobile phone network (signal)?

□ Yes
□ No

6. Does this house have access to electricity?

□ Yes
□ No
□ Yes, I know (if the answer is YES, Respondent must answer the next question)
□ No, I do not know

Mention the symptoms of malaria that you know. (can be more than one)

□ High fever
□ Shivering and sweating
□ Nausea and Vomiting
□ Headache
□ Muscle pain
□ Easily tired and weak
□ Others….

Do you know the trend of malaria cases in the last few years?

□ Higher cases
□ Same number of cases
□ Lower cases

B. Knowledge and Perception of Malaria

1. Do you know how malaria spreads?

□ Yes, I know (if the answer is YES, Respondent must explain)
□ No, I do not know

Do you know the symptoms of malaria?

Appendix 1: Malaria Knowledge Questionnaire

2. If the previous question is YES, when did it happen? (Month & Year)
Exp.:
□ January, 2025
□ Etc..

3. If the previous question is YES, how many times in the last 12 months?
□ 1 time
□ 2-3 times
□ More than 3 times

4. Did you take a test to diagnose that you were malaria-positive?
□ Yes
□ No

5. If the previous question is YES, where were you diagnosed with Malaria?
□ Health center
□ Hospital
□ Traditional medicine
□ In the community around your house

6. Did you receive treatment?
□ Yes, with prescription drugs from a health facility
□ Yes, with traditional medicine
□ No

C. Experience with Malaria

1. Have you ever had malaria?
□ Yes, I had
□ No, I have not
□ I'm not sure

2. Does this house have access to a mobile phone network (signal)?
□ Yes
□ No

D. Access to Treatment and Costs

1. Where do you find medical care when sick?
□ Nearest health center
□ Regional hospital
□ Nearest health clinic
□ Traditional medicine
□ Self-medication

2. Do you have a National Health Insurance card or Free National Health Insurance (KIS)?
□ Yes, I have BPJS
□ Yes, I have KIS
□ No, I do not have

3. How far is the nearest health center or clinic from your home?
□ Less than 1 km
□ 1-5 km
□ More than 5 km

4. How long will you get to the health center?
□ Less than 15 minutes
□ 15-30 minutes
□ More than 30 minutes

Appendix 1: Malaria Knowledge Questionnaire

5. How do you get to the health center?
□ Walking
□ Motorcycle
□ Car
□ Public transport medication if needed?

6. Do you have difficulty accessing malaria medication?
□ No, I don't
□ Sometimes
□ Yes, I have

7. What is the average cost of malaria treatment?
□ Free
□ Less than IDR 50,000
□ IDR 50,000 - IDR 100,000
□ More than IDR 100,000

8. Do you have enough money to buy mosquito nets or anti-malarial medication if needed?
□ Have
□ No

E. Impact of Malaria on Daily Life

1. Have you ever missed work/school due to malaria?
□ Yes
□ No

2. If yes, how many days on average?
□ 1-3 days
□ 4-7 days
□ More than 1 week

3. Has malaria affected your family's income?
□ No impact
□ Slight impact
□ Quite an impact
□ Very impact

F. Malaria Prevention

1. Do you know how to prevent malaria for yourself and your family?
□ Yes, I Know
□ No, don't know
□ I'm not sure

2. Can you name some ways to prevent malaria? (You can choose more than one)
□ Using mosquito nets
□ Using mosquito repellent
□ Avoiding stagnant water
□ Spraying the house
□ Others, please specify….

3. Do you do a lot of activities at night or early morning so that mosquitoes more often bite you?
□ Yes
□ No

4. Have you ever heard of a malaria prevention campaign in your village?
□ Yes
□ No

APPENDICES

Supporting Documents & Data Access

- **Scientific Report** — Umalulu Malaria Baseline *(PDF, English)* — IMRaD-formatted summary for journals, with policy implications, ethics, and data access.
- **Financial report – Umalulu Study** *(PDF - English)* – audited budget and expenditure statement.
- **Raw survey dataset*** *(Excel)* – anonymised household-level data from the 2025 Umalulu malaria study.
- **Malaria Survey Training Guide** – module for agents and surveyors on running malaria-risk surveys.

Malaria Knowledge Questionnaire – *(PDF - English)* – full survey instrument for reuse or adaptation.

Recognising Malaria Symptoms – A Life-Saving Guide *(PDF - Poster)* – visual aid showing early warning signs and urging prompt treatment.

Preventing Malaria – Simple Steps to Stay Safe *(Poster)* – poster promoting nets, repellents, water management and protective clothing.

How to Use Our Health Posters – facilitator guide for nine Fair Future education posters.

Training Manual for Kawan Sehat *(144 pp, Indonesian)* – 14 modules covering primary medical care.

Quick Guide for Health Fieldwork *(Indonesian)* – pocket reference for off-line, off-grid medical work.

Kawan Sehat, Healthy Habits for Rural Children *(English)* – illustrated storybook teaching hygiene and nutrition.

How to Share the Kawan Sehat Story *(Indonesian)* – community edition of the children's health book.

Matawai – The Shades of Water *(15-minute documentary)* – film chronicling the daily struggle for safe water in Eastern Indonesia and the impact of sustainable solutions.

Child Protection Policy for Children's Safety – Fair Future's standalone policy safeguarding minors in all programmes.

Annual Activity Report 2024 *(PDF, English or French)* – latest overview of Fair Future's programmes, impact metrics and finances, published this month.

***Data privacy.** The raw dataset is fully anonymised and will be released only under a signed data-use agreement that safeguards participant confidentiality.*

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Sources & Acknowledgements

All findings, maps, and tools in this report are the direct result of field work carried out by Fair Future and Kawan Baik between March and July 2025.

- **Primary data** | 100 % of household, environmental, and KAP figures were collected door-to-door by our survey teams using the custom Kawan Against Malaria offline app.

- **Spatial tools** | The interactive risk map and the full Google-Maps inventory of every house, school, and public building in Umalulu were digitised by Fair Future staff and village volunteers after days of manual GPS pinpointing; no third-party GIS layers were used.

- **Program experience** | Analytical frameworks draw on eight years of neutral medical work in East Sumba and the practical knowledge of local cadres who led data collection.

- **District statistics** | 2024 malaria case totals and population estimates were taken from routine tables published by the East Sumba District Health Office; no other external reports were consulted.

No additional published studies, datasets, or commercial tools informed this baseline; all supporting materials *(training guides, posters, children's books, manuals)* were produced in-house as part of the same project.

A SHARED COMMITMENT TO END MALARIA

This report goes beyond mere data; it acts as a roadmap encouraging all stakeholders—villagers, health workers, government agencies, schools, and global partners—to collaborate. Every LLIN hung, every child educated, and every RDT conducted by a cadre is a crucial part of the protective chain that keeps Umalulu healthy. Investing in clean water, secure housing, accurate diagnosis, and sustainable incomes can turn today's recommendations into reality tomorrow.

Your ongoing participation—whether hosting village dialogues, funding the Kassa Malaria initiative, providing RDT kits, or sharing this report's insights—drives us closer to a resilient, malaria-free community. Together, we can demonstrate that even the most remote villages can lead the fight against this disease.

Join us. Spread knowledge, bolster networks, and help eradicate malaria in Umalulu and beyond.

How you can help

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https://fairfuturefoundation.org

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