THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER, ELDERLY AND CHILDREN

NATIONAL MALARIA CONTROL PROGRAMME

SCHOOL MALARIA PARASITAEMIA SURVEY (SMPS) REPORT

A Study Conducted in Public Primary Schools –Tanzania Mainland in 2014 – 2015

February 2018

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

ACT	Artemisinin Combination Therapy
ALu	Artemether Lumefantrine
CCHP	Comprehensive Council Health Plan
CHMT	Council Health Management Team
CSO	Civil Society Organisation
CSR	Corporate Social Responsibility
DFID	Department for International Development
DHIS2	District Health Information Software
DMO	District Medical Officer
DMT	District Management Team
DPS	Directorate of Preventive Services
DSS	Demographic Sentinel Surveillance
EDS	Early Detection System
GFATM	Global Fund AIDS Tuberculosis and Malaria
HH	House Holds
HMIS	Health Management Information System
HMM	Home Malaria Management
IHI	Ifakara Health Institute
IRM	Insecticide Resistance Management
IRS	Indoor Residual Spraying
ITN	Insecticide Treated Net
KEMRI	Kenya Medical Research Institute
LGAs	Local Government Authorities
LLIN	Long Lasting Insecticide Treated Net
M&E	Monitoring and Evaluation
MDAs	Ministries Department and Agents
MDGs	Millennium Development Goals
MEEDS	Malaria Epidemic Early Detection System
MEEWS	Malaria Epidemic Early Warning System
MERG	Monitoring and Evaluation Reference Group
METW	Monitoring and Evaluation Technical Woking Group
MKUKUTA	Mkakati wa Kuinua Uchumi na Kupunguza Umasikini Tanzania
MoF	Ministry of Finance
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly, and Children
MOP	Malaria Operational Plan
MPR	Malaria Programme Performance Review
mRDT	malaria rapid diagnostic test
MSP	Malaria Strategic Plan
NBS	National Bureau of Statistics
NGO	Non-Governmental Organisation
NIMR	National Institute for Medical Research
NMCP	National Malaria Control Programme
NSGRP	National Strategy for Growth and Reduction of Poverty
OPD	Out Patient Department
PA*f*PR$_{2\text{-}10}$	Predicted adjusted *Plasmodium falciparum* Parasite Rate in children 2-10 years
PMI	United States of America President's Malaria Initiative
QA	Quality Assurance
QAACTs	Quality Assured ACT
QC	Quality Control
RAS	Regional Administration Secretary
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
RHMT	Regional Health Management Team
RMO	Regional Medical Officer
SME	Surveillance, Monitoring and Evaluation
SNP	School Net Programme
SOPs	Standard Operating Procedures
TDHS	Tanzania Demographic Health Survey
THMIS	Tanzania HIV/AIDS Malaria Indicator Survey
TWG	Technical Working Group
URT	United Republic of Tanzania
WHO	World Health Organisation

Foreword

The Ministry of Health, Community Development, Gender, Elderly, and Children (MoHCDGEC) through the National Malaria Control Programme (NMCP) initiated School Malaria Parasitemia Survey (SMPS) to evaluate the prevalence and dynamics of plasmodium infection in the Tanzania Mainland.

This SMPS survey provides complementarity approach on Malaria Surveillance and Parasitological Monitoring in-line with other population-based surveys such as Tanzania Demographic and Health Survey (TDHS) and Malaria Indicator Survey (MIS) conducted by the National Bureau of Statistics (NBS).

The TDHS and MIS which are conducted every 4-5 years; provide malaria prevalence for children aged between 6 – 59 months only with limited sample size that limit its findings to regional representativeness. On the other hand, SMPS have high power that provides sufficient sample size to estimate malaria prevalence at council and sub-council levels. It also enriches information on other studies which have shown shifting of malaria epidemiology from under five children to higher age groups, as this study targets school children aged between 5-16 years.

On behalf of the Ministry of Health, Community Development, Gender, Elderly, and Children, I encourage all stakeholders in health including the development partners, decision makers, implementing partners, Health Care Workers (HCWs) and the general population to utilize findings of this report to facilitate rational use and stratification of the malaria control interventions in the country.

Dr. Mpoki M. Ulisubisya
PERMANENT SECRETARY (HEALTH)

ACKNOWLEDGEMENTS

The Minsitry of Health, Community Development, Gender, Elderly, and Children (MoHCDGEC) would like to thank all individuals, Institutions, partners who tirelessly contributed to this first of its kind malaria prevalence survey covering all councils in the country. Special thank goes to the Government of Tanzania; President's Office, Local Government Authorities (LGA), Ministry of Education, Science, Technology and Vocational Training, and the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) for their tirelessly work to conducting this School Malaria Parasitemia Survey (SMPS). The MoHCDGEC acknowledges the government's commitment and funding support through DfID (Phase I) and the Global Fund (Phase II and III).

I would like to express my sincere appreciation for the collaborative efforts made by the National Institute for Medical Research (NIMR), Ifakara Health Institute (IHI), Kenya Medical Research Institute (KEMRI) and the National Malaria Control Programme (NMCP) during developing field protocol, data collection tools, organizing and conducting training to field staff including participating in field work exercises.

Special gratitude goes to Ally Mohamed, Renata Mandike, Frank Chacky, Fabrizio Molteni, Susan Rumisha, Prosper Chaki, Fidelis Mgohamwende, Julius Massaga, Pendael Machafuko, Rose Lusinde, Sigsbert Mkude, Bob Snow, Manuela Runge, Paul Kazyoba, Witness Mchwampaka, Abdallah Kajuna and other NMCP staff for their collaborative efforts on ensuring this survey is achieved.

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Prof. Muhammad Bakari Kambi

CHIEF MEDICAL OFFICER

EXECUTIVE SUMMARY

Malaria epidemiology in Tanzania is in transition from very high to meso-endemic and low levels. The observed transition is characterized by a marked heterogeneity among and within regions/councils, coupled with the need to achieve a prevalence of less than 1% by 2020, and eliminate malaria by 2030; a robust and accurate monitoring is important to help effective targeting of malaria interventions for impact.

School Malaria Parasitemia Survey (SMPS) which is powered with sufficient sample size to provide malaria prevalence estimates at council and sub-council levels provides a complementary approach to malaria surveillance and parasitological monitoring alongside with the National representative surveys such as Tanzania Demographic and Health Survey (TDHS) and Malaria Indicator Survey (MIS). The SMPS primary objective is to evaluate the prevalence and dynamics of plasmodium infection in Tanzania Mainland, and also to understand ownership and usage of mosquito net as well as to determine absenteeism pattern due to illiness among school children.

In this study, a total of 48,290 school children were selected using a two-stage sampling from 537 public primary schools in all regions and councils in the Tanzania Mainland. Data were collected in three phases: 1) August to September 2014 covered 5 regions, 2) May 2015 covered eleven (11) regions, and 3) October 2015 covered remained 9 regions. Children were tested for malaria parasites using malaria Rapid Diagnostic Tests (mRDTs) and each child was interviewed about household information, parent's education, bednet availability, usage and history of fever for the past two weeks.

The overall malaria prevalence was 21.6% ranging from <0.01 (Arusha & Manyara) to 53.6% (Geita) regions. Malaria heterogeneity observed in this survey is similar to other prevalence surveys (TDHS/MIS). The population of school children living in the coastal belt and regions bordering Lake Victoria, Nyasa and Tanganyika were more likely to have higher malaria prevalence compared to other areas. Regarding ownership and use of nets, majority (89.9%) of school children reported to have at least one net in the household and about seven in ten children (69.6%) slept under a mosquito net previous night before the survey. Results of this survey are useful for updating malaria epidemiologic profile, identifying hotspots; stratify malaria transmission by region, council and age groups which is essential for guiding resource allocation and future malaria interventions.

INTRODUCTION

Overview of Malaria Burden in Tanzania Mainland

Malaria is a vector-borne disease transmitted by the bite of female Anopheles mosquitoes and caused by five different species of Plasmodium parasites (P.falciparum, P.vivax, P. malariae, P.ovale, P.knowlesi) (1). Plasmodium falciparum, is the most predominant species in Tanzania (2) which causes severe malaria and can be fatal if not recognized promptly and properly managed.

Malaria is a major public health issue and a leading cause of morbidity and mortality accounting 26% of all causes of out patients visits (3), and the number of annual malaria deaths in Tanzania among all ages was estimated 60,000 to 80,000 annually up to the year 2009 (4).

Since the year 2000 up to 2010, the proportion of people living in areas of intense transmission has declined from 11.6% to 2.3% (5), and malaria prevalence for children under the age of 5 year has been reduced by 45% from 18% in 2008 to 10% in 2012. However, the prevalence remains high in the regions; around Lake Victoria, Coastal areas, Lake Tanganyika and Lake Nyasa (6,7).

Malaria Epidemiology

The malaria burden varies with age, depending on the transmission intensity and rates of acquired immunity (8). The most severe cases occur among children under the age of 5 years, who have not yet developed sufficient immunity to malaria through previous exposure (7). In areas with continuous and frequent malaria exposure, partial immunity is acquired in early childhood which reduces the risk of getting severe malaria.

Malaria endemicity has been classified based on the prevalence rate of P. falciparum and age. High malaria transmission areas have prevalence rates of more than 50% among children aged 2 – 9 years, moderate transmission areas 10 – 50%, and in low transmission areas the prevalence is less than 10% as shown in figure 1. In high transmission areas, malaria burden is highest among children under the age of 5 years, in moderate transmission areas is highest during childhood and adolescence and in low transmission areas malaria is low in all age groups (8–10).

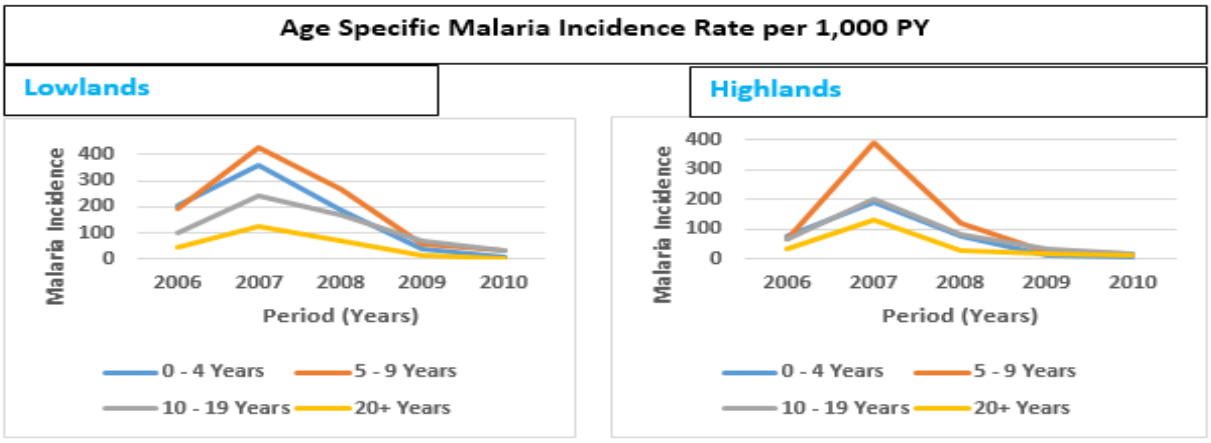


Figure 1: Age Specific Malaria Incidence Rate per 1,000 Per Year (Source: Rutta, 2012)

Malaria Control Interventions in Tanzania

Since combating malaria re-emerged as a priority global health issue in the year 2000, there has been a tangible decline in malaria mortality and morbidity due to an extensive scaling up of malaria control interventions (4,9). The basic aim of malaria control interventions is the reduction of human exposure to infectious malaria vectors. The most widely implemented and successful interventions are vector control interventions, namely Long Lasting Insecticide Treated Nets (LLINs), Indoor Residual Spraying (IRS) and Larval Source Management (LSM) (2). It has been envisaged that scaling up of IRS in conjunction with increased access to LLIN coverage; and availability of malaria Rapid Diagnostic Tests (mRDT) and Artemesinin-based Combination Therapy (ACTs) reduces malaria transmission and contribute to significant reductions of malaria burdens (7).

School Surveillance for Malaria Control

The school enrolment is described through intake and enrolment ratios, whereas the National Intake Ratio (NIR) is the percentage of new enrolments of children of official school entrance age over all children of official school entrance age (11). The NIR increased from 67.8% in 2010 to 72.9% in 2013 (12).

It has been recommended to increase malaria control interventions to children above five years of age as malaria transmission intensity decreases and becomes more heterogeneous(13). School Malaria Surveys have gained increased attention as a complementary approach for providing malaria surveillance data (14) and many school malaria surveys have been conducted in different African countries, such as in Kenya, Ethiopia and Malawi (15–18).

School Surveillances provides an easy accessible infrastructure and hold flexible opportunities for monitoring malaria transmission control measures. Furthermore, school surveys are relatively fast to conduct, cost effective and creates sense of ownership especially when it involves respective councils and regional officers as field assistants. It also provides an attractive complementary approach to large household surveys and compliments the information gap found in the National Health Management Information System (HMIS) of which the current data relies on clients attending the health facilities hence, do not capture asymptomatic cases. Accurate and timely data on the spatial-temporal distribution of malaria transmission is collected, as well as data on the malaria burden and impact of deployed control interventions in children above the age of 5 years.

Information collected through school malaria surveys are useful for decision making on resource allocation and stratifying control interventions which cannot be implemented universally. Examples of such interventions are IRS in remaining high endemicity areas, Intermittent Preventive Treatment for pregnant women (IPTp) that should be discontinued in low endemicity settings, and/or providing seasonal chemoprophylaxis in certain climatic zones.

OBJECTIVES OF THE SURVEY

General Objective

The SMPS was designed to allow estimates of malaria prevalence and determine spatial and temporal risks of P. falciparum transmissionamong public primary school age pupils in Tanzania mainland. SMPS also investigated additional indicators on LLINs use and pattern of school absenteeism in the same population.

Specific objectives

- To determine the prevalence of malaria among public primary school enrolled pupils,
- To determine the prevalence of asymptomatic malaria infections among public primary school age pupils,
- To define the spatial and temporal risks of P. falciparum transmission across malaria endemic councils;
- To determine the access and use of insecticide treated bed nets among school age children;
- To determine the pattern of school absenteeism due to illness.

METHODS

Study Area and Seasonality

Tanzania has a high variation in geography and climatic condition, ranging from tropical coastal lowlands to mountainous highland areas in the North and South (19). The temperature ranges between 10°C and 20°C in the highlands, and is usually above 20°C in the lowlands throughout the year. The hottest months are between November and February while the coldest months are between May and August. The rainfall pattern in Southern, South-Western, Central and Western parts of Tanzania is unimodal (from December to April) while in North-East and Lake zones of Tanzania is bimodal (from October to December and from March to May) (20–22) as shown in figure 2.

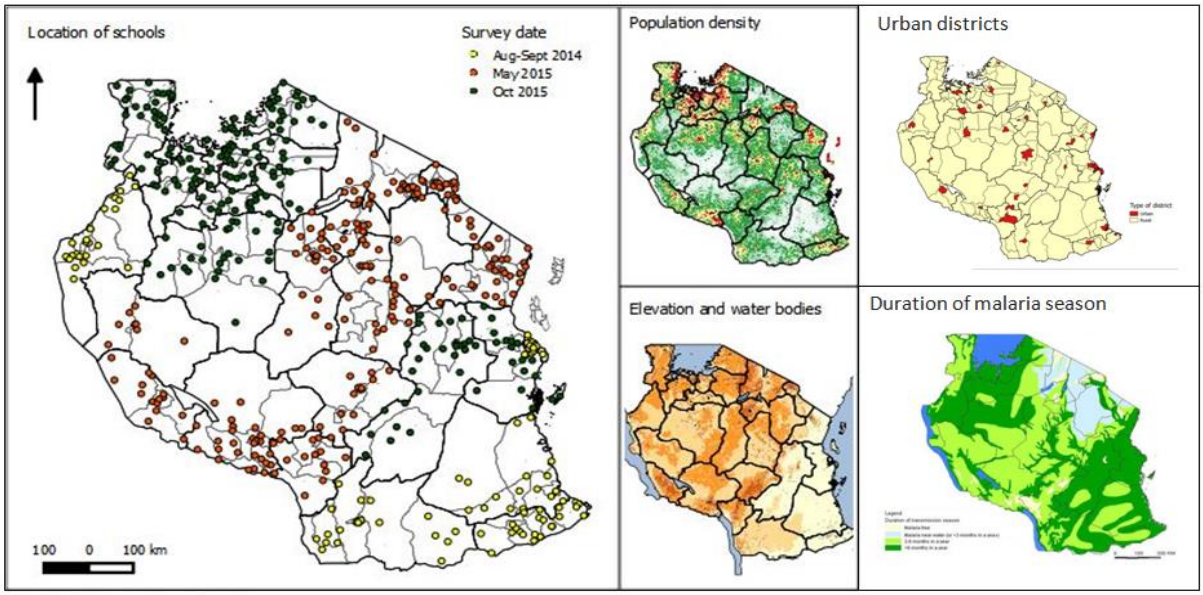


Figure 2: Tanzania maps with SMPS study phases, population density, elevation and water bodies

The School Malaria Parasitaemia Survey (SMPS) was conducted in three phases between August 2014 and October 2015 in Tanzania Mainland. A total of 166 Councils; City, Municipal and Town Councils from the 25 regions were included in this survey. The First phase of the survey was conducted in August-September 2014 after the "wet season" in 5 regions (Dar es Salaam, Kigoma, Lindi, Mtwara and Ruvuma). The Second phase was conducted in May 2015, immediately after the "wet season" in 11 regions (Arusha, Kilimanjaro, Tanga, Dodoma, Manyara, Singida, Katavi, Mbeya, Rukwa, Iringa and Njombe). The Third phase was conducted in October 2015, covering the remaining 9 regions (Geita, Kagera, Mara, Morogoro, Mwanza, Pwani, Shinyanga, Simiyu and Tabora), during the dry season.

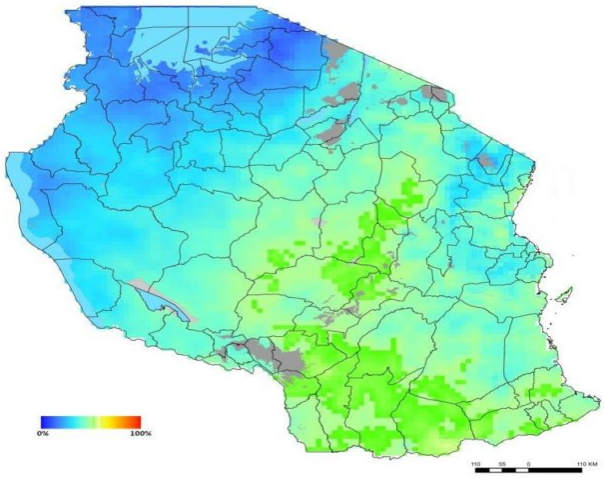


Figure 3: Rainfall/seasonality concentration index in Tanzania

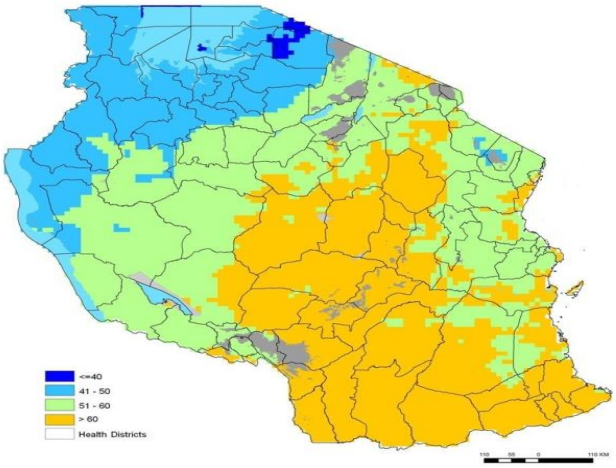


Figure 4: Maximum percentage of the total annual rainfall

Figure 3 shows National Oceanic and Atmospheric Administration (NOAA) rainfall/seasonality concentration index in Tanzania in continuous form while figure 4 indicates maximum percentage of the total annual rainfall occurring in a period of consecutive months (where >= 60% of rainfall falls within 3 continuous months (Orange); dark grey areas represent malaria free, light grey unstable aridity defined areas)[1]

[1]*The gridded daily rainfall estimates at 0.1-degree resolution from the RFE 2.0 dataset between January 2002 and December 2009 was acquired from the NOAA CPC/FEWS archive [NWS, 2012; ftp://ftp.cpc.ncep.noaa.gov/fews/newalgo_est/]. The daily rainfall estimates were then aggregated to calculate total monthly and annual rainfall. For each pixel, the maximum percentage of the total annual rainfall occurring in three month-iterations was then calculated for each year using spatial analyst tool in ArcGIS 10.1 (ESRI, USA). The average pixel value between 2002 and 2009 was then calculated and the resulting image reclassified to give a binary output of areas where rainfall in three consecutive months was < 60% or > 60%*

Sampling and Design

The study included all Tanzania Mainland regions (25) and all councils (166) and multistage sampling was used to select the study population. The sample was determined, by using probability proportional sampling (PPS), involving the following four steps: (1) sample size calculation per council, (2) wards stratification and sample size calculation per strata/school, (3) selection of ward, village and school, and (4) selection of children within each school.

The stratification of wards within councils and selection of schools were performed during orientation meeting with respective regional and council teams which involved both, the health and education sectors. The selection of children within schools was done by field teams at the respective schools prior or at the day of testing.

Sample Size Calculation per Council

The council sample size was calculated based on the malaria prevalence (PfPR), precision, Council population with a confidence interval of 0.95 and a design effect of 2. The Council population estimates were taken from the latest National census data (23). The calculated number of children to be tested per council was divided by 100 to get the number of schools per council.

Wards stratification and Sample size per strata/school

In each Council, the wards were stratified according to standardized geographical (altitude), demographic, topography and human setting criteria (population density, rural/urban), whereas the number of strata was equal to the number of schools calculated. This was done to ensure that the study design captured the heterogeneity of malaria transmission at all levels.

Selection of Ward, Village and School

In each stratum, one ward and then one village/street were randomly selected. The same procedure was used to select one school; in case a village/street had more than one school, random procedure was used to select one school. The number of pupils per school were calculated based on proportion of population per stratum. Hence, a total of 48,290 pupils from 537 schools in all 166 councils were calculated.

Pupils' Selection within Schools

School attendance records were used to identify and select pupils using Systematic Sampling Procedure (SSP). At school level, all classes, that is class 1 to 7 in phase I, II and class 1 to 6 in phase III (class 7 was not involved because they already finished their primary education studies). Pupils were selected prior, or on the day of testing. Boys and girls were selected in

a ratio of 1:1 in each school class. Equal number of children was taken from each class taking the fact that, in most schools the class sizes do not differ significantly.

Data Collection

Data Collection Tools

Data was collected using individual questionnaires, registers for malaria tests (malaria Rapid Diagnostic Test – mRDT) and school identification registers. The questionnaire was used to collect information about the pupils' demographic information, household size, education of parents, mosquito net use, history of fever within the two weeks prior the survey, school absenteeism, mRDT result, malaria treatment and body temperature. The school identification captured information such as geo-location, altitude, total number of pupils in a school, total number of children tested, number of children tested positive, as well as name and distance of the nearest health facility.

Designated malaria tests register captured information on the pupil unique identification (ID), class, age, malaria test (mRDT), lot number and expiry date of the mRDT kits and test result. The input for the tools was according to the consensus reached be the team of statisticians, laboratory technicians, clinicians and epidemiologists from NIMR, IHI and NMCP.

Pre-testing of questionnaire

Pupil's questionnaire i.e. "Tool 3" was pre-tested in conveniently selected primary schools within the council where the orientation sessions was taking place. Education officers were grouped into small groups and assigned to one school for the pre-test. Members of the group were randomly selected using a random function in excel. In each school, two students were randomly selected (guided by the school administration), one student from lower classes i.e. Standard (STD) 1 and 2, and second student was selected from higher classes i.e. STD 5-7.

Field Team

There were 166 Council teams of five (5) people each. Each team had one District Malaria Focal Person (DMFP), one education officer, two laboratory technicians and one driver. The DMFP was responsible to organize and coordinate the field work, interviewing pupils and to ensure the tools were filled and collected. The education officer was responsible to inform the council management, organize school committee meetings to seek parents'/guardians' consent as well as interviewing pupils. Laboratory technicians were responsible for performing malaria testing, interpreting the results, recording mRDT results in the registers, storage of the used mRDT cassettes, and ensures appropriate disposal of mRDT wastes.

In each surveyed school, two teachers (those who were responsible with health education at the school) were added to the team and assigned to organizing pupils' selection, classrooms arrangements and refreshments distribution. School administrations were instructed to inform the students and parents concerning the exercise. Field supervisors who were responsible to oversee the day to day activities and coordinate the district teams were comprised of a National officer from NMCP, IHI or NIMR, and the respective regional malaria focal person (RMFP).

Training of Field Staff

Three days orientation workshops were held in Morogoro prior field visits in August 2014, May and October 2015 with respect to the three SMPS phases. Participants for the orientation workshop were RMFP's and DMFP's, Education Officer delegated by District Education Officer (DEO), and Regional laboratory technicians. Facilitators were senior staff from NMCP, IHI and NIMR.

Participants were oriented on the field protocol, data collection tools, testing procedures, sample selection procedures, treatment of pupils tested positive for malaria, documentation processes, handling of the field materials, reporting and submitting of the filled tools to the higher level. The last day of the training, field teams were provided with study supplies (mRDT kits, ACTs, paper forms and checklists) and budget for conducting the study in their respective councils.

Field Work Process

In each selected school, a two days visit was performed by the council team; day one was scheduled for the meeting with school committee to explain the purpose of the survey and seeking the parents/guardians' consent and sample size selection, while the second day was reserved for testing and interviewing exercises. There were prior arrangements made by the teams through education office, who sent formal letter to respective schools on holding a meeting with school committee members for the malaria survey mission. Also, the meeting involved students' representatives, teachers and head teacher as the chairperson. The main agenda was presented and raised issues/concerns were clarified by the council team members.

Supervisors from the national and regional levels were responsible to oversee testing and interviewing sessions in the selected schools. Thus, national and regional supervisors devided councils into two groups (group one and group two were supervised by the national regional supervisors respectively) to facilitate supervising all councils within a short time as testing

and interviews were conducted simultaneously across councils. Each day, supervisors visited at least one council and one school (each council were testing and interviewing one school per day) and sometimes they visited two councils per day if the selected council/schools were close to each other.

In each school, two teachers were selected and instructed to prepare two classrooms; one for testing and interviewing, and another one was used as a waiting room for the children. Each selected child was assigned an identification number before being interviewed and tested. After the interview and malaria testing, refreshments were given to pupils while they were waiting for the test results.

During field work, supervisors used study protocols and Standard Operating Procudures (SOPs) to ensure the quality of data collection procedure is maintained. The mRDT kits of each school were re-checked at the end of the day to account for possible transcription errors. For this purpose, 20% of the mRDT kits were randomly selected and compared with the documented mRDT result in the paper forms. The questionnaires were counted and sorted by the children's ID and checked for completeness, while individual responses were occasionally inspected for completeness and correctness.

Malaria testing

A drop of blood was obtained after a finger prick for immediate testing using the SD Bioline (Standard Diagnostics) for malaria Rapid Diagnostic Test (mRDT). This mRDT has relatively high sensitivity and uses HRP2 (Plasmodium falciparum) and LDH (all plasmodium species) antigens. The waiting time for mRDT results was 15 minutes. Test results were recorded in the mRDT register and respective boxes in the pupil's questionnaire. All pupils who tested malaria positives were given a full course of first line antimalarial medicine i.e. Artemeter-Lumefantrine (ALu) as recommended in the National Malaria Diagnosis and Treatment Guidelines (24). Cases with noted complications were referred to the nearest health facility.

Interviewing Sessions

Education officers from council education department and DMFPs were responsible for carrying out interviewing pupils. Children were asked to provide information related to net ownership and use, history of fever within the last 2 weeks, treatment seeking behaviour, any antimalarial medicines received, school absenteeism as well as demographic characteristics.

Responses were recorded in the respective individual questionnaire. Laboratory technicians provided pupils' malaria test results to interviewers for recording in the questionnaire.

Data Management

Data Compilation

The council teams counted and reviewed filled forms to determine missing papers, accuracy and completeness of the records. The filled paper forms and mRDT kits were collected and returned to the NMCP central office in Dar es Salaam by the National supervisors.

Data Entry

Data entry was done by a small group of data entry clerks within 3 weeks after field work for each phase using Epi-data software version 3.1. During the data entry the performance of data entry clerks was monitored by a data entry supervisor. After all data were entered, a data entry quality check was done by the supervisor to assess the quality of entered data. By each data entry clerk 20% of the entered schools were randomly selected and within schools another 20% were randomly selected. The selected data were inspected and compared with the paper forms. The quality check as well as the random selection was done in MS Excel. Quality checked data were combined and imported into STATA Software (StataCorp LP, Texas – USA) for further processing and analysis.

Data cleaning

Data were screened for duplicates, completeness, misspelling, and for invalid and inconsistent values. Suspicious values were exported into an Excel file for manual re-inspection and comparison with paper forms. Remaining invalid or inconsistent values were re-codedintomissing values.

Data analysis

To describe the data structure; the mean, minimum and maximum of children tested per school and council across all regions were calculated. To describe numeric variables; the mean, standard deviation and ranges were also calculated. Categorical variables are described, using frequencies and percentages. Frequency distribution tables were created representing percentage of children tested positive, children with fever within two weeks before survey and tested positive as well as percentage of children whose household own and use mosquito net. For geographical description, maps of malaria prevalence, mosquito net ownership and use, were created using QGIS (QGIS Development Team, 2016).

Children were categorized by age into three groups: those less than 9 years, 9 to 12 years, and older children which were those aged over 12 years. Urbanization was defined based on the type of council, i.e. rural and urban (incl. municipals, township authorities, and city councils).Using the geo-location data for each school, altitude (distance above sea level) information were extracted for each site using data from Shuttle Radar Topography Mission (www2.jpl.nasa.gov/srtm/), downloaded from the WorldClim data source (www.worldclim.org). The sites were then categorized into lowland (below 750 meters), midland (750 to 1,250 meters), highland (above 1,250 to 1,750 meters) and mountainous highland (above 1,750 meters). Education of parents was grouped into those who had never been to school, had primary education, secondary and those with higher education (i.e. secondary and above). The results of the key indicators i.e. malaria prevalence and net ownership and use are presented by selected variables in overall and for each region.

RESULTS

Sample characteristics

All 25 regions covering166 councils in Tanzania Mainland were included in this survey. Table 1 indicates 537 schools which were included in the survey whereby 49,113 pupils were interviewed and tested for malaria. An average of 21 schools and 1,965 children were sampled in each region ranging from 9 schools in Katavi to 33 schools in Mbeya region. In each council an average of 296 pupils were sampled, ranging from 64 pupils in Mafinga TC, Iringa to 1,013 pupils in Temeke, Dar es Salaam. The ratio between boys and girls was 1:1 (50.2% girls) with mean age of 11 years.

Table 1: Overview of the survey sample within regions

Region	Councils				Schools				Pupils				
	N councils	Pupils per council			N schools	Pupils per school			N pupils	% male	Age		
		min	mean	max		min	mean	max			min	mean	max
Dodoma	7	201	332	546	24	55	97	148	2,326	49.5	5	11.2	19
Arusha	7	166	306	496	25	55	86	120	2,145	49.9	5	10.7	19
Kilimanjaro	7	111	235	424	19	55	87	163	1,644	46.3	5	10.4	20
Tanga	11	87	218	367	29	55	83	129	2,402	50.2	5	11.2	17
Morogoro	7	180	362	484	28	55	90	144	2,532	50.2	5	10.5	17
Pwani	7	110	199	337	18	54	78	117	1,395	46.5	5	10.7	17
Dar Es Salaam	3	951	1,013	1,109	30	44	101	132	3,040	48.9	5	10.5	18
Lindi	6	113	287	495	17	56	101	124	1,724	49.3	6	11.0	19
Mtwara	7	154	325	543	22	77	104	136	2,278	49.3	5	10.7	19
Ruvuma	6	193	347	464	20	84	104	116	2,083	49.8	5	10.7	18
Iringa	5	64	205	308	12	55	85	120	1,024	48.9	5	10.6	17
Mbeya	11	79	265	501	33	44	88	166	2,917	49.5	5	10.6	17
Singida	6	176	285	424	20	55	86	121	1,711	48.4	5	11.1	17
Tabora	7	155	356	653	26	55	96	158	2,494	47.5	5	10.8	20
Rukwa	4	252	313	376	14	42	89	153	1,251	53.4	5	11.2	18
Kigoma	8	174	289	404	24	78	96	106	2,311	50.1	5	11.2	19
Shinyanga	6	206	265	476	17	55	94	157	1,590	48.9	6	10.8	17
Kagera	8	145	350	629	31	51	90	199	2,799	49.6	5	10.9	17
Mwanza	7	249	392	579	28	57	98	165	2,744	50.5	6	10.9	19
Mara	8	89	244	397	23	54	85	112	1,952	50.4	6	10.5	17
Manyara	6	114	269	377	19	56	85	121	1,616	50.4	5	11.2	18
Njombe	6	121	168	230	13	44	78	118	1,009	52.2	4	10.5	17
Katavi	4	126	175	228	9	55	78	115	699	51.4	5	11.6	18
Simiyu	6	107	238	365	17	48	84	122	1,429	49.2	6	11.0	18
Geita	6	172	333	692	19	49	105	156	1,998	49.5	5	11.5	18
Total	166	64	296	1,109	537	42	92	199	49,113	49.5	4	10.9	20

Malaria Prevalence

Sex and Age

Table 2 indicates malaria positivity rate slightly increases from lower to higher age groups. Out of children older than 12 years 23% tested malaria positive, compared to 18% of children younger than 9 years. The malaria positivity rate among boys was slightly higher (23%) compared to girls (20%).

Residence, Zone and Region

Around one quarter (26%) of children in rural districtcs tested positive as compared to children in the urban councils (10%) (Figure 5 and table 2). Nearly 40% of the children living in the Lake Zone were malaria positive, with the highest prevalence in Geita region (>50%), and the lowest malaria positivity rates were found in children living in Northern regions of Manyara, Arusha and Kilimanjaro.

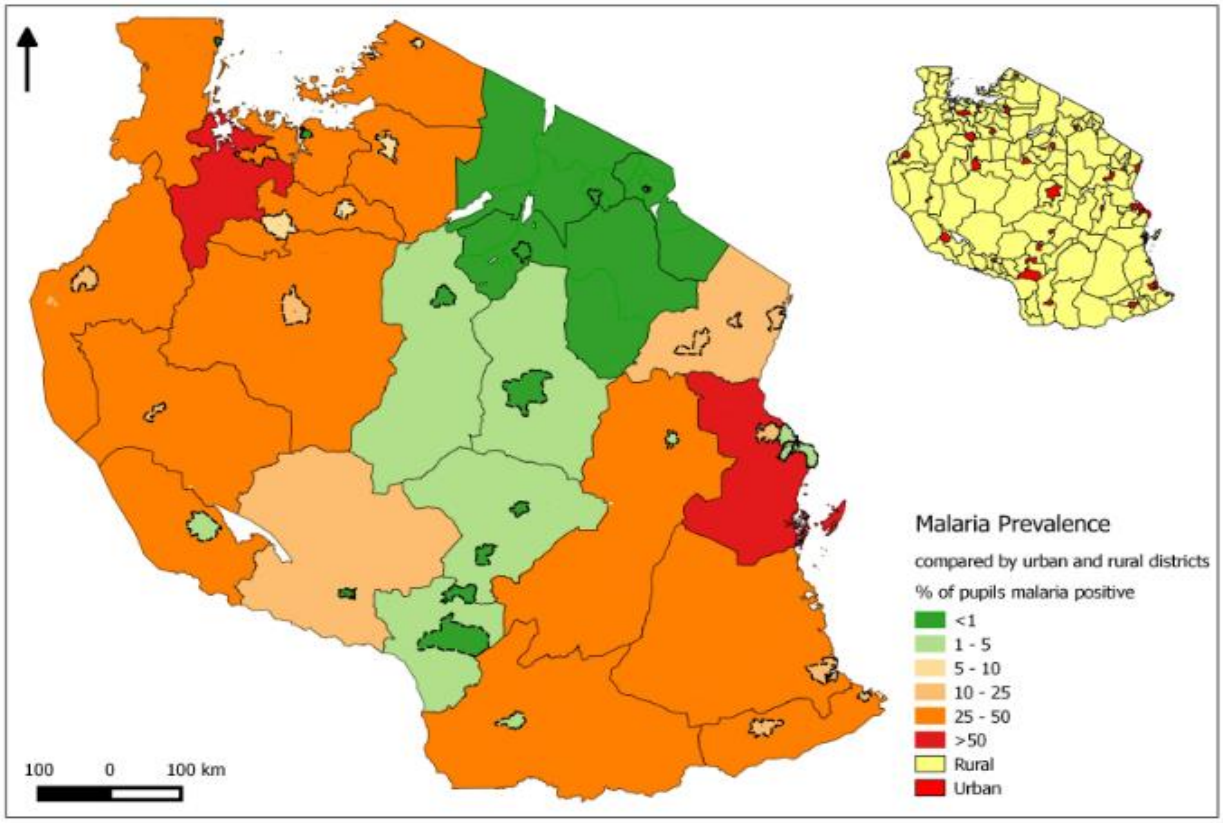
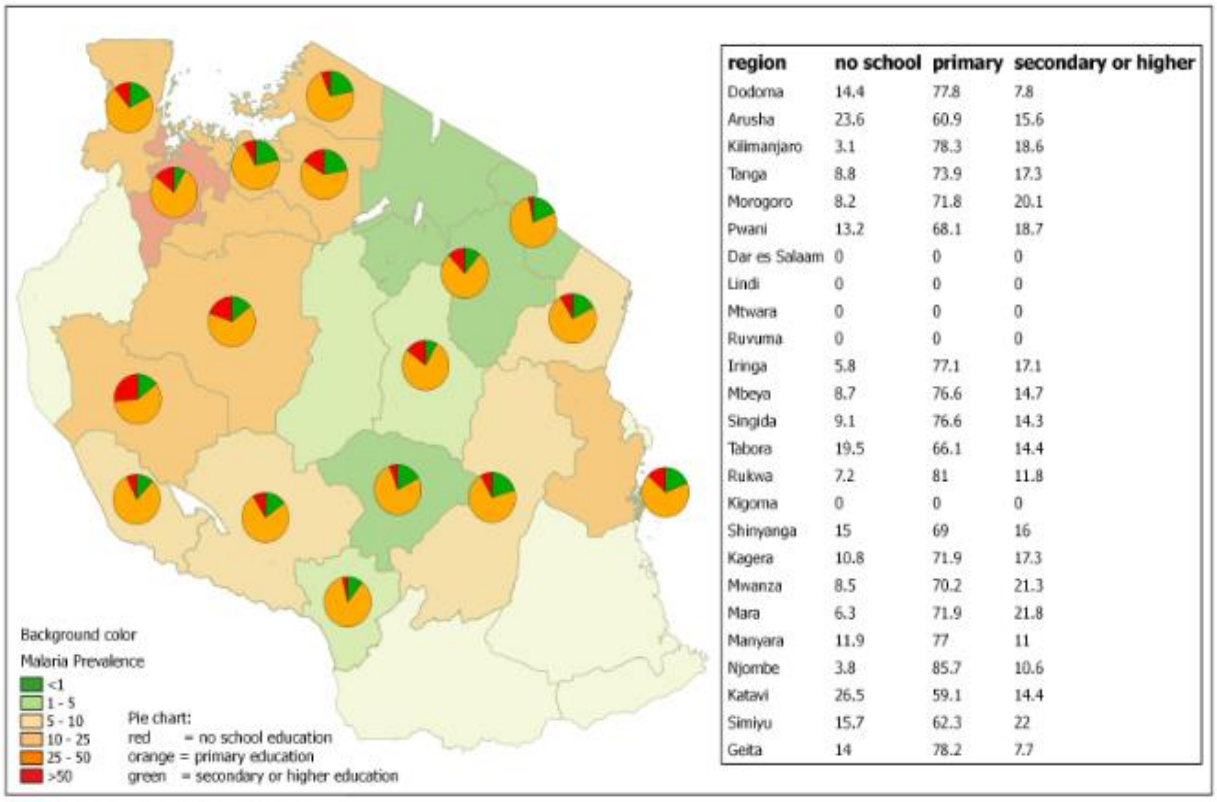


Figure 5: School children malaria prevalence by residence defined by urban and rural settings

Education of the Parents

The positivity rate of the children decreases with education level of their parents/guardians. The positivity rate of the children was higher for low educated parents and low for high educated parents (Figure 6 and table 2).



region	no school	primary	secondary or higher
Dodoma	14.4	77.8	7.8
Arusha	23.6	60.9	15.6
Kilimanjaro	3.1	78.3	18.6
Tanga	8.8	73.9	17.3
Morogoro	8.2	71.8	20.1
Pwani	13.2	68.1	18.7
Dar es Salaam	0	0	0
Lindi	0	0	0
Mtwara	0	0	0
Ruvuma	0	0	0
Iringa	5.8	77.1	17.1
Mbeya	8.7	76.6	14.7
Singida	9.1	76.6	14.3
Tabora	19.5	66.1	14.4
Rukwa	7.2	81	11.8
Kigoma	0	0	0
Shinyanga	15	69	16
Kagera	10.8	71.9	17.3
Mwanza	8.5	70.2	21.3
Mara	6.3	71.9	21.8
Manyara	11.9	77	11
Njombe	3.8	85.7	10.6
Katavi	26.5	59.1	14.4
Simiyu	15.7	62.3	22
Geita	14	78.2	7.7

Figure 6: Reported education of parents and malaria prevalence by regions

Table 2: Children tested positive and background characteristics

Background characteristics	Tested positive*		Tested positive and temperature taken*		Tested positive and had fever at day of testing	
	Percentage	Number	Percentage	Number	Percentage	Number
Total	**21.6**	**10,627**	**75.04**	**7,974**	**21.43**	**1,709**
Age						
<9	18.2	1,651	69.3	1,144	26.6	304
9-12	21.4	4,045	75.9	3,072	20.9	641
>12	23.4	4,847	76.2	3,694	20.2	748
Sex						
Male	23.2	5,606	75.8	4,250	21.5	913
Female	20.0	4,940	74.2	3,664	21.6	790
Residence						
Urban	6.1	588	63.9	376	15.7	59
Rural	25.5	10,039	75.7	7,598	21.7	1,650
Zone						
Eastern	18.2	1,269	67.6	858	9.9	85
Western	30.2	1,449	74.8	1,084	39.9	432
Southern	33.7	1,344	39.9	536	21.1	113
Southern	12.0	495	26.1	129	80.6	104
Southwest	17.4	846	98.3	832	29.8	248
Central	2.8	156	98.1	153	25.5	39
Northern	5.1	317	97.2	308	10.4	32
Lake	38.0	4,751	85.8	4,074	16.1	656
Region						
Dodoma	3.7	86	100.0	86	40.7	35
Arusha	0.0	1	0.0	0	0	0
Kilimanjaro	0.2	3	100.0	3	33.3	1
Tanga	13.0	313	97.4	305	10.2	31
Morogoro	21.9	554	99.3	550	12.7	70
Pwani	48.4	675	45.6	308	4.9	15
Dar Es Salaam	1.3	40	0.0		0	0
Lindi	30.3	519	58.4	303	14.5	44
Mtwara	36.2	825	28.2	233	29.6	69
Ruvuma	22.8	475	26.9	128	81.3	104
Iringa	0.9	9	11.1	1	0.0	0
Mbeya	10.7	313	98.7	309	36.9	114
Singida	4.0	69	95.7	66	6.1	4
Tabora	30.0	748	98.4	736	53.5	394
Rukwa	20.3	254	96.5	245	37.1	91
Kigoma	30.3	701	49.6	348	10.9	38
Shinyanga	35.1	558	99.5	555	7.0	39
Kagera	31.1	871	97.8	852	20.8	177
Mwanza	40.0	1,097	99.2	1,088	10.1	110
Mara	36.4	710	39.9	283	34.3	97
Manyara	0.1	1	100.0	1	0.0	0
Njombe	1.1	11	0.0	0		0
Katavi	39.9	279	99.6	278	15.5	43
Simiyu	31.0	443	53.5	237	36.3	86
Geita	53.7	1,072	98.8	1,059	13.9	147
Education of Parents						
No school	28.7	1,074	90.0	967	22.5	218
Primary	22.0	5,163	85.9	4,435	20.0	886
Secondary	17.8	808	82.1	663	21.6	143
Higher	9.9	52	86.5	45	22.2	10

Table 3: Sample characteristics and risk factors for malaria infection and bednet use in Tanzania

	Total Children			**Malaria** (N=49,102)			**Net Use** (N=47,800)		
				Children tested positive			Children sleeping under net		
	N	%		n	%	95%CI	n	%	95%CI
Total	**49,113**	**100**	**....**	**10,627**	**21.6**	**(19.6-23.9)**	**33,284**	**70**	**(67.6-71.6)**
Area									
Urban	9,708	19.8		588	6.1	(4-9.1)	7,866	82.2	(78.7-85.2)
Rural	39,405	80.2		10,039	25.5	(23.1-28)	25,418	66.5	(64.1-68.8)
Missing	0	0.0		0	0.0	-	0	0.0	-
Eco-zone (tropical) *									
Dry forest	7,124	19.0		2,247	31.5	(25.9-37.8)	5,417	79.4	(74.7-83.4)
Moist decid.	5,819	15.5		1,816	31.2	(25.1-38)	3,786	67.8	(62-73.1)
Mountain	6,053	16.1		723	11.9	(7.9-17.6)	3,329	57.0	(50.3-63.5)
Rainforest	3,331	8.9		1,272	38.2	(28.6-48.7)	2,664	82.8	(76.3-87.8)
Scrubland	15,216	40.5		2,009	13.2	(10.3-16.7)	9,078	61.2	(57.4-64.9)
Missing	11,570	23.6		2,560	22.2	-	9,010	77.9	-
Altitude									
<750	13,228	26.9		3,248	24.6	(20.7-28.9)	10,697	82.7	(80.1-85)
750-1250	18,901	38.5		5,040	26.7	(23.3-30.4)	13,284	72.0	(68.8-75)
1250-1750	14,581	29.7		2,335	16.0	(12.6-20.1)	8,434	59.8	(56-63.4)
>1750	2,403	4.9		4	0.2	(0.1-0.5)	869	37.8	(30.5-45.7)
Missing	0	0.0		0	0.0	-	0	0.0	-
Transmission zone**									
Low stable	7,606	15.5		105	1.4	(0.5-3.7)	3,706	48.7	(45.2-54.8)
Hypoendemic	11,845	24.1		1,299	11.0	(8.4-14.2)	7,467	63.0	(60.6-69.3)
Hypoendemic	8,188	16.7		2,397	29.3	(24.5-34.5)	6,014	73.5	(71-80.1)
Mesoendemic	21,208	43.2		6,725	31.7	(28.3-35.3)	15,878	74.9	(74.1-79.1)
Hyper-	146	0.3		48	32.9	(11-66.1)	109	74.7	(61.7-85.0)
Missing	120	0.2		53	44.2	-	110	91.7	-

*) Missing malaria test result for 11 children

**) Temperature was not taken in phase I regions, 24% missing temperature for positive tested children

Table 4: Malaria test, pf, pan and environmental characteristics

Environmental characteristics	Malaria		Positive P.f		Positive P.f & Pan		Positive Pan	
	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number
Total	**21.6**	**10,627**	**65.0**	**6,840**	**34.1**	**3,582**	**0.9**	**93**
Residence								
Urban	6.05	588	62.9	370	35.9	211	1.2	7
Rural	25.5	10,050	65.2	6,470	34.0	3,371	0.9	86
Ecozone*								
Dry forest	31.5	2,247	73.6	1,653	25.6	575	0.8	19
Moist deciduous	31.2	1,818	70.5	1,281	28.8	524	0.7	13
Mountain	11.9	723	62.7	453	36.5	264	0.8	6
Rainforest	38.2	1,272	68.6	873	30.8	392	0.6	7
Shrubland	13.2	2,011	71.2	1,430	27.8	558	1.0	21
Zone								
Eastern	18.2	1,270	71.3	905	28.2	358	0.6	7
Western	30.1	1,452	66.7	968	32.6	474	0.7	10
Southern	33.7	1,352	44.2	544	54.7	673	1.1	14
Southern	11.9	491	47.3	232	51.5	253	1.2	6
Southwest	17.4	848	63.4	538	34.3	291	2.2	19
Central	2.8	156	64.1	100	32.7	51	3.2	5
Northern	5.1	317	67.5	214	31.5	100	0.9	3
Lake	38.0	4,752	70.3	3,339	29.1	1,382	0.6	29
Region								
Dodoma	3.7	86	75.6	65	19.8	17	4.7	4
Arusha	0.0	1	100.0	1	0.0	0	0.0	0
Kilimanjaro	0.2	3	33.3	1	33.3	1	33.3	1
Tanga	13.0	313	67.7	212	31.6	99	0.6	2
Morogoro	21.9	554	82.1	455	17.3	96	0.5	3
Pwani	48.4	676	64.3	435	35.2	238	0.4	3
Dar Es	1.3	40	37.5	15	60.0	24	2.5	1
Lindi	30.1	519	52.5	209	47.2	188	0.3	1
Mtwara	36.4	833	40.2	335	58.2	485	1.6	13
Ruvuma	22.6	471	47.3	223	51.8	244	0.8	4
Iringa	0.9	9	55.6	5	22.2	2	22.2	2
Mbeya	10.7	314	70.4	221	25.5	80	4.1	13
Singida	4.0	69	50.7	35	49.3	34	0.0	0
Tabora	30.0	748	80.2	600	19.5	146	0.3	2
Rukwa	20.3	254	57.5	146	41.3	105	1.2	3
Kigoma	30.3	704	52.3	368	46.6	328	1.1	8
Shinyanga	35.1	558	61.1	341	38.2	213	0.7	4
Kagera	31.1	871	65.8	573	33.3	290	0.9	8
Mwanza	40.0	1,097	72.7	797	27.2	298	0.2	2
Mara	36.4	711	71.0	505	27.7	197	1.3	9
Manyara	0.1	1	0.0	0	0.0	0	100.0	1
Njombe	1.1	11	36.4	4	63.6	7	0.0	0
Katavi	40.1	280	61.1	171	37.9	106	1.1	3
Simiyu	31.0	443	68.5	302	30.4	134	1.1	5
Geita	53.7	1,072	76.6	821	23.3	250	0.1	1

*no information for phase I (Dar es Salaam, Kigoma, Lindi, Mtwara and Ruvuma Regions)

Geographical Distribution of Malaria

Malaria prevalence in Tanzanian regions

Overall, 21.6 percent of children aged 5 to 16 years tested positive for malaria parasites. The positivity rate varies among regions and was highest in the North-Western regions and South-Eastern regions, and lowest in the Northern highlands, Central plateau and Southern highlands of the country (see figure 7 and table 3).

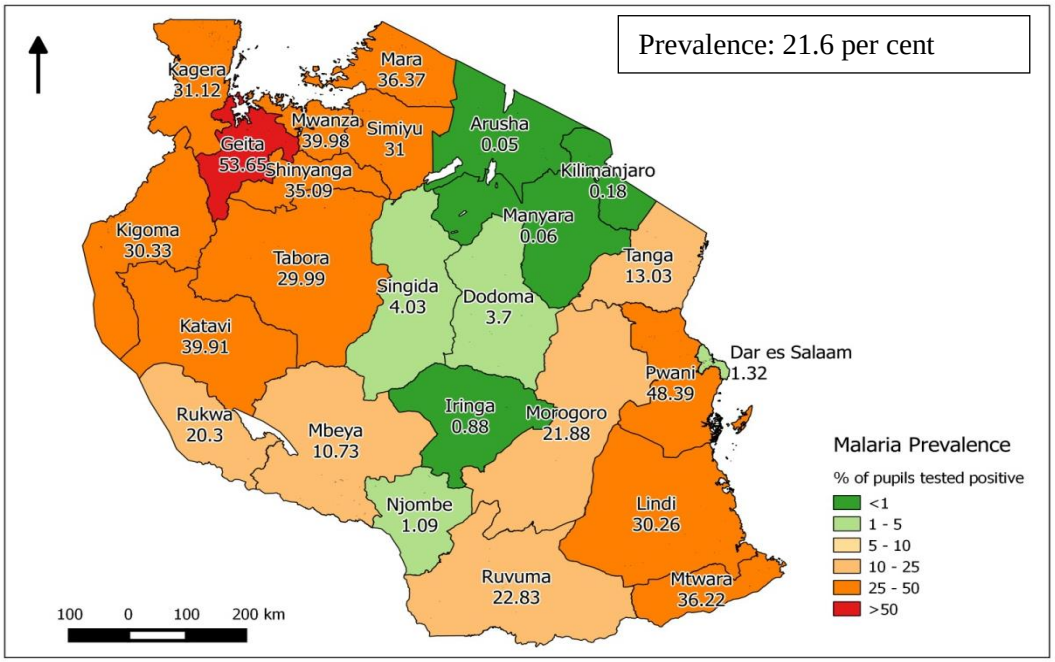


Figure 7: Malaria prevalence in school children aged 5 to 16 years by region.

Malaria prevalence in Councils

Figure 8 shows malaria positivity rate among children aged 5 to 16 years old by council. At council level the malaria prevalence ranges from zero to 76.4%, whereas 18 councils had prevalence above 50%, 51 councils between 25 and 50%, 25 councils between 10 and 25%, 27 councils between 5 and 10%, 17 councils between 1 and 5%, and 45 councils below 1%. The highest prevalences were found in the councils around Lake Victoria, Nsimbo (Katavi) and South-eastern councils; Ulanga (Morogoro), Tunduru (Ruvuma), Ruangwa (Lindi) and Mkuranga (Pwani). These had a malaria prevalence of more than 50% among primary school children. The lowest malaria prevalence was found in the councils in Central corridor.

Malaria prevalence and altitude

Malaria positivity rate and altitude in most areas in the lowlands have high malaria positivity rates compared to the areas located in the highlands (figure 9). The positivity rate was predominant in Coastal regions and around lakes Victoria and Tanganyika (low land) and very low in Central corridor including southern highland regions (highland).

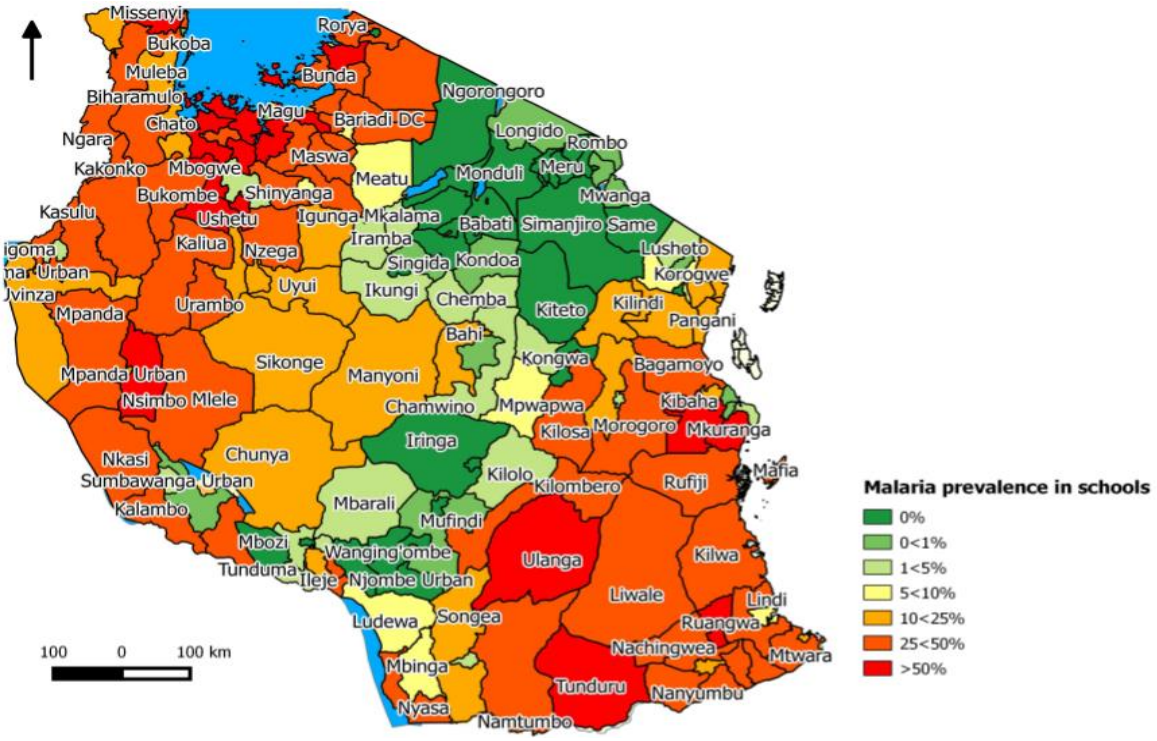


Figure 8: School children malaria prevalence indicating a spatial variation by council

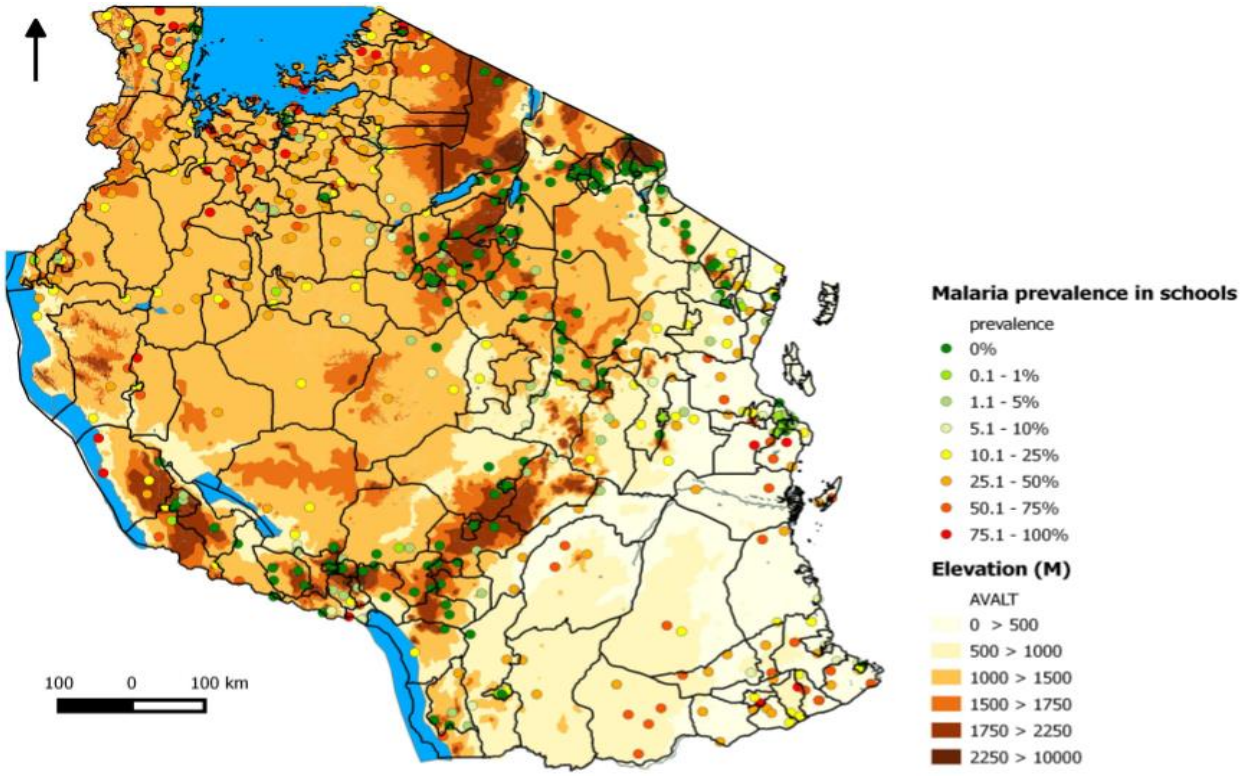


Figure 9: School children malaria prevalence by altitude.

Mosquito Net Ownership and Use

Table 2 shows reported net ownership and use among pupils according to age groups, sex, residence, zone, region and parents'/guardians' level of education. Almost 90% of all pupils interviewed reported to have at least one bed net at home, and 70% reported to sleep under a mosquito net.

Sex and Age

Table 5 shows mosquito net ownership and those reported to sleep under mosquito net slightly higher among pupils aged 9 to 12 years (71%), compared to the other age groups (69%). Slight differences were also observed among boys (68%) and girls (71%).

Residence

The percentage of pupils who reported to have at least one net at home was higher in urban councils (93%) compared to rural councils (89%). The difference between pupils living in urban and rural councils is higher for the reported net use with 82% reported use in urban councils and 67% in rural councils (table 5).

Region

The reported mosquito net ownership is lowest in Iringa, Njombe, Dodoma, Arusha, and Singida regions (<76%) and highest in Mara, Shinyanga, Mwanza, Tabora and Mtwara (>99%). The trend for the net use is in-line with the one of the ownership, which is lowest in Iringa, Njombe, Dodoma, Arusha and Singida, (≤50%) (table 5).

Zone

Table 5 indicates the reported mosquito net ownership is lowest in the Central zone (75%) and highest in the Lake Zone (98%), followed by the Southern and Eastern Zones (97% and 96% respectively).

Altitude

High percentage (96%) of children living in low altitude areas reported to have at least one net at household and about 83% of them are generally sleeping under mosquito net. Overall, percentage of net ownership and use decreased with increasing altitude (table 5).

Table 5: Background Characteristics and responses on the Mosquito Net Ownership and Use

Background characteristics	Pupils responded to own at least one net at home (N=46,826)		Pupils responded to generally sleeping under a Net (N=47,800)		Pupils responded to Slept under Net last night (N=47,909) *	
	Percentage	Number	Percentage	Number	Percentage	Number
Total	**89.53**	**41,583**	**69.69**	**33,037**	**66.1**	**31,425**
Age						
<9	87.8	7,369	68.8	5,974	66.4	5,780
9-12	90.4	16,306	71.3	13,106	67.9	12,516
>12	89.4	17,908	68.6	13,957	64.5	13,129
Sex						
Male	88.9	20,503	68.3	16,077	64.6	15,261
Female	90.1	21,232	71.0	17,078	67.6	16,282
Residence						
Urban	93.18	8,839	82.2	7,866	79.89	7,653
Rural	88.58	33,075	66.5	25,418	62.62	24,003
Zone						
Eastern	96.4	6,403	86.6	5,819	83.7	5,643
Western	94.2	4,330	68.8	3,221	63.5	2,984
Southern	96.6	3,854	81.6	3,255	79.1	3,152
Southern Highlands	80.3	3,147	58.7	2,350	54.6	2,187
Southwest Highlands	85.9	4,015	61.6	2,946	58.5	2,809
Central	75.0	4,049	55.1	3,077	50.8	2,836
Northern	79.4	4,589	55.6	3,360	52.2	3,159
Lake	97.5	11,527	77.2	9,256	73.8	8,886
Altitude						
<750	96.0	11,263	83.2	9,822	80.3	9,488
750-1250	91.2	12,080	70.5	9,485	66.8	9,007
1250-1750	87.8	15,965	65.7	12,228	61.7	11,524
>1750	70.9	2,606	44.7	1,749	41.6	1,637
Region						
Dodoma	68.5	1,579	50.0	1,158	45.1	1,044
Arusha	68.8	1,371	47.8	995	44.9	933
Kilimanjaro	80.8	1,244	54.7	878	51.2	824
Tanga	88.0	1,974	63.1	1,487	59.3	1,402
Morogoro	95.8	2,302	83.8	2,041	79.1	1,939
Pwani	94.6	1,208	82.6	1,043	78.0	996
Dar Es Salaam	97.6	2,893	90.7	2,735	89.9	2,708
Lindi	95.6	1,647	81.4	1,400	77.8	1,332
Mtwara	97.3	2,207	81.7	1,855	80.1	1,820
Ruvuma	92.1	1,909	72.1	1,499	68.8	1,426
Iringa	65.8	649	46.7	464	42.2	419
Mbeya	86.3	2,419	63.1	1,806	60.5	1,734
Singida	75.5	1,257	56.8	958	53.0	896
Tabora	99.1	2,328	74.8	1,786	67.9	1,631
Rukwa	81.5	969	48.1	593	44.1	547
Kigoma	89.0	2,002	62.4	1,435	58.9	1,353
Shinyanga	99.5	1,516	65.4	1,009	62.1	957
Kagera	98.7	2,686	86.0	2,343	81.9	2,238
Mwanza	99.5	2,637	92.5	2,501	90.9	2,467
Mara	99.8	1,881	88.9	1,673	85.3	1,616
Manyara	84.9	1,213	60.8	961	56.7	896
Njombe	68.3	589	41.5	387	36.5	342
Katavi	91.9	627	78.9	547	76.1	528
Simiyu	89.3	1,199	54.9	730	49.7	662
Geita	94.5	1,608	55.2	1,000	51.9	946
Education of Parents						
No school	80.8	2,774	54.7	1,930	50.1	1,769
Primary	87.9	19,506	65.8	14,968	61.9	14,147
Secondary	92.8	4,063	77.5	3,430	73.2	3,253
Higher	95.5	487	80.7	415	77.8	400

**) Assumption: Those who do not generally sleeping under a net also did not sleep under a net the previous night*

Figure 10 shows the percentages distribution of pupils who reported to have at least one mosquito net in their household ("mosquito bed-net ownership") by regional. Ownership of the mosquito net was above 95% in 8 regions, 9 regions ranges between 85% - 95%, and in 8 regions below 85%. The reported mosquito net ownership was lowest in the regions Iringa, Njombe, Dodoma, Arusha and Singida, (50-75%) and highest in Kagera, Mara, Shinyanga, Mwanza, Tabora, Lindi, Morogoro and Mtwara (>95%).

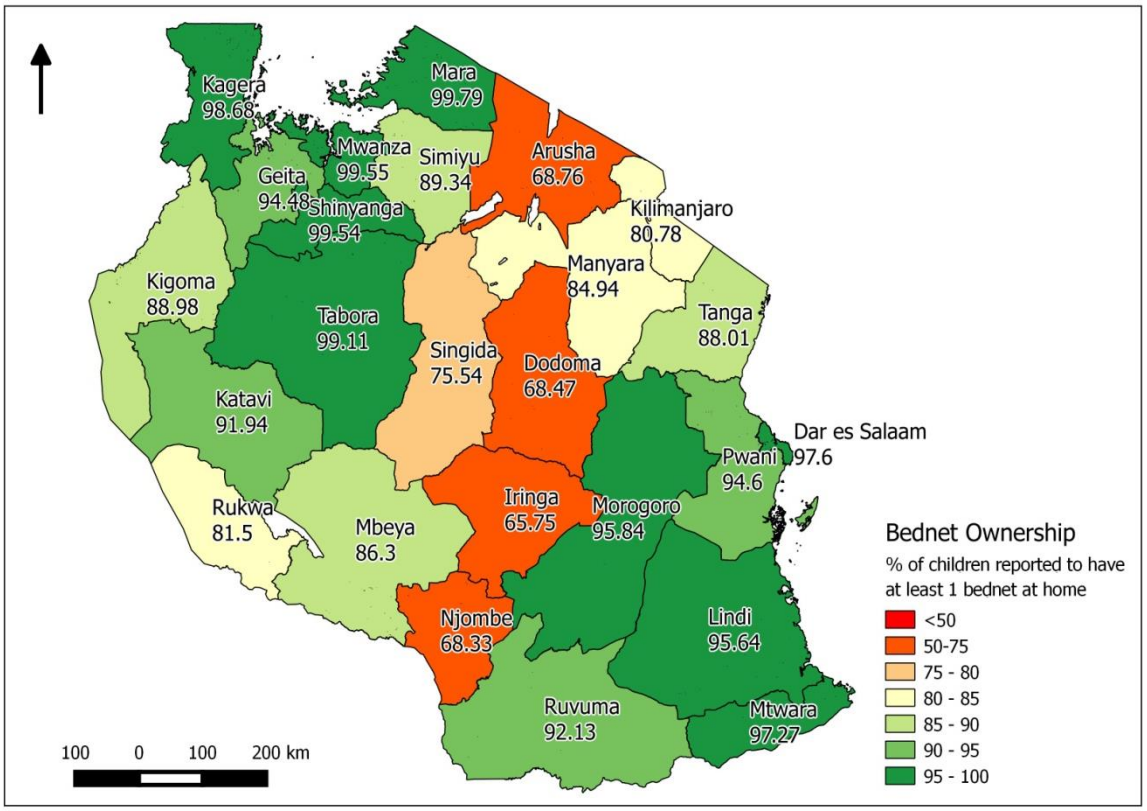


Figure 10: Mosquito net ownership by regions (at least 1 net per household)

School absenteeism and history of fever

Table 6 shows the percentage of children who reported to have been absent from school due to sickness in the last two weeks prior to the survey and whether they also reported to have had fever, sought medical care at the health facilities and/or were diagnosed and treated.

Overall, 36 percent of the pupils reported absenteeism from school due to sickness, of which 33 percent of them reported to have had fever. About 70 percent of the pupils with fever reported to sought medical care in the health facilities of which 80 percent of them were diagnosed with malaria and 92 percent were given medicines.

Figure 11 and 12 shows the percentage distribution of school absenteeism due to sickness and children who had fever last two weeks. School absenteeism was more prevalent in Mwanza,

Mara, Simiyu, Tabora, Morogoro and Pwani (figure 6). Similar results were observed for pupils who had fever last two weeks except Mwanza and Lindi (figure 12).

Sex and Age

Table 6 indicates children aged 5 to 9 years reported the highest percentage of school absenteeism (40%), followed by children aged 9-12 years (38%). More than one-third (34%) of the girls had fever, of which 71% sought health care for treatment and 81% were diagnosed malaria.

Residence

According to table 6, children living in rural were slightly reported to have been absent from school due to sickness (36%), compared to children living in urban councils (33%). Nearly one-third of the children in rural and urban councils had fever while the percentage of children who went to a health facility for treatment was higher in urban councils (75%).

Zone and Region

More than half (52%) of the children living in the Eastern zone reported school absenteeism due to sickness. Around 40% of those living Southern west highland fever of which 82% of them sought treatment in in the health care facilities.

In addition, above 90% of the children living in Mwanza reported school absenteeism due to sickness last 2 weeks before survey. Children who reported to have fever during the past two weeks prior the survey was highest (nearly 50%) in Mara of which only 58% of them went to a health facility for treatment (table 6).

Education of Parents

Table 6 shows nearly 40% of the children reported their parents/guardians have higher or secondary education were more likely to report school absenteeism than their counterparts.

Table 6: Children's background characteristics, Sickness and History of fever

Background characteristics	Absent due to sickness		Children who had fever		Children with fever: went to health facility		Children with fever: Had malaria diagnosis		Children with fever: Received treatment	
	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number
Total*	**35.7**	**17,272**	**32.7**	**15,709**	**70.1**	**10,697**	**80.0**	**8,448**	**92.3**	**9,916**
Age										
<9	40.0	3,548	37.7	3,328	76.2	2,471	80.6	1,937	94.1	2,331
9-12	38.1	7,092	34.6	6,414	71.6	4,468	80.2	3,552	93.4	4,195
>12	31.7	6,498	28.7	5,830	65.1	3,672	79.4	2,895	89.9	3,311
Sex										
Male	34.3	8,173	30.9	7,313	68.9	4,898	78.9	3,808	91.8	4,516
Female	37.0	9,013	34.3	8,304	71.2	5,740	81.0	4,594	92.8	5,347
Residence										
Urban	33.1	3,185	32.3	3,101	77.7	2,309	75.8	2,036	85.3	2,331
Rural	36.4	14,087	32.8	12,608	68.3	8,388	72.0	6,902	81.0	8,135
Zone										
Eastern	51.6	6,307	36.7	4,502	59.5	2,654	88.1	2,326	98.3	2,531
Western	23.7	1,447	24.1	1,447	75.9	1,038	59.8	600	80.9	891
Southern	37.3	1,776	42.2	2,009	62.5	1,251	83.4	1,031	95.0	1,190
Southern Highlands	23.4	1,309	20.9	1,157	77.7	856	62.6	508	82.0	722
Southwest Highlands	38.0	2,600	40.1	2,769	82.1	2,165	88.4	1,976	98.0	2,118
Central	28.8	1,390	28.2	1,329	79.8	1,013	62.9	607	74.2	770
Northern	26.8	1,084	25.7	1,039	74.5	751	78.5	580	96.8	732
Lake	34.1	1,359	37.7	1,457	68.6	969	88.5	820	98.9	962
Region										
Dodoma	25.4	589	22.4	517	76.3	383	68.6	243	83.6	321
Arusha	16.5	347	15.1	313	79.4	243	38.3	88	84.8	212
Kilimanjaro	27.3	442	28.9	465	76.0	310	55.0	159	79.8	285
Tanga	27.6	658	28.9	669	74.3	485	72.8	353	79.6	394
Morogoro	42.5	1,039	44.5	1,116	79.4	884	92.4	816	97.0	851
Pwani	44.2	599	45.2	614	82.9	432	83.5	430	98.4	426
Dar Es Salaam	31.7	962	34.2	1,039	84.8	849	87.2	730	98.8	841
Lindi	34.2	586	40.7	655	64.9	408	86.5	340	99.3	410
Mtwara	34.0	773	35.5	802	71.6	561	89.9	480	98.6	552
Ruvuma	33.1	688	32.9	683	70.9	474	86.7	405	98.1	466
Iringa	21.2	216	17.9	183	80.9	140	66.7	96	94.5	137
Mbeya	24.3	702	22.5	629	85.0	526	66.1	336	82.5	438
Singida	17.7	299	16.7	276	76.0	193	64.4	121	83.7	174
Tabora	43.0	1,055	45.2	1,110	69.7	775	84.7	654	94.5	732

Background characteristics	Absent due to sickness		Children who had fever		Children with fever: went to health facility		Children with fever: Had malaria diagnosis		Children with fever: Received treatment	
	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number
Rukwa	34.0	424	36.1	444	68.6	275	63.7	172	74.7	213
Kigoma	31.3	721	39.1	899	53.6	476	81.3	377	96.0	458
Shinyanga	28.6	454	24.8	394	61.9	242	87.8	215	97.9	237
Kagera	39.9	1,077	36.7	1,006	60.7	594	86.3	506	99.3	550
Mwanza	91.7	2,474	29.1	795	66.2	526	94.9	499	98.8	514
Mara	49.1	931	49.2	920	58.0	539	89.9	479	98.5	520
Manyara	26.3	421	23.1	364	81.2	280	53.3	144	78.8	227
Njombe	19.0	180	18.4	173	82.5	137	61.7	79	94.9	129
Katavi	38.2	264	37.5	256	84.8	212	52.9	99	53.6	119
Simiyu	45.5	633	48.0	651	54.9	350	81.5	287	95.9	329
Geita	37.9	738	37.3	736	55.3	403	85.6	340	97.9	381
Education of parents										
No school	35.5	1,304	31.5	1,149	63.8	704	73.8	515	86.5	608
Primary	36.5	8,425	31.5	7,220	70.2	4,930	77.9	3,829	90.5	4,468
Secondary	39.1	1,729	34.3	1,519	74.2	1,103	84.3	915	93.9	1,040
Higher	39.3	201	40.0	206	76.4	155	80.9	123	93.5	143

**) missing values not shown, the total might differ between variables*

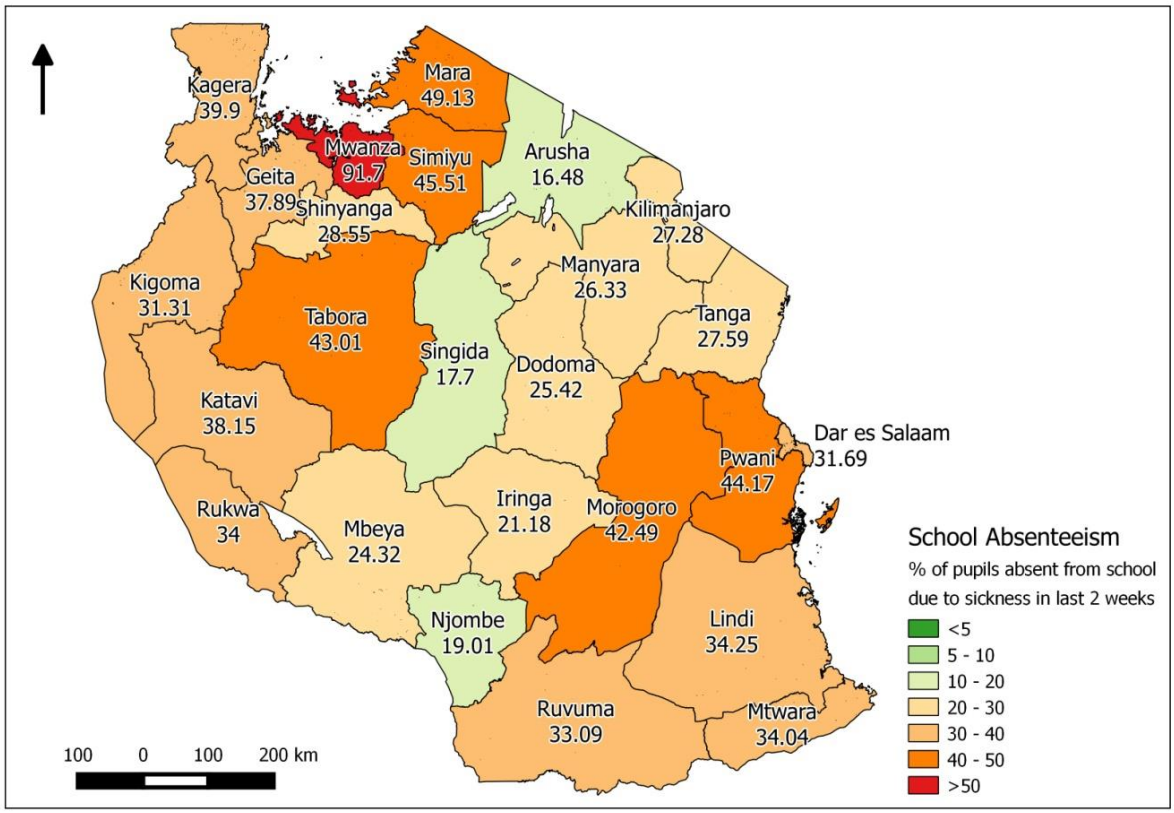


Figure 11: School Absenteeim due to sickness in last two weeks, prior the survey

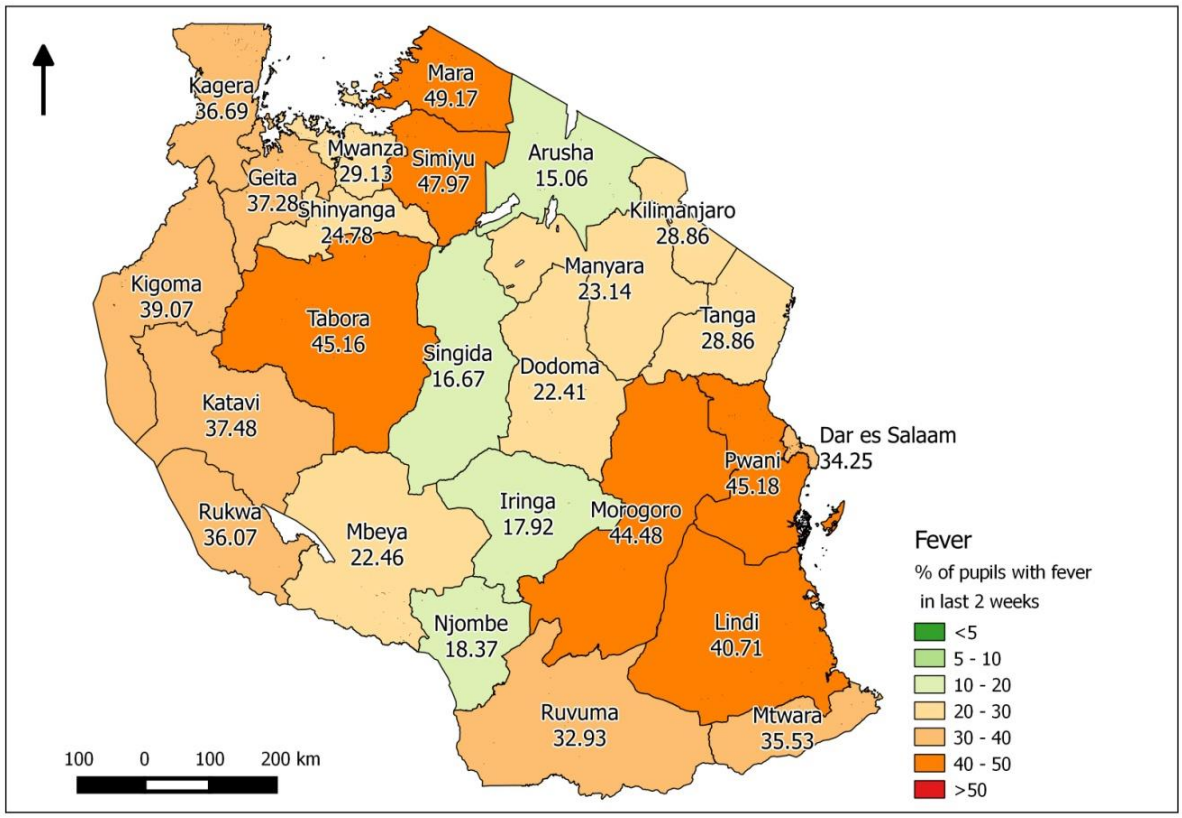


Figure 12: Fever in the last two weeks, prior the survey

DISCUSSION

Determinants of Malaria Transmission

Altitude and other Ecological Parameters

The study findings show that, the altitude influences greatly the malaria prevalence. Schools located at altitude higher than 1750 meters above sea level (asl) have lower prevalence compared to the altitudes lower than 1250 mt. asl (0.2% vs >25% respectively). Based on study results, altitude, especially the three strata which elevation a) below 1250, b) between 1250 and 1750 and, c) above 1750 mt asl, might be considered as a proxy indicator of malaria transmission from meso-high endemicity to low and extremely low endemicity.

The survey results indicate high heterogenighty in malaria risks with respect to the altitude, the low land communities being at relatively higher risk compared to most highland communities. Similarly, findings indicate, both net ownership and usage was reportedly higher in the lowland communities presumably because of perceived exposure to malaria infection, whereas on the other hand, most highland communities reported less LLIN ownership and use. Hence, more strategic behaviour change communications need to be properly packaged and tailored to local micro environments.

In terms of ecological zone, population living in shrublands and mountain system are 3 times less at risk compared to other ecological zones (dry, moisty decidual and rainforest respectively).

Geographical distribution

The findings from this study showed that, the overall malaria prevalence is at 21.6%; however, there existed some marked variation across the country. The observed malaria prevalence in this study is much higher compared to the 2011-12 THMIS and 2015-16 TDHS-MIS findings whereby malaria prevalence were 9.5% and 14.8% respectively (7,25). Nevertheless, the observed low malaria transmission in the Central corridor (Northern, Central and some parts of Southern highland regions) and high transmission along the shores of Lake Victoria, Tanganyika and Coastal regions is consistent with findings reported in the malaria epidemiological profile (5). Nothwithstanding of the upward trend in interventions coverage, particularly availability and use of LLINs; its effect is not reflected in the overall disease burden. Therefore, it is evident that the current strategy for malaria control interventions might be insufficient and less likely to lead to malaria elimination targets.

Population settings

SMPS confirms that urban population has a lower risk (4 times lower) to malaria infection compared to rural population which is in-line with THMIS and TDHS-MIS survey (5–7,25).

Transmission risk

Based on SMPS findings, more than half of Tanzanian population (56%) lives in hypoendemic areas (areas with prevalences less than 10%). Similar findings (see figure 13) was reported in the Malaria epidemiological profile in Tanzania (5).

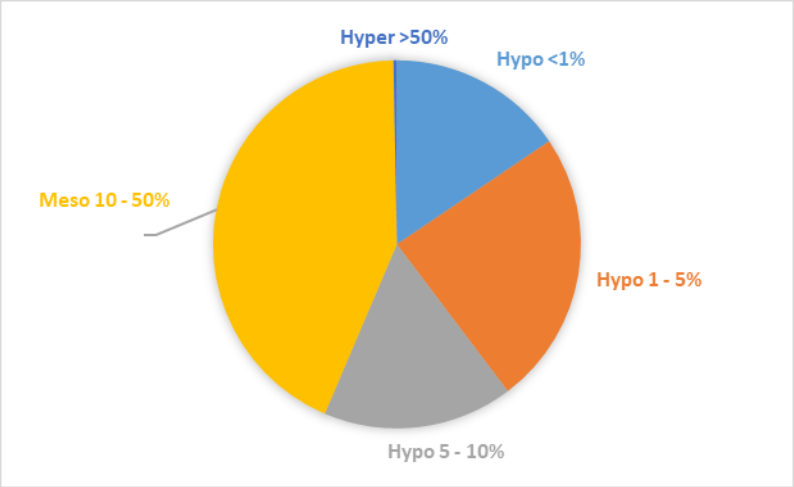


Figure 13: Epidemiological classes for Plasmodium falciparum Prevalence Rate (PfPR)

Age and sex

SMPS findings indicate insignificance difference of malaria transmission risks between gender as evidenced with the observed positivity rates of 23% and 20% among boys and girls respectively.

Despite the little differences observed on LLIN ownership and use among boys and girls, the results indicate very high levels of equal access to interventions. This is key for the future of malaria control and elimination, as equity is a major setback if it's not properly addressed.

SMPS within Malaria Surveillance Framework

NMCP developed a comprehensive malaria package for Surveillance Framework within the Surveillance, Monitoring and Evaluation Plan and the National Guidelines for Malaria Surveillance and Response (26,27). The aim is to strengthen the increased needs of information in the current malaria epidemiological transition and transform the information into knowledge malaria control interventions in the country.

This comprehensive malaria surveillance framework includes four major pillars: disease, programmatic, transmission and services. The disease surveillance component collects data on

passive routine reporting, while the programmatic surveillance gathers information on commodities, preventive services, therapeutic efficacy, insecticide susceptibility and pharmacovigilance. Transmission surveillance brings together parasitological, entomological and climatic information and, finally, the services surveillance in health facilities is monitored through quality improvement indicators including data audit. The framework operates across all levels of the health care delivery system and generates output in term of tables, charts and maps.

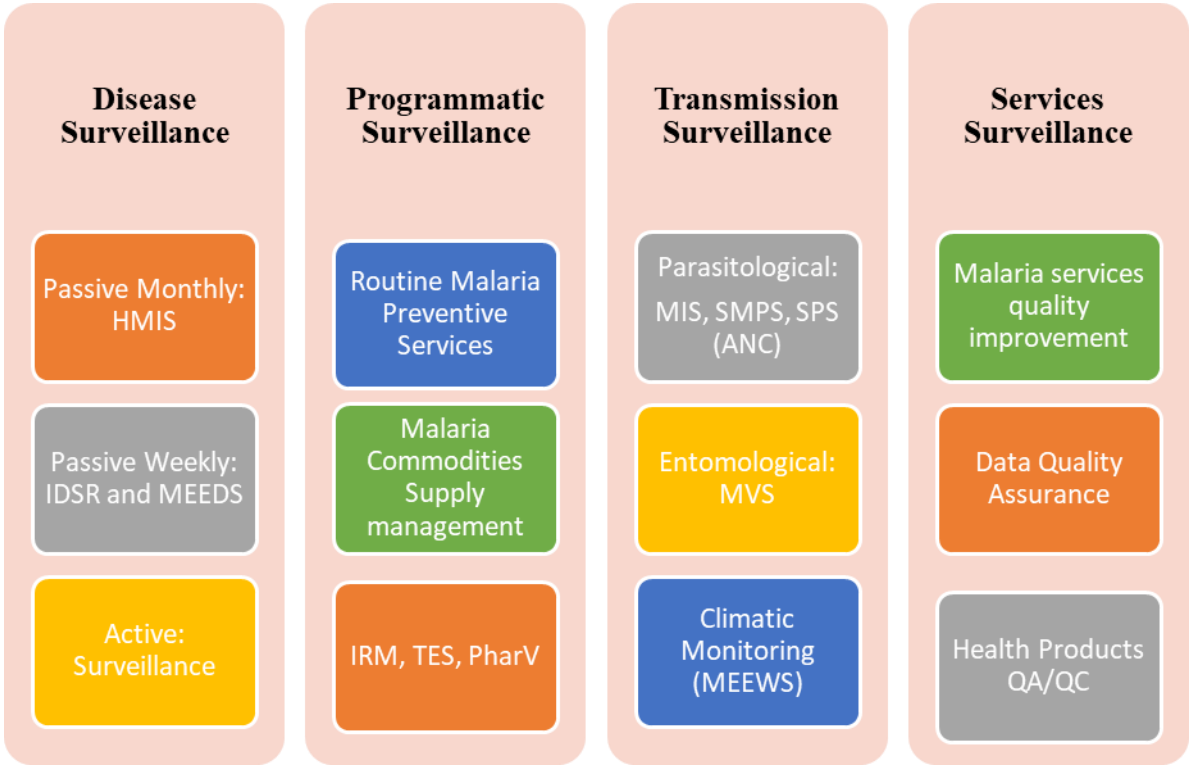


Figure 14: Comprehensive Malaria Surveillance Framework

SMPS falls under transmission surveillance element of the framework together with other parasitological capturing surveys and system. Thus, SMPS findings provide a practical approach for gathering nationwide representative data among school going children at council and sub-council level within a short period of time. When conducted continuously, the SMPS can complement MIS surveys and can be used to improve appropriate malaria risk-stratification of areas, age groups, and efficient targeting with control measures.

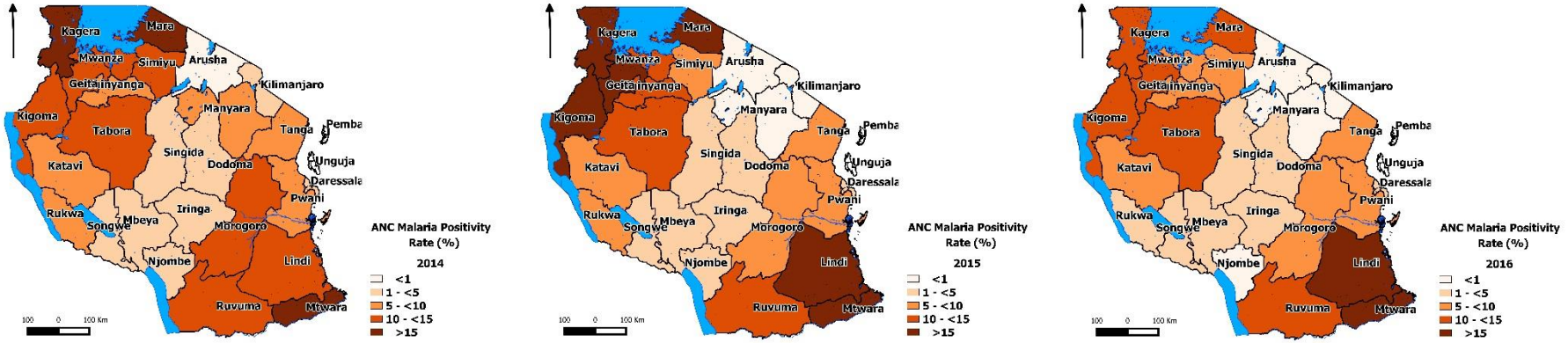
Whilst the proportion of children with malaria was slightly increasing in all transmission settings, overall the prevalence rates observed among school age chilren (21.6%) are higher compared to those reported from the most recent TDHS – MIS (2015-16) (figure 15) among children aged 6-59 months with a respective 9.5 (THMIS 2012) and 14.8% (TDHS-MIS 2016) prevalence (7,25). The regional malaria prevalence estimate maps generated from the SMPS, the patterns observed corresponds well with the findings of the THMIS/TDHS-MIS reported

estimates (6,7,25). In addition, the overall malaria prevalence among school children as observed in the SMPS findings is also higher compared to the years of 2014 and 2016 routine data from health facilities of malaria positivity rate (7.2% - 8.1%) among pregnant women aged between 15 – 45 years old who were tested for malaria at their first Antenatal Care (ANC) visits (figure 15). Furthermore, the three-parasitological surveys (TDHS-MIS, ANC pregnant women testing, and SMPS) shows similar patterns in term of herogeneity with relevant lower prevalence in the Central, South West and North-East zones (figure 15&16).

Maps showing Malaria Prevalence over time per region according to HMIS data reported at ANC in Tanzania

2014 **2015** **2016**

DHIS2 (ANC)



Maps showing Malaria Prevalence over time per region according to THMIS/TDHS-MIS in Tanzania

2008 **2012** **2016**

THMIS/

TDHS (MIS)

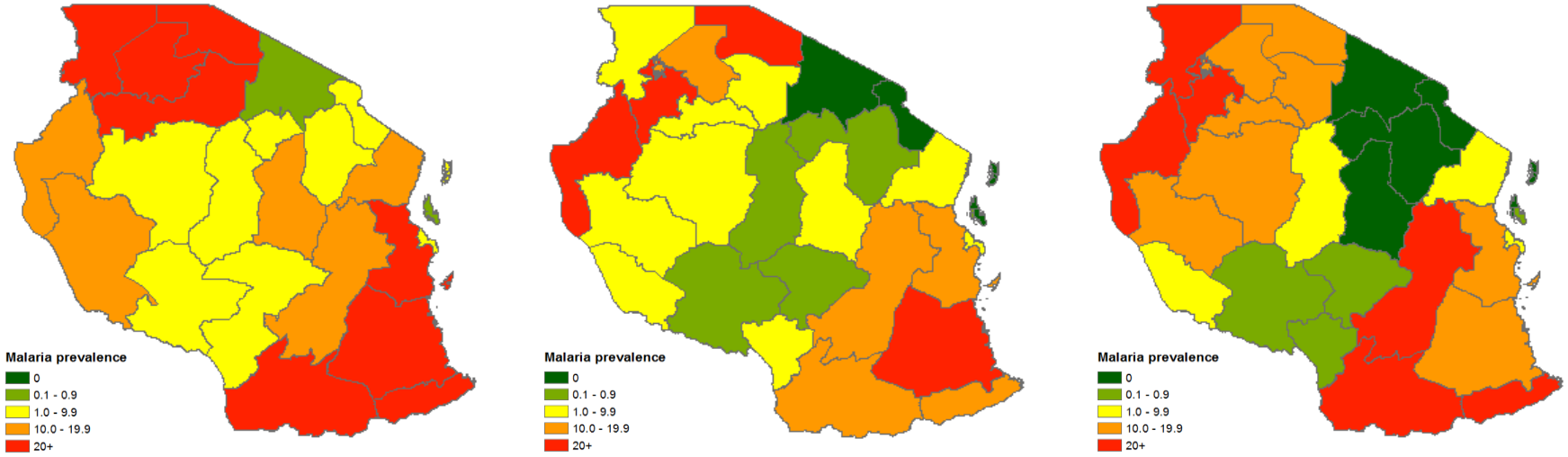


Figure 15: Malaria Prevalence over time per region according to MIS and ANC in Tanzania

Maps showing Malaria Incidences over time per region according to HMIS/DHIS2 in Tanzania

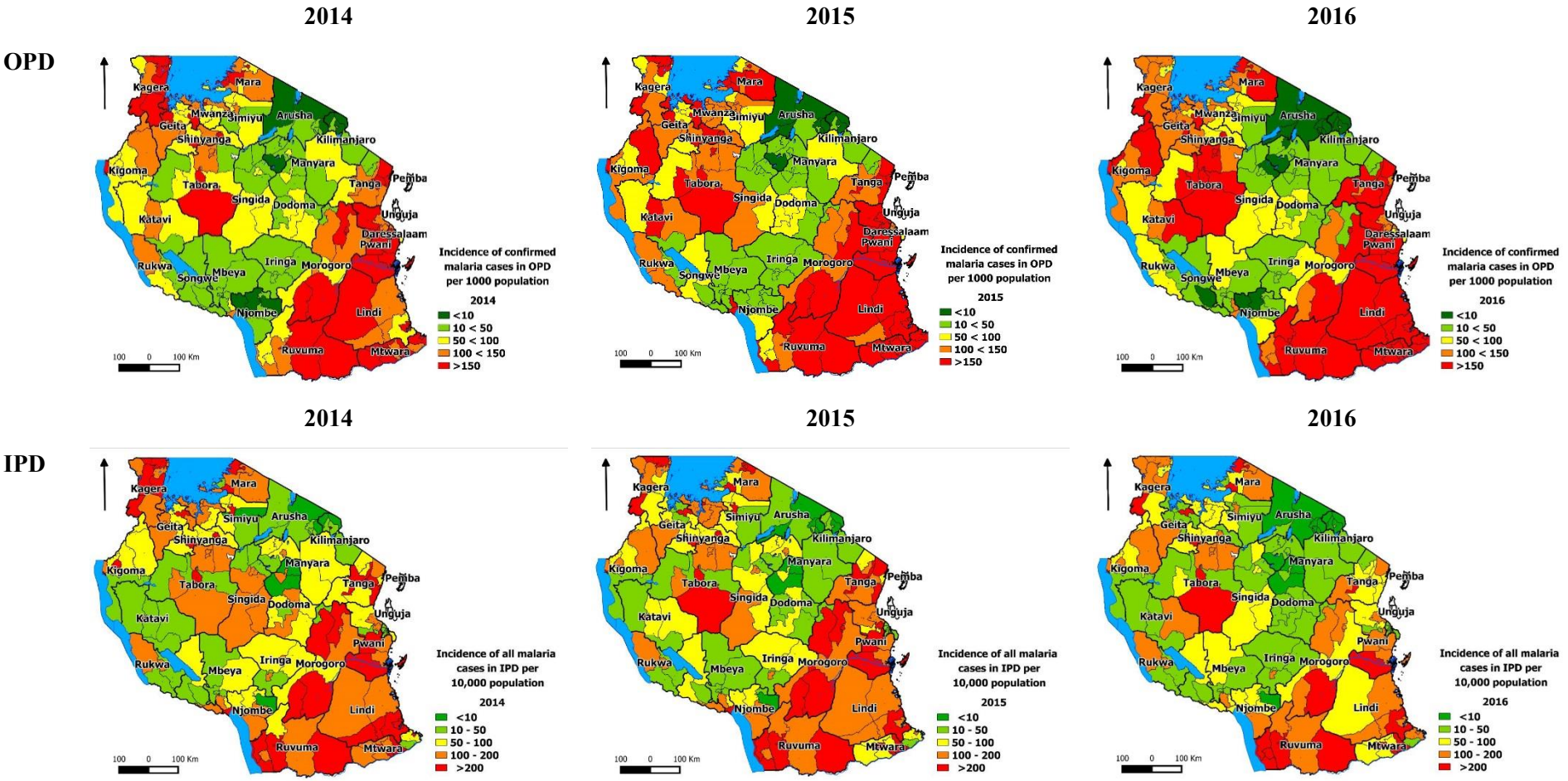


Figure 16: Malaria Incidences over time per region according to HMIS/DHIS2 in Tanzania

Preventive and Curative practices among school children

Ownership and Use of Mosquito Net

The use of mosquito net is a primary health intervention strategy used to reduce malaria burden in Tanzania while ownership measures the success of malaria control. Widespread use of mosquito net is expected to reduce mosquito density and biting intensity.

The results suggest that ownership of at least one mosquito net at home was more than 88 percent among age groups and nearly 70% children are generally sleeping under mosquito net. Of those generally sleeping under mosquito net; 65 percent slept under mosquito net the night before the survey. Although the mosquito net ownership at home as reported between children living in rural and urban do not differ, but more than three quarter of the children living in urban are generally sleeping under mosquito net compared to rural.

The current findings also highlight the marked variation in the level of reported mosquito net ownership. There is high level of mosquito net ownership in Eastern, Western and Southern Tanzania including Lake Zone and least mosquito net ownership reported in central and northern Tanzania. The THMIS 2011-12, indictaed that mosquito net ownership was more than 90 percent in Central and Northern Tanzania (7). Although the mosquito net ownership at home is generally high at all education levels of the parents, but highly educated parents are more likely to own mosquito net compared to none or less educated parents.

School absenteeism

Children living in rural and urban were equally likely to report school absenteeism, although children living in rural areas slightly reported higher school absenteeism. The results also highlighted the marked variation in the level of school absenteeism across regions.

RECOMMENDATIONS

The SMPS provides another set of information for the NMCP and partners to utilize to make informed decisions on appropriate stratification of the malaria burden and appropriate targeting interventions and resources. The high malaria prevalence rates among asymptomatic school children, calls for special emphasis from the program and other stakeholders to particularly target this group that is increasingly at risk and harbouring high proportion of the parasites. To increase utilization of deployed resources, efforts should be directed to this population observed to have high malaria prevalence by promoting mosquito net use and early treatment seeking behavior. This should go in-line with efforts to harmonize the existing school health plans with current malaria control measures.

Quality assured and cost effective diagnostic methods to detect low levels of infection should be in available in all health care facilities. In addition, to control malaria in areas resilient to malaria transmission (hot spots); a targeted malaria control measures should be deployed guided by the defined environmental and/or socioeconomic risk factors rather than the routine implementation of relying current political boundaries.

There is a need to understand better the burden of malaria observed in this SMPS report by triangulating it with morbidity and mortality data generated in the health facilities to inform policy makers, implementers, general population and donors in relation to changing malaria epidemiology in this school age children.

CONCLUSIONS

Malaria transmission intensity in most parts of Africa has been changing largely due to increased access to malaria control interventions. However, due to the underlying transmission intensity and intervention coverage, the changes in malaria transmission have not been universal between and within countries. The SMPS have high sample size and adequately powered that provide malaria prevalence estimates at the council and sub-council level compared to THMIS and TDHS-MIS which have national and regional estimates only. The heterogeneity in malaria risk, as described in the epidemiological profile of malaria in Tanzania and its control, has necessitated the malaria program to undertake this School Malaria Parasitological Surveys (SMPS) to evaluate the prevalence and dynamics of the plasmodium infection among public primary school pupils.

School Surveillance is a practical and cost-effective approach to collect nationwide data among school children at sub-council level in a short period of time. When conducted continuously, SMPS can complement MIS surveys and can be used to improve mapping malaria transmission and guide stratification of control interventions and resource allocation.

REFERENCES

1. WHO | World Malaria Report 2014. WHO. [cited 2016 May 24]. Available from: http://www.who.int/malaria/publications/world_malaria_report_2014/en/

2. URT, MoHCDGEC/NMCP. National Malaria Strategic Plan 2015 - 2020 - [cited 2016 May 24]. https://www.google.com/?gws_rd=ssl#q=National+Malaria+Strategic+Plan+2014+-+2020

3. URT, MoHCDGEC/NMCP. Annual Malaria Data from Health Facilities reported through HMIS/DHIS2. Dar es Salaam, Tanzania; 2015.

4. WHO | World Malaria Report 2011. WHO. [cited 2016 May 24]. Available from: http://www.who.int/malaria/world_malaria_report_2011/en/

5. URT, MoHCDGEC. An Epidemiological Profile of Malaria and its Control in Mainland Tanzania. 2013 [cited 2014 Apr 4]. Available from: https://mail.google.com/mail/u/0/#inbox/1452cbbf5e5d0fb2

6. National Bureau of Statistics. Tanzania HIV/AIDS and Malaria Indicator Survey. Tanzania; 2009 March.

7. National Bureau of Statistics. Tanzania HIV/AIDS and Malaria Indicators. Tanzania; 2013 Mar.

8. Griffin JT, Ferguson NM, Ghani AC. Estimates of the changing age-burden of Plasmodium falciparum malaria disease in sub-Saharan Africa. National Communication. 2014; 5:3136.

9. WHO | World Malaria Report 2015. WHO. [cited 2016 May 24]. Available from: http://www.who.int/malaria/publications/world-malaria-report-2015/report/en/

10. Rutta ASM, Francis F, Mmbando BP, Ishengoma DS, Sembuche SH, Malecela EK, et al. Using Community-owned Resource Persons to Provide Early Diagnosis and Treatment and estimate Malaria Burden at Community level in North-Eastern Tanzania. Malar Journal. 2012 May 3 [cited 2014 Apr 15]; 11:152. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3517357/

11. BEST | Pmoralg - Tanzania. [cited 2016 May 24]. Available from: http://www.pmoralg.go.tz/noticeboard/tangazo-1023-20141229-Basic-Education-Statistics-BEST/

12. Statistics. UNICEF. [cited 2016 May 24]. Available from: http://www.unicef.org/infobycountry/tanzania_statistics.html

13. Okiro EA, Al-Taiar A, Reyburn H, Idro R, Berkley JA, Snow RW. Age patterns of severe paediatric malaria and their relationship to Plasmodium falciparum transmission intensity. Malar Journal. 2009 [cited 2016 May 24]; 8:4. Available from: http://dx.doi.org/10.1186/1475-2875-8-4

14. Brooker S, Kolaczinski JH, Gitonga CW, Noor AM, Snow RW. The use of schools for malaria surveillance and programme evaluation in Africa. Malar Journal. 2009 [cited 2016 May 24]; 8:231. Available from: http://dx.doi.org/10.1186/1475-2875-8-231

15. Implementing school malaria surveys in Kenya: towards a national surveillance system | Malaria Journal | Full Text. [cited 2016 May 24]. Available from: http://malariajournal.biomedcentral.com/articles/10.1186/1475-2875-9-306

16. Ayi I, Nonaka D, Adjovu JK, Hanafusa S, Jimba M, Bosompem KM, et al. School-based participatory health education for malaria control in Ghana: engaging children as health

messengers. Malar Journal. 2010 [cited 2016 May 24]; 9:98. Available from: http://dx.doi.org/10.1186/1475-2875-9-98

17. Ashton RA, Kefyalew T, Tesfaye G, Pullan RL, Yadeta D, Reithinger R, et al. School-based surveys of malaria in Oromia Regional State, Ethiopia: a rapid survey method for malaria in low transmission settings. Malar Journal. 2011 [cited 2016 May 24]; 10:25. Available from: http://dx.doi.org/10.1186/1475-2875-10-25

18. Mathanga DP, Halliday KE, Jawati M, Verney A, Bauleni A, Sande J, et al. The High Burden of Malaria in Primary School Children in Southern Malawi. Am J Trop Med Hygiene. 2015 Oct 7 [cited 2016 May 24];93(4):779–89. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4596600/

19. An Introduction to Tanzania. [cited 2017 Jun 11]. Available from: http://www.geographia.com/tanzania/

20. Tanzania Meteorological Agency. [cited 2016 May 24]. Available from: http://www.meteo.go.tz/

21. Tanzania Travel Weather Averages (Weather-base). Weather-base. [cited 2016 May 24]. Available from: http://www.weatherbase.com/weather/city.php3?c=TZ

22. Climate Change Knowledge Portal 2.0. [cited 2016 May 24]. Available from: http://sdwebx.worldbank.org/climateportal/index.cfm?page=country_historical_climate&ThisRegion=Africa&ThisCCode=TZA

23. National Bureau of Statistics. Tanzania National Census 2012. 2012 [cited 2014 Apr 1]. Available from: http://www.nbs.go.tz/

24. URT, MoHSW/NMCP. National Guidelines for Diagnosis and Treatment of Malaria 2013. Vol. 25. Dar es Salaam; 2013. 90 p.

25. URT, MoHCDGEC/NMCP. Surveillance, Monitoring and Evaluation Plan - 2015-2020. MoH/Tanzania; 2017.

26. URT, MoHCDGEC/NMCP. National Guidelines for Malaria Surveillance and Response. 2017.

27. Tanzania - Tanzania Demographic and Health Survey 2015-2016. [cited 2017 Jun 5]. Available from: http://www.nbs.go.tz/tnada/index.php/catalog/41

APPENDIX

Sampled Population

Table 7: Number of councils and schools per zone and region, by urban rural

	Councils			Schools		
	Total	**Urban**	**Rural**	**Total**	**Urban**	**Rural**
Zone						
Eastern	17	6	11	76	41	35
Western	15	4	11	50	12	38
Southern	13	6	7	39	16	23
Southern Highlands	17	7	10	45	16	29
Southwest Highlands	19	3	16	56	9	47
Central	19	4	15	63	12	51
Northern	25	7	18	73	16	57
Lake	41	10	31	135	27	108
Region						
Dodoma	7	1	6	24	4	20
Arusha	7	2	5	25	6	19
Kilimanjaro	7	2	5	19	4	15
Tanga	11	3	8	29	6	23
Morogoro	7	2	5	28	9	19
Pwani	7	1	6	18	2	16
Dar Es Salaam	3	3		30	30	
Lindi	6	2	4	17	6	11
Mtwara	7	4	3	22	10	12
Ruvuma	6	2	4	20	7	13
Iringa	5	2	3	12	3	9
Mbeya	11	1	10	33	4	29
Singida	6	2	4	20	6	14
Tabora	7	2	5	26	7	19
Rukwa	4	1	3	14	3	11
Kigoma	8	2	6	24	5	19
Shinyanga	6	2	4	17	5	12
Kagera	8	2	6	31	7	24
Mwanza	7	2	5	28	8	20
Mara	8	2	6	23	3	20
Manyara	6	1	5	19	2	17
Njombe	6	3	3	13	6	7
Katavi	4	1	3	9	2	7
Simiyu	6	1	5	17	2	15
Geita	6	1	5	19	2	17

Table 8: Sampled population by zone, region and urban rural

	Population sampled			% of total	% urban	% rural
	Total	**Urban**	**Rural**			
Total	49,113	13,490	35,623	100	27.5	72.5
Zone						
Eastern	6,967	4,033	2,934	14.2	57.9	42.1
Western	4,805	1,081	3,724	9.8	22.5	77.5
Southern	4,002	1,500	2,502	8.1	37.5	62.5
Southern Highlands	4,116	1,267	2,849	8.4	30.8	69.2
Southwest Highlands	4,867	687	4,180	9.9	14.1	85.9
Central	5,653	967	4,686	11.5	17.1	82.9
Northern	6,191	1,418	4,773	12.6	22.9	77.1
Lake	12,512	2,537	9,975	25.5	20.3	79.7
Region						
Dodoma	2,326	343	1,983	4.7	14.7	85.3
Arusha	2,145	523	1,622	4.4	24.4	75.6
Kilimanjaro	1,644	344	1,300	3.3	20.9	79.1
Tanga	2,402	551	1,851	4.9	22.9	77.1
Morogoro	2,532	804	1,728	5.2	31.8	68.2
Pwani	1,395	189	1,206	2.8	13.5	86.5
Dar Es Salaam	3,040	3,040	0	6.2	100.0	0.0
Lindi	1,724	497	1,227	3.5	28.8	71.2
Mtwara	2,278	1,003	1,275	4.6	44.0	56.0
Ruvuma	2,083	639	1,444	4.2	30.7	69.3
Iringa	1,024	201	823	2.1	19.6	80.4
Mbeya	2,917	303	2,614	5.9	10.4	89.6
Singida	1,711	510	1,201	3.5	29.8	70.2
Tabora	2,494	612	1,882	5.1	24.5	75.5
Rukwa	1,251	258	993	2.5	20.6	79.4
Kigoma	2,311	469	1,842	4.7	20.3	79.7
Shinyanga	1,590	451	1,139	3.2	28.4	71.6
Kagera	2,799	792	2,007	5.7	28.3	71.7
Mwanza	2,744	797	1,947	5.6	29.0	71.0
Mara	1,952	222	1,730	4	11.4	88.6
Manyara	1,616	114	1,502	3.3	7.1	92.9
Njombe	1,009	427	582	2.1	42.3	57.7
Katavi	699	126	573	1.4	18.0	82.0
Simiyu	1,429	59	1,370	2.9	4.1	95.9
Geita	1,998	216	1,782	4.1	10.8	89.2

Table 9: Sampled population by zone, region and urban rural

	Population sampled			% of total	% urban
	Total	**Urban**	**Rural**		
Total	49,113	13,490	35,623	100	27.5
Zone					
Eastern	6,967	4,033	2,934	14.2	57.9
Western	4,805	1,081	3,724	9.8	22.5
Southern	4,002	1,500	2,502	8.1	37.5
Southern Highlands	4,116	1,267	2,849	8.4	30.8
Southwest Highlands	4,867	687	4,180	9.9	14.1
Central	5,653	967	4,686	11.5	17.1
Northern	6,191	1,418	4,773	12.6	22.9
Lake	12,512	2,537	9,975	25.5	20.3
Region					
Dodoma	2,326	343	1,983	4.7	14.7
Arusha	2,145	523	1,622	4.4	24.4
Kilimanjaro	1,644	344	1,300	3.3	20.9
Tanga	2,402	551	1,851	4.9	22.9
Morogoro	2,532	804	1,728	5.2	31.8
Pwani	1,395	189	1,206	2.8	13.5
Dar Es Salaam	3,040	3,040	0	6.2	100.0
Lindi	1,724	497	1,227	3.5	28.8
Mtwara	2,278	1,003	1,275	4.6	44.0
Ruvuma	2,083	639	1,444	4.2	30.7
Iringa	1,024	201	823	2.1	19.6
Mbeya	2,917	303	2,614	5.9	10.4
Singida	1,711	510	1,201	3.5	29.8
Tabora	2,494	612	1,882	5.1	24.5
Rukwa	1,251	258	993	2.5	20.6
Kigoma	2,311	469	1,842	4.7	20.3
Shinyanga	1,590	451	1,139	3.2	28.4
Kagera	2,799	792	2,007	5.7	28.3
Mwanza	2,744	797	1,947	5.6	29.0
Mara	1,952	222	1,730	4.0	11.4
Manyara	1,616	114	1,502	3.3	7.1
Njombe	1,009	427	582	2.1	42.3
Katavi	699	126	573	1.4	18.0
Simiyu	1,429	59	1,370	2.9	4.1
Geita	1,998	216	1,782	4.1	10.8

Table 10: Minimum and maximum number of classes and pupils sampled per school and region

Region	Classes per school		Pupil per class per school		
	min	max	min	mean	max
Total	**3**	**8**	**1**	**14**	**38**
Dodoma	7	7	2	14	25
Arusha	7	7	6	12	26
Kilimanjaro	7	7	4	12	26
Tanga	7	7	3	12	25
Morogoro	6	6	5	15	37
Pwani	6	6	4	13	22
Dar Es Salaam	3	7	1	15	34
Lindi	5	7	6	15	28
Mtwara	7	7	6	15	22
Ruvuma	7	7	6	15	21
Iringa	6	7	4	12	20
Mbeya	6	7	4	13	27
Singida	7	7	6	12	22
Tabora	6	6	4	16	37
Rukwa	6	7	1	13	30
Kigoma	6	7	2	14	28
Shinyanga	6	6	8	16	30
Kagera	6	6	4	15	34
Mwanza	5	6	6	17	31
Mara	6	6	8	14	23
Manyara	5	7	6	12	28
Njombe	7	8	5	11	25
Katavi	7	7	7	11	18
Simiyu	6	6	3	14	26
Geita	6	6	8	18	38

Regional Profiles

Dodoma

Total schools: 24

Schools per council: Bahi (2), Chamwino (3), Chemba (3), Dodoma MC (4), Kondoa (3), Kongwa (5), Mpwapwa (4).

Table 11: Dodoma - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=2,306)		Sleeping under a net (N=2,318)		Absent from school (N=2,317)		Fever last two weeks (N=2,307)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	100.0	2,326	3.7	86	68.3	1,579	50.0	1,150	25.4	589	22.4	517
Age**												
<9	15.6	360	3.3	12	58.9	209	39.9	143	25.9	93	23.1	82
9-12	36.3	840	3.2	27	69.2	574	51.5	430	26.0	218	22.1	185
>12	48.1	1,112	4.2	47	70.7	783	51.9	577	24.9	275	22.4	247
Sex**												
Male	49.5	1,151	4.4	51	67.7	774	48.1	553	23.3	267	21.6	247
Female	50.5	1,174	3.0	35	69.2	804	51.8	605	27.5	322	23.3	270
Residence												
Urban	14.7	343	0.9	3	83.4	286	73.2	251	7.0	24	6.7	23
Rural	85.3	1,983	4.2	83	65.9	1,293	45.9	907	28.6	565	25.2	494
Council												
Bahi	8.6	201	13.9	28	79.9	159	39.7	79	50.5	100	51.3	101
Chamwino	12.7	296	3.7	11	77.0	228	59.3	175	28.7	85	27.8	82
Chemba	10.8	251	1.2	3	62.4	156	43.4	109	29.3	73	24.0	59
Dodoma MC	14.7	343	0.9	3	83.4	286	73.2	251	7.0	24	6.7	23
Kondoa	12.4	288	0.3	1	82.5	236	62.8	179	33.4	96	32.9	94
Kongwa	23.5	546	1.6	9	53.1	282	33.8	184	19.7	107	18.8	102
Mpwapwa	17.2	401	7.7	31	57.9	232	45.1	181	26.0	104	14.1	56

*) Total number of children interviewed may differ for age and sex, due to missing values (not shown)
**) Missing values: age n=11, inconsistent age n=3, sex n=1.

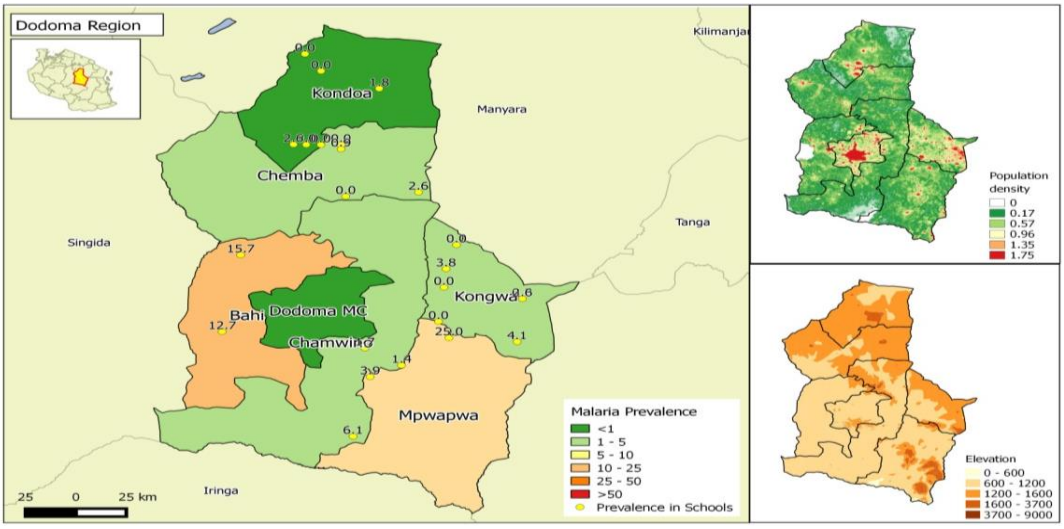


Figure 17: Malaria prevalence, precipitation and elevation map by council in Dodoma region

Arusha

Total schools: 25

Schools per council: Arusha DC (5), Arusha MC (3), Karatu (4), Longido (2), Meru (5), Monduli (3), Ngorongoro (3)

Table 12: Arusha - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=1,994)		Sleeping under a net (N=2,082)		Absent from school (N=2,105)		Fever last two weeks (N=2,078)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**2,145**	**0.0**	**1**	**68.8**	**1,371**	**47.8**	**995**	**16.5**	**347**	**15.1**	**313**
Age**												
<9	22.8	482	0.2	1	62.8	274	44.8	207	15.4	72	14.4	66
9-12	37.5	792	0.0	0	69.9	519	48.6	376	20.4	159	18.3	141
>12	39.7	838	0.0	0	70.6	556	48.8	398	13.2	109	12.3	100
Sex**												
Male	49.9	1,067	0.1	1	67.9	666	46.8	480	16.5	172	14.8	152
Female	50.1	1,072	0.0	0	69.8	703	48.9	513	16.4	173	15.2	159
Residence												
Urban	13.2	284	0.0	0	79.6	223	62.7	178	15.9	45	14.1	40
Rural	86.8	1,861	0.1	1	67.0	1,148	45.4	817	16.6	302	15.2	273
Council												
Arusha DC	23.1	496	0.0	0	78.0	323	43.3	210	22.4	111	24.2	120
Arusha MC	13.2	284	0.0	0	79.6	223	62.7	178	15.9	45	14.1	40
Karatu	14.7	316	0.0	0	87.0	267	71.6	222	22.6	65	20.2	53
Longido	7.7	166	0.6	1	68.4	80	45.2	56	28.3	47	17.6	29
Meru	19.3	413	0.0	0	77.4	319	60.3	249	7.0	29	5.8	24
Monduli	10.8	231	0.0	0	30.8	70	19.6	45	4.3	10	3.9	9
Ngorongoro	11.1	239	0.0	0	37.6	89	14.8	35	17.4	40	16.6	38

*) Total number of children interviewed may differ for age and sex, due to missing values (not shown)
**) Missing values: age n=30, inconsistent age n=3, sex n=6

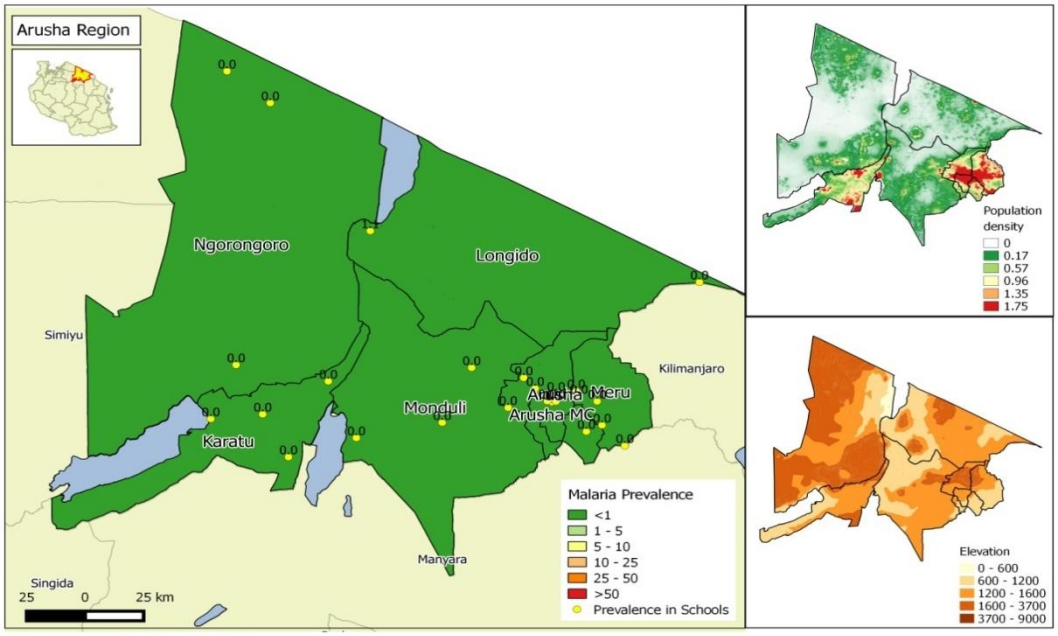


Figure 18: Malaria prevalence, precipitation and elevation map by council in Arusha region

Kilimanjaro

Total schools: 19

Schools per council: Hai (2), Moshi DC (4), Moshi MC (2), Mwanga (2), Rombo (2), Same (5), Siha (2)

Table 13: Kilimanjaro - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=1,540)		Sleeping under a net (N=1,604)		Absent from school (N=1,620)		Fever last two weeks (N=1,611)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	100.0	1,644	0.2	3	80.8	1,244	54.7	878	27.3	442	28.9	465
Age**												
<9	23.2	379	0.0	0	79.5	272	55.3	204	36.7	137	35.4	131
9-12	41.4	676	0.1	1	77.3	489	52.6	347	25.2	168	27.0	179
>12	35.3	576	0.3	2	85.5	472	56.8	319	23.1	131	26.2	148
Sex**												
Male	46.3	761	0.1	1	80.6	568	52.2	385	26.8	201	28.2	211
Female	53.7	882	0.2	2	80.9	675	56.9	492	27.6	240	29.3	253
Residence												
Urban	8.6	142	0.0	0	90.8	129	80.3	114	38.0	54	26.1	37
Rural	91.4	1,502	0.2	3	79.8	1,115	52.3	764	26.3	388	29.1	428
Council												
Hai	12.5	205	0.0	0	71.1	145	50.5	96	32.7	67	32.8	67
Moshi DC	22.6	372	0.3	1	80.7	246	45.3	162	23.9	85	27.4	96
Moshi MC	8.6	142	0.0	0	90.8	129	80.3	114	38.0	54	26.1	37
Mwanga	8.9	146	0.7	1	78.8	115	46.2	67	20.7	30	22.9	33
Rombo DC	14.8	244	0.4	1	78.5	164	41.9	99	14.3	34	17.6	42
Same	25.8	424	0.0	0	85.3	361	65.6	277	32.1	136	40.2	170
Siha	6.8	111	0.0	0	75.7	84	56.8	63	32.4	36	18.2	20

*) Total number of children interviewed may differ for age, due to missing values (not shown)

**) Missing values: age n=9, inconsistent age n=4, sex n=1

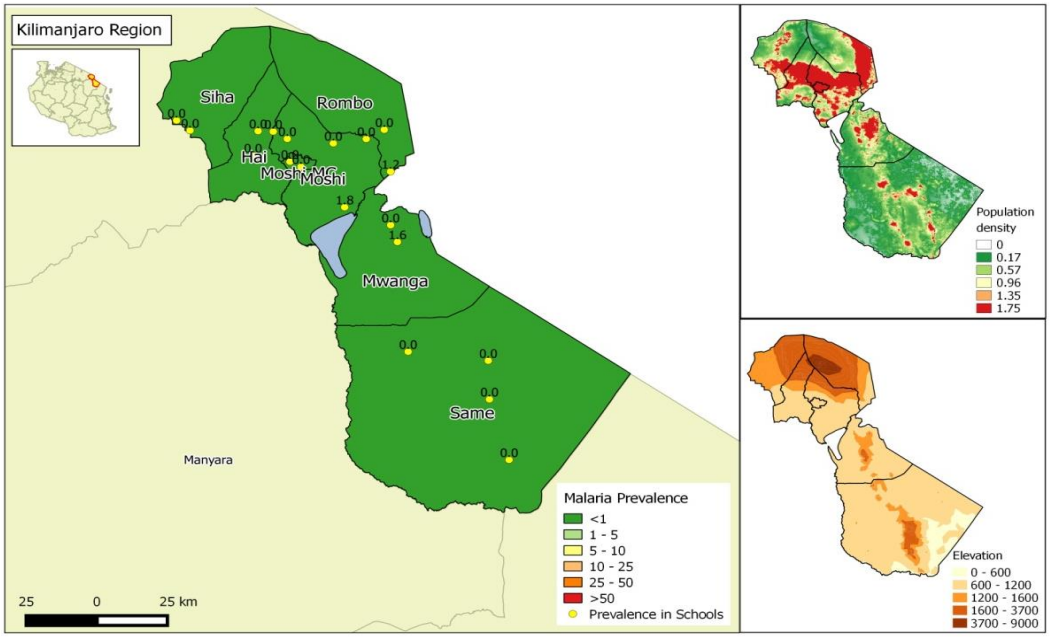


Figure 19: Malaria prevalence, precipitation and elevation map by council in Kilimanjaro region

Tanga

Total schools: 29

Schools per council: Bumbuli (2), Handeni DC (4), Handeni TC (1), Kilindi (3), Korogwe DC (4), Korogwe TC (1), Lushoto (3), Mkinga (2), Muheza (3), Pangani (2), Tanga CC (4)

Table 14: Tanga - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=2,243)		Sleeping under a net (N=2,357)		Absent from school (N=2,385)		Fever last two weeks (N=2,318)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**2,402**	**13.0**	**313**	**88.0**	**1,974**	**63.1**	**1,487**	**27.6**	**658**	**28.9**	**669**
Age**												
<9	15.6	372	11.3	42	91.3	315	69.1	251	36.9	135	37.5	135
9-12	35.1	837	14.5	121	91.0	722	68.1	559	30.6	255	32.6	263
>12	49.2	1,173	12.5	147	84.8	924	58.0	669	22.6	264	23.5	266
Sex**												
Male	50.2	1,203	13.8	166	86.9	971	60.3	712	25.9	309	26.0	302
Female	49.8	1,195	12.3	147	89.1	1,000	65.9	772	29.2	347	31.7	366
Residence												
Urban	22.9	551	10.9	60	92.4	495	78.8	428	17.1	94	16.4	87
Rural	77.1	1,851	13.7	253	86.6	1,479	58.4	1,059	30.7	564	32.5	582
Council												
Bumbuli DC	7.8	187	0.5	1	82.4	145	53.6	98	9.2	17	8.6	16
Handeni DC	14.2	340	24.4	83	73.5	244	40.5	137	36.3	123	37.7	127
Handeni TC	4.0	97	22.7	22	78.4	69	49.0	47	49.5	48	47.4	46
Kilindi DC	8.9	214	19.2	41	73.8	127	31.1	65	28.1	59	25.5	54
Korogwe DC	12.8	307	5.9	18	96.6	255	63.5	193	33.1	101	36.1	100
Korogwe TC	3.6	87	0.0	0	93.1	81	79.3	69	25.3	22	21.8	19
Lushoto DC	14.2	341	5.9	20	89.9	275	63.2	203	30.2	102	32.5	104
Mkinga DC	5.2	124	17.7	22	90.8	109	58.5	72	31.5	39	30.6	38
Muheza DC	9.4	226	22.6	51	97.3	219	87.1	196	31.9	72	41.2	93
Pangani DC	4.7	112	15.2	17	93.8	105	85.6	95	46.4	51	46.3	50
Tanga CC	15.3	367	10.4	38	95.6	345	86.7	312	6.6	24	6.4	22

*) *Total number of children interviewed may differ for age, due to missing values (not shown)*

**) *Missing values: age n=16, inconsistent age n=4, sex n=4*

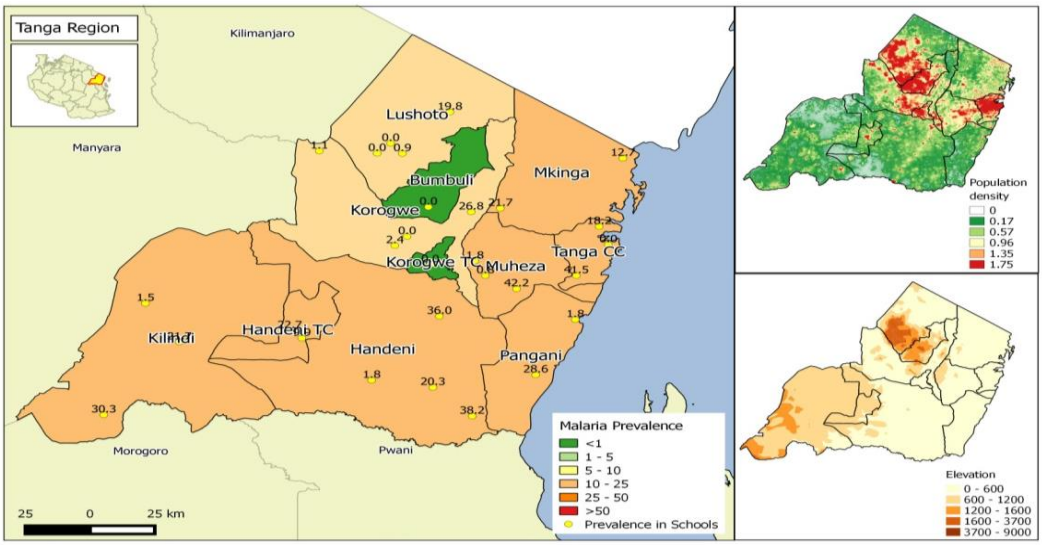


Figure 20: Malaria prevalence, precipitation and elevation map by council in Tanga region

Morogoro

Total schools: 28

Schools per council: Gairo (2), Kilombero DC (5), Kilosa (5), Morogoro DC (4), Morogoro MC (5), Mvomero (4), Ulanga (3)

Table 15: Morogoro - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=2,402)		Sleeping under a net (N=2,437)		Absent from school (N=2,445)		Fever last two weeks (N=2,509)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**2,532**	**21.9**	**554**	**95.8**	**2,302**	**83.8**	**2,041**	**42.5**	**1,039**	**44.5**	**1,116**
Age**												
<9	19.9	503	17.1	86	97.4	457	88.8	420	51.3	249	53.5	267
9-12	45.7	1,155	22.1	255	96.0	1,045	82.8	920	42.2	472	44.9	514
>12	34.4	871	24.5	213	94.7	798	82.1	699	37.7	316	38.5	332
Sex**												
Male	50.2	1,270	24.1	306	96.2	1,155	83.4	1,018	41.1	503	43.2	544
Female	49.8	1,261	19.7	248	95.5	1,146	84.0	1,022	43.9	535	45.8	572
Residence												
Urban	17.6	446	2.7	12	99.8	438	92.5	409	53.4	226	57.2	255
Rural	82.4	2,086	26.0	542	95.0	1,864	81.8	1,632	40.2	813	41.7	861
Council												
Gairo DC	7.1	180	0.0	0	79.4	139	53.4	93	20.3	35	17.3	31
Kilombero DC	19.1	484	30.2	146	98.1	459	91.0	427	41.1	195	42.2	204
Kilosa DC	17.3	439	26.9	118	95.6	408	82.1	352	39.1	166	45.9	198
Morogoro DC	15.2	386	28.0	108	94.7	340	72.9	275	58.3	218	55.7	215
Morogoro MC	17.6	446	2.7	12	99.8	438	92.5	409	53.4	226	57.2	255
Mvomero DC	14.1	358	14.0	50	95.4	289	84.2	262	39.3	134	38.6	133
Ulanga DC	9.4	239	50.2	120	99.1	229	94.9	223	27.5	65	33.5	80

*) *Total number of children interviewed may differ for age, due to missing values (not shown)*

**) *Missing values: age n=1, inconsistent age n=2, sex n=1*

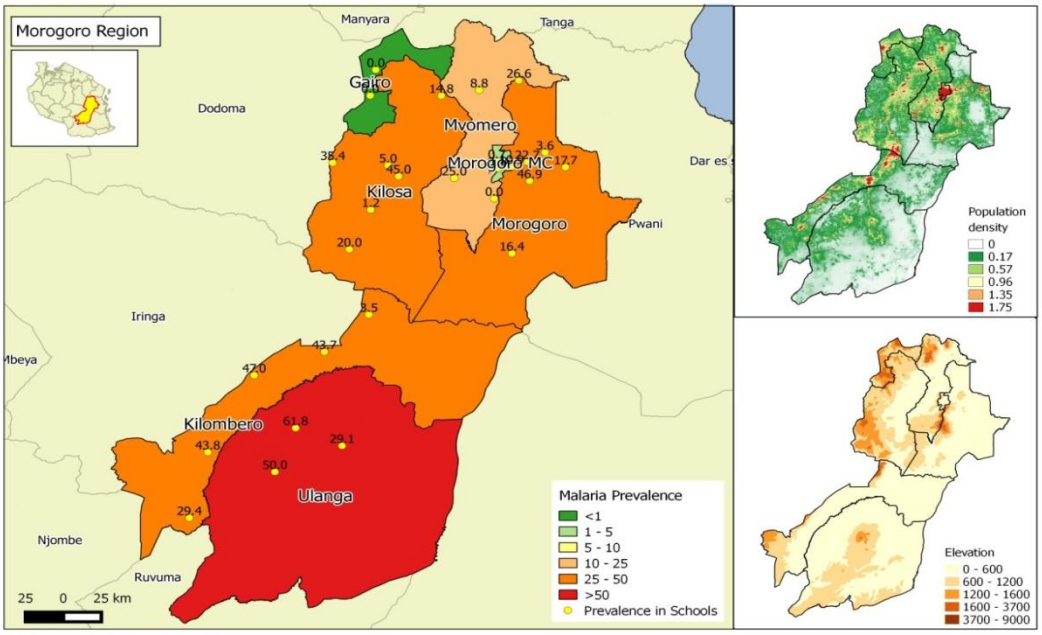


Figure 21: Malaria prevalence, precipitation and elevation map by council in Morogoro region

Pwani

Total schools: 18

Schools per council: Bagamoyo (4), Kibaha DC (2), Kibaha TC (2), Kisarawe (2), Mafia (2), Mkurunga (3), Rufiji (3)

Table 16: Pwani - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=1,277)		Sleeping under a net (N=1,263)		Absent from school (N=1,356)		Fever last two weeks (N=1,359)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	100.0	1,395	48.4	675	94.6	1,208	82.6	1,043	44.2	599	45.2	614
Age**												
<9	18.2	250	44.8	112	96.2	204	88.1	185	48.1	116	49.4	121
9-12	42.6	584	47.8	279	94.3	511	83.4	446	48.6	274	50.0	285
>12	39.2	538	51.3	276	94.0	474	79.0	394	38.3	202	38.3	200
Sex**												
Male	46.5	648	51.1	331	95.5	570	82.3	485	41.7	262	42.5	267
Female	53.5	746	46.0	343	93.8	637	82.8	557	46.3	336	47.4	346
Residence												
Urban	13.5	189	13.8	26	97.8	177	93.3	167	47.6	88	51.3	96
Rural	86.5	1,206	53.8	649	94.1	1,031	80.8	876	43.6	511	44.2	518
Council												
Bagamoyo	24.2	337	38.3	129	84.4	275	73.1	231	22.8	75	27.5	91
Kibaha DC	7.9	110	63.6	70	96.9	31	81.3	26	21.1	23	21.1	23
Kibaha TC	13.5	189	13.8	26	97.8	177	93.3	167	47.6	88	51.3	96
Kisarawe	10.3	144	70.1	101	97.2	139	90.6	125	55.8	77	51.4	74
Mafia	8.6	120	44.2	53	100.0	116	94.8	110	45.5	50	42.1	40
Mkuranga	16.8	235	66.8	157	99.6	225	82.3	186	76.4	178	68.9	162
Rufiji	18.6	260	53.5	139	96.8	245	77.3	198	42.9	108	49.6	128

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missing values: age n=23, sex=1*

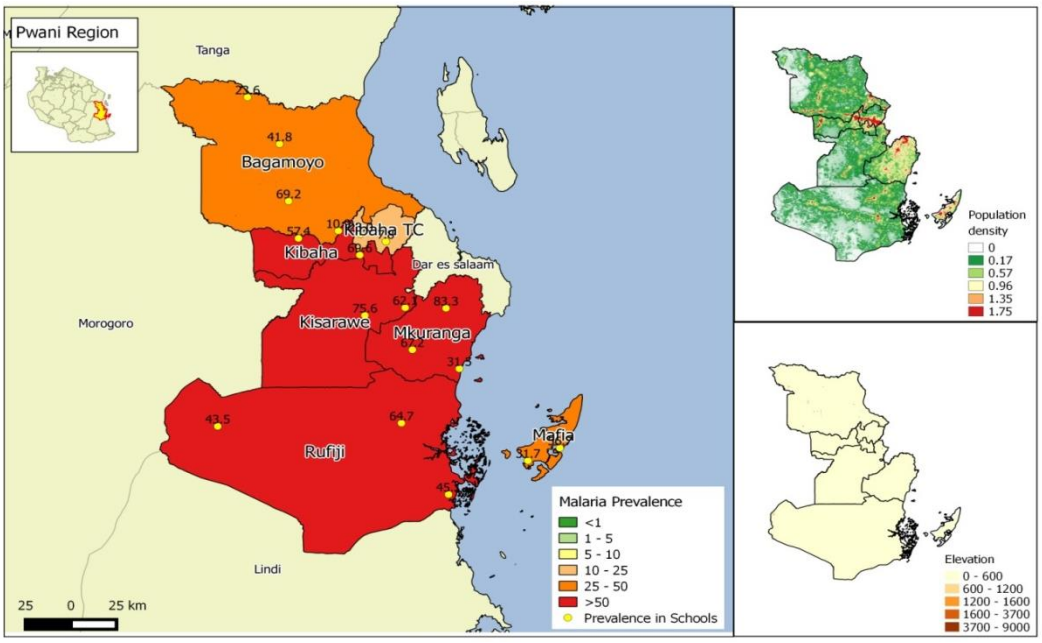


Figure 22: Malaria prevalence, precipitation and elevation map by council in Pwani region

Dar es Salaam

Total schools: 30

Schools per council: Ilala (9), Kinondini (10), Temeke (11)

Table 17: Dar es Salaam - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=2,964)		Sleeping under a net (N=3,017)		Absent from school (N=3,036)		Fever last two weeks (N=3,034)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**3,040**	**1.3**	**40**	**97.6**	**2,893**	**90.7**	**2,735**	**31.7**	**962**	**34.2**	**1,039**
Age**												
<9	23.2	704	0.3	2	97.9	668	89.3	626	38.8	273	41.6	293
9-12	40.5	1,229	1.6	20	97.4	1,172	91.9	1,122	33.1	406	35.5	435
>12	36.3	1,103	1.6	18	97.6	1,049	90.1	983	25.5	281	28.1	309
Sex**												
Male	48.9	1,487	1.3	19	97.6	1,408	90.2	1,328	30.4	451	32.7	486
Female	51.1	1,551	1.4	21	97.6	1,483	91.1	1,405	33.0	511	35.7	553
Residence												
Urban	100.0	3,040	1.3	40	97.6	2,893	90.7	2,735	31.7	962	34.2	1,039
Rural												
Council												
Ilala	31.3	951	0.5	5	100.0	913	91.4	868	37.0	352	44.3	421
Kinondoni	32.2	980	0.9	9	96.2	929	90.1	875	39.3	385	37.7	369
Temeke	36.5	1,109	2.3	26	96.9	1,051	90.5	992	20.3	225	22.5	249

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missing values: age n=3, inconsistent age n=1, sex =2*

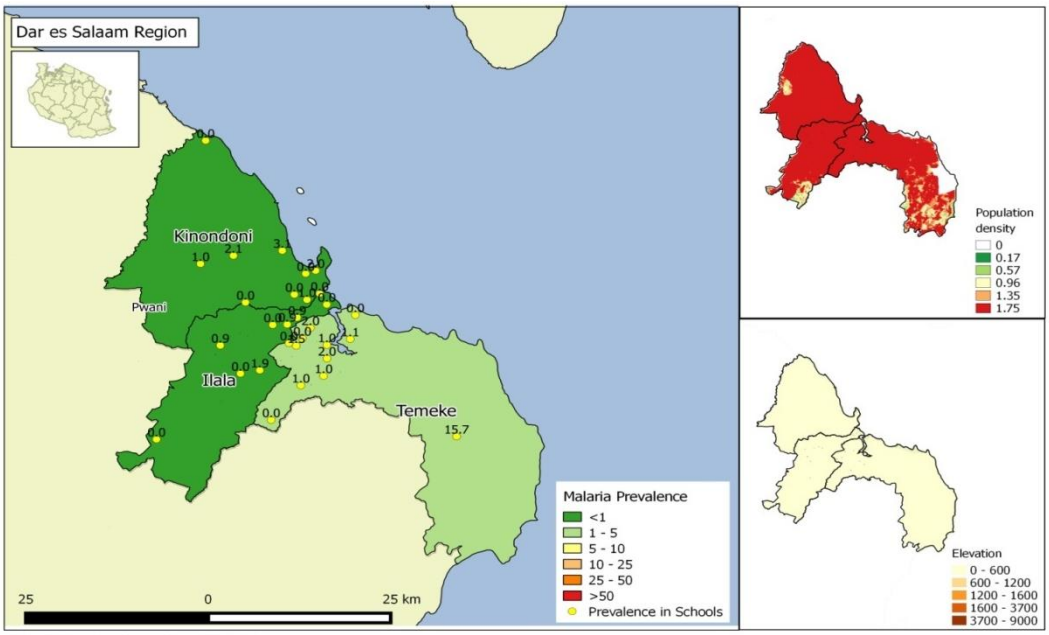


Figure 23: Malaria prevalence, precipitation and elevation map by council in Dar es Salaam region

Lindi

Total schools: 17

Schools per council: Kilwa (4), Lindi DC (3), Lindi MC (2), Liwale (2), Nachingwea (4), Ruangwa (2)

Table 18: Lindi - core variables by sex, age and council

Background characteristics	Total*		Malaria positive (N=1,715)		At least one net at home (N=1,722)		Sleeping under a net (N=1,720)		Absent from school (N=1,711)		Fever last two weeks (N=1,609)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**1,724**	**30.3**	**519**	**95.6**	**1,647**	**81.4**	**1,400**	**34.2**	**586**	**40.7**	**655**
Age**												
<9	18.2	313	28.8	90	92.7	290	79.2	248	39.5	123	46.1	140
9-12	35.2	605	31.5	190	96.2	581	82.9	498	37.0	223	44.0	252
>12	46.5	801	29.8	237	96.4	771	81.0	649	29.9	237	35.8	260
Sex**												
Male	49.2	850	30.5	257	94.7	803	80.1	679	30.9	260	36.1	283
Female	50.8	873	30.1	262	96.6	843	82.7	720	37.5	326	45.0	372
Residence												
Urban	6.6	113	17.9	20	100.0	113	96.5	109	24.8	28	44.1	49
Rural	93.4%	1,611	31.1	499	95.3	1,534	80.3	1,291	34.9	558	40.5	606
Council												
Kilwa	28.7	495	34.5	171	92.9	460	77.4	383	28.9	143	27.9	138
Lindi DC	18.0	310	27.4	85	98.1	303	83.8	259	26.9	83	31.1	96
Lindi MC	6.6	113	17.9	20	100.0	113	96.5	109	24.8	28	44.1	49
Liwale	8.5	146	32.9	48	93.2	136	75.2	109	35.9	52	29.5	43
Nachingwea	25.5	440	28.0	121	94.5	415	80.1	351	50.6	217	76.5	251
Ruangwa	12.8	220	33.6	74	100.0	220	85.9	189	28.6	63	35.5	78

*) Total number of children interviewed may differ for age and sex, due to missing values (not shown)
**) Missing values age n=5, sex =1

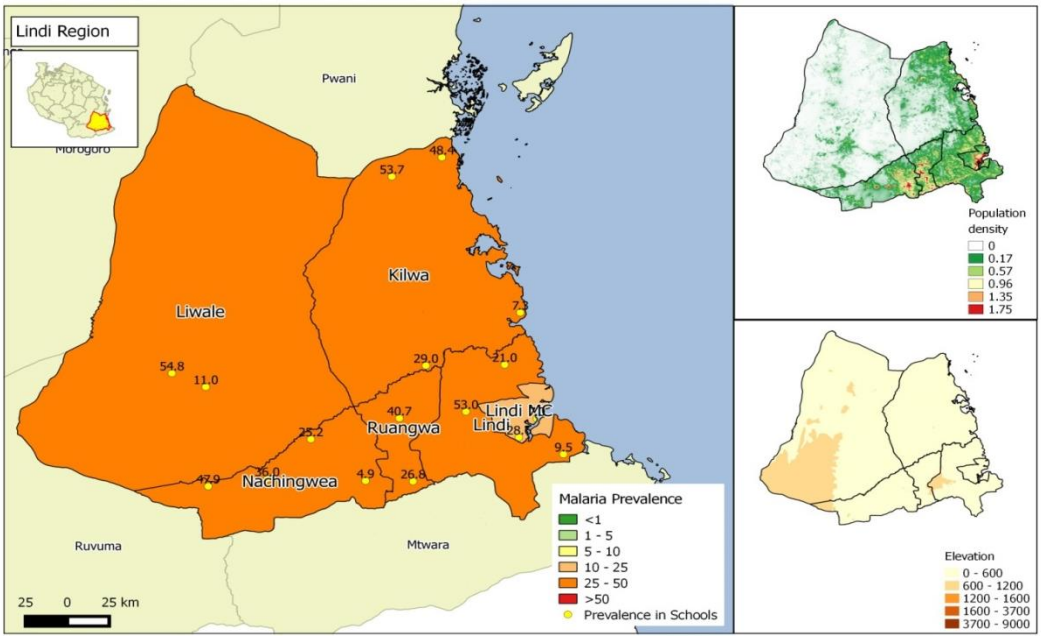


Figure 24: Malaria prevalence, precipitation and elevation map by council in Lindi region

Mtwara

Total schools: 22

Schools per council: Masasi DC (4), Masasi TC (2), Mtwara DC (4), Mtwara MC (2), Nanyumbu (3), Newala DC (3), Tandahimba (4)

Table 19: Mtwara - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N= 2,269)		Sleeping under a net (N= 2,271)		Absent from school (N= 2,271)		Fever last two weeks (N= 2,257)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**2,278**	**36.2**	**825**	**97.3**	**2,207**	**81.7**	**1,855**	**34.0**	**773**	**35.5**	**802**
Age**												
<9	23.3	529	41.0	217	94.9	499	73.0	383	42.9	225	44.1	230
9-12	35.7	810	35.6	288	97.5	786	82.5	666	36.3	293	37.3	299
>12	41.0	931	33.9	316	98.5	915	86.0	801	27.0	251	28.8	267
Sex**												
Male	49.3	1,123	38.6	433	97.5	1,090	79.9	894	32.0	358	33.3	370
Female	50.7	1,155	33.9	392	97.0	1,117	83.4	961	36.0	415	37.7	432
Residence												
Urban	17.7	403	24.8	100	98.5	397	90.8	365	35.2	142	40.0	161
Rural	82.3	1,875	38.7	725	97.0	1,810	79.7	1,490	33.8	631	34.6	641
Council												
Masasi DC	17.3	394	35.0	138	97.2	380	74.6	291	39.1	154	42.1	161
Masasi TC	6.8	154	46.1	71	98.1	151	92.8	142	33.8	52	37.7	58
Mtwara DC	23.8	543	44.4	241	98.5	530	90.6	491	26.7	144	26.1	141
Mtwara MC	10.9	249	11.6	29	98.8	246	89.6	223	36.1	90	41.4	103
Nanyumbu	10.7	243	29.2	71	95.9	232	74.0	179	47.1	114	46.3	112
Newala DC	14.7	335	36.4	122	95.2	319	74.9	251	28.3	94	26.6	88
Tandahimba	15.8	360	42.5	153	96.9	349	77.2	278	34.7	125	38.7	139

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missing values: age n=8*

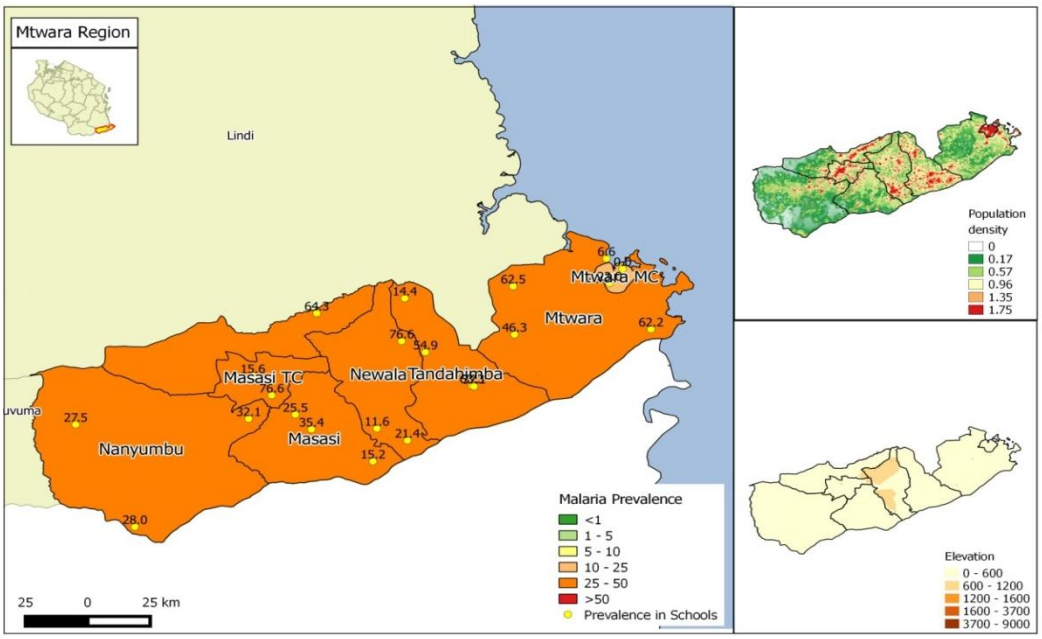


Figure 25: Malaria prevalence, precipitation and elevation map by council in Mtwara region

Ruvuma

Total schools: 20

Schools per council: Mbinga (4), Namtumbo (3), Nyasa (2), Songea DC (3), Songea MC (4), Tunduru (4)

Table 20: Ruvuma - core variables by sex, age and council

Background characteristics	Total*		Malaria positive (N=2,081)		At least one net at home (N=2,072)		Sleeping under a net (N=2,079)		Absent from school (N=2,079)		Fever last two weeks (N=2,074)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**2,083**	**22.8**	**475**	**92.1**	**1,909**	**72.1**	**1,499**	**33.1**	**688**	**32.9**	683
Age**												
<9	22.1	460	21.3	98	88.3	401	67.5	310	43.2	198	45.5	208
9-12	36.9	769	21.8	167	93.1	716	72.3	555	31.9	245	30.1	230
>12	41.0	853	24.5	209	93.3	791	74.5	634	28.6	244	28.7	244
Sex**												
Male	49.8	1.035	24.8	257	92.1	946	71.6	740	32.2	333	32.0	330
Female	50.2	1.042	20.8	217	92.1	959	72.5	755	33.9	353	33.9	352
Residence												
Urban	18.6	387	3.6	14	98.7	382	84.8	328	33.6	130	36.8	142
Rural	81.4	1.696	27.2	461	90.6	1.527	69.2	1.171	33.0	558	32.0	541
Council												
Mbinga DC	22.3	464	8.6	40	94.8	439	72.6	336	34.6	160	27.9	129
Namtumbo	12.1	252	34.0	85	85.8	211	59.8	150	21.9	55	29.5	74
Nyasa DC	9.3	193	26.9	52	80.3	155	55.4	107	47.2	91	47.2	91
Songea DC	16.0	333	12.9	43	89.1	294	74.8	249	33.0	110	29.5	98
Songea MC	18.6	387	3.6	14	98.7	382	84.8	328	33.6	130	36.8	142
Tunduru DC	21.8	454	53.1	241	94.5	428	72.8	329	31.4	142	33.1	149

*) Total number of children interviewed may differ for age and sex, due to missing values (not shown)

**) Missing values: age n=1, sex n=4

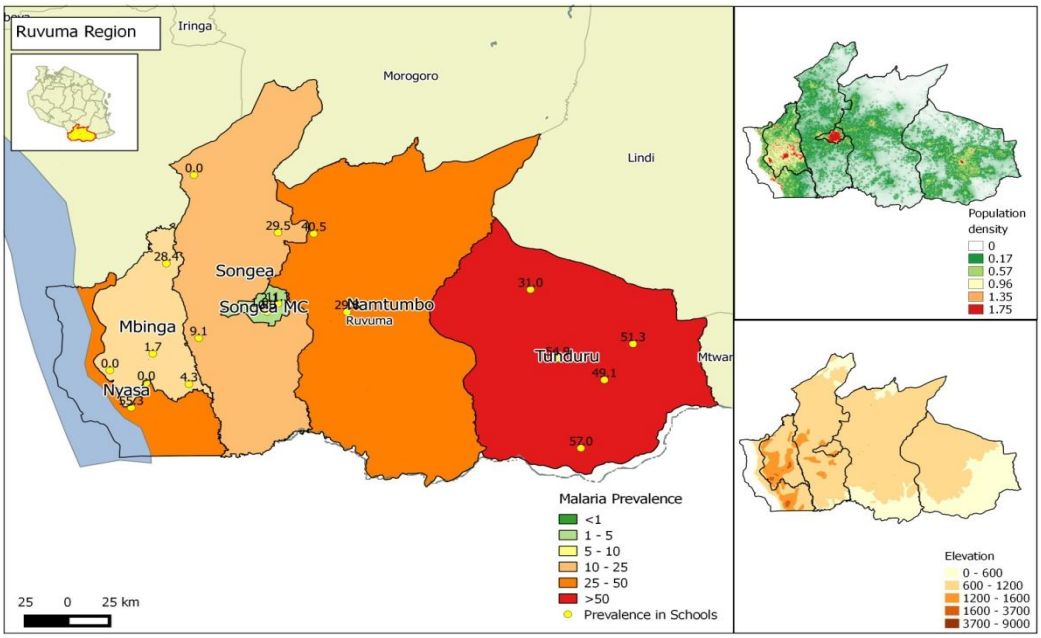


Figure 26: Malaria prevalence, precipitation and elevation map by council in Ruvuma region

Iringa

Total schools: 12

Schools per council: Iringa DC (3), Iringa MC (2), Kilolo DC (3), Mafinga TC (1), Mufindi (3)

Table 21: Iringa - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=987)		Sleeping under a net (N=994)		Absent from school (N=1,020)		Fever last two weeks (N=1,021)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**1,024**	**1.0**	**8**	**65.8**	**649**	**46.7**	**464**	**21.2**	**216**	**17.9**	**183**
Age**												
<9	20.4	205	0.5	1	59.3	115	42.1	83	24.1	49	21.6	44
9-12	40.7	409	0.5	2	68.6	269	50.9	202	22.5	92	19.8	81
>12	39.0	392	1.5	6	65.4	251	44.8	171	18.2	71	13.8	54
Sex**												
Male	48.9	500	1.2	6	61.7	301	45.3	223	19.9	99	16.3	81
Female	51.1	522	0.6	3	69.6	346	48.0	240	22.3	116	19.4	101
Residence												
Urban	19.6	201	0.0	0	81.1	154	63.2	120	25.9	52	31.3	63
Rural	80.4	823	1.1	9	62.1	495	42.8	344	20.0	164	14.6	120
Council												
Iringa DC	22.1	226	0.0	0	60.4	131	41.4	92	5.4	12	4.4	10
Iringa MC	13.4	137	0.0	0	94.4	119	78.7	100	29.9	41	37.2	51
Kilolo DC	30.1	308	2.6	8	70.5	208	45.2	133	30.2	93	19.2	59
Mafinga TC	6.3	64	0.0	0	54.7	35	31.7	20	17.2	11	18.8	12
Mufindi DC	28.2	289	0.3	1	54.7	156	41.3	119	20.6	59	17.8	51

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*
**) *Missings values: age n=12, inconsistent age=6, sex n=2, education of parents n=200*

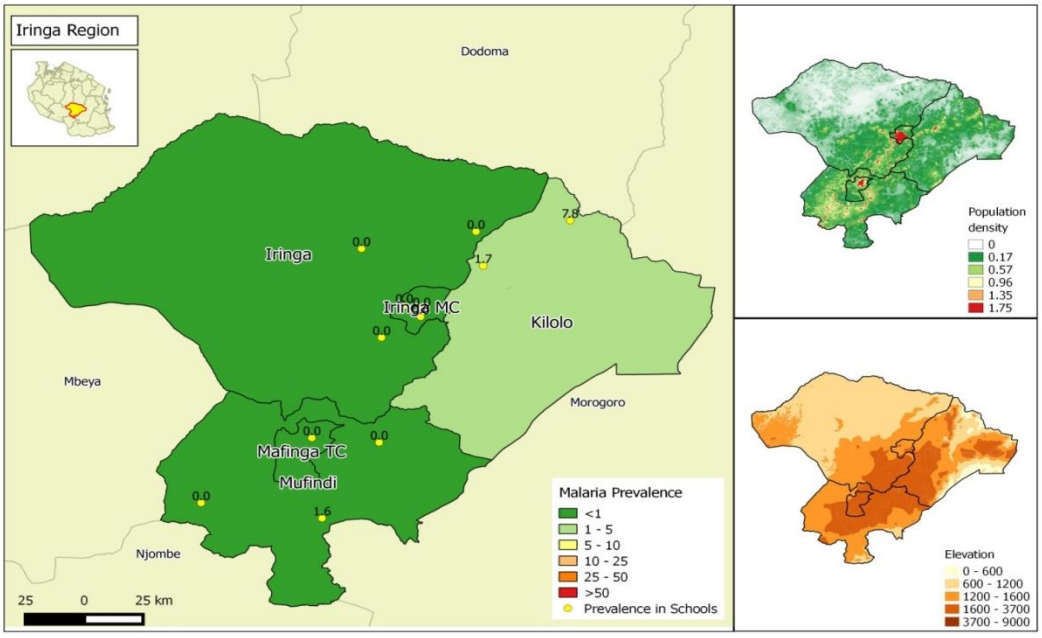


Figure 27: Malaria prevalence, precipitation and elevation map by council in Iringa region

Mbeya

Total schools: 33

Schools per council: Busokelo (2), Chunya (4), Ileje (2), Kyela (3), Mbarali (5), Mbeya DC (3), Mbeya MC (4), Mbozi (4), Momba (2), Rungwe (3), Tunduma (1)

Table 22: Mbeya - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=2,803)		Sleeping under a net (N=2,860)		Absent from school (N=2,887)		Fever last two weeks (N=2,800)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	100.	2,91	10.	31	86.	2,41	63.	1,80	24.	70	22.	62
Age**												
<9	22.1	637	9.1	58	81.	475	61.	375	28.	18	26.	16
9-12	38.6	1,11	10.	12	89.	964	67.	740	25.	28	23.	25
>12	39.3	1,13	11.	13	86.	958	60.	675	20.	23	19.	21
Sex**												
Male	49.5	1,44	10.	15	84.	1,17	61.	865	23.	33	21.	28
Female	50.5	1,46	10.	15	88.	1,23	64.	934	25.	36	24.	33
Residenc												
Urban	10.4	303	0.0	0	73.	220	54.	165	10.	32	5.3	16
Rural	89.6	2,61	12.	31	87.	2,19	64.	1,64	25.	67	24.	61
Council												
Busokelo	5.7	167	29.	49	92.	115	48.	75	44.	72	42.	67
Chunya	12.3	360	20.	75	83.	297	60.	215	30.	10	35.	10
Ileje	5.3	155	3.2	5	97.	144	57.	88	35.	54	35.	53
Kyela	8.0	234	32.	77	98.	230	86.	201	35.	83	45.	10
Mbarali	17.2	501	1.4	7	99.	490	92.	460	20.	10	17.	88
Mbeya	8.5	249	1.2	3	61.	150	29.	72	21.	52	15.	38
Mbeya	10.4	303	0.0	0	73.	220	54.	165	10.	32	5.3	16
Mbozi	12.3	359	0.0	0	84.	276	51.	173	15.	54	6.3	22
Momba	5.7	166	43.	72	97.	161	73.	122	50.	82	49.	75
Rungwe	11.8	344	7.3	25	79.	265	55.	187	12.	42	11.	41
Tunduma	2.7	79	0.0	0	89.	71	61.	48	27.	22	27.	22

**) Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

***) Missings values: age n=26, inconsistent age=3, sex n=8, education of parents n=571*

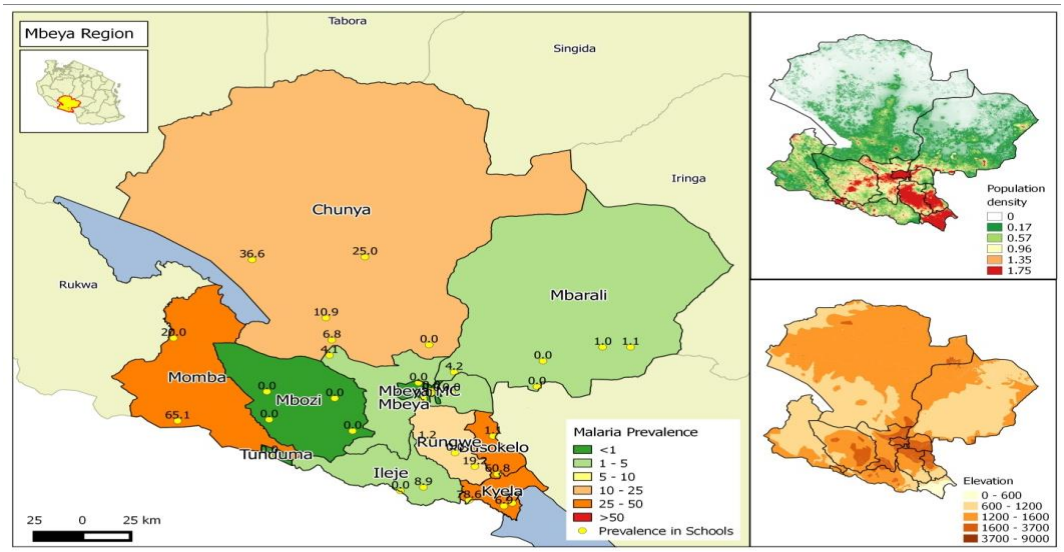


Figure 28: Malaria prevalence, precipitation and elevation map by council in Mbeya region

Singida

Total schools: 20
Schools per council: Ikungi (3), Iramba (3), Manyoni (5), Mkalama (2), Singida DC (4), Singida MC (3)

Table 23: Singida - core variables by sex, age and council

Background characteristics	**Total**[*]		**Malaria positive**		**At least one net at home** (N=1,664)		**Sleeping under a net** (N=1,687)		**Absent from school** (N=1,689)		**Fever last two weeks** (N=1,656)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	100.0	1,711	4.0	69	75.5	1,257	56.8	958	17.7	299	16.7	276
Age[**]												
<9	15.7	265	4.5	12	75.7	187	53.7	138	22.9	60	19.8	51
9-12	36.8	621	3.4	21	79.1	480	60.7	373	18.9	115	19.1	114
>12	47.5	803	4.5	36	73.2	579	55.2	439	15.5	123	14.1	110
Sex[**]												
Male	48.4	823	4.5	37	74.6	599	54.0	442	16.8	137	15.4	123
Female	51.6	877	3.6	32	76.6	653	59.5	512	18.8	162	18.0	153
Residence												
Urban	14.4	246	0.0	0	91.3	221	84.8	207	20.7	51	21.0	50
Rural	85.6	1,465	4.7	69	72.9	1,036	52.0	751	17.2	248	15.9	226
Council												
Ikungi	15.4	264	1.5	4	73.7	191	52.3	136	14.8	39	14.8	39
Iramba	13.6	233	4.3	10	94.4	218	74.5	172	23.9	55	17.4	38
Manyoni	24.8	424	10.8	46	84.9	354	64.0	267	27.5	112	28.1	114
Mkalama	10.3	176	3.4	6	72.2	109	45.9	78	1.1	2	0.6	1
Singida DC	21.5	368	0.8	3	45.1	164	26.8	98	10.9	40	9.6	34
Singida MC	14.4	246	0.0	0	91.3	221	84.8	207	20.7	51	21.0	50

[*]*) Total number of children interviewed may differ for age and sex, due to missing values (not shown)*
[**]*) Missings values: age n=20, inconsistent age=2, sex n=11, education of parents n=196*

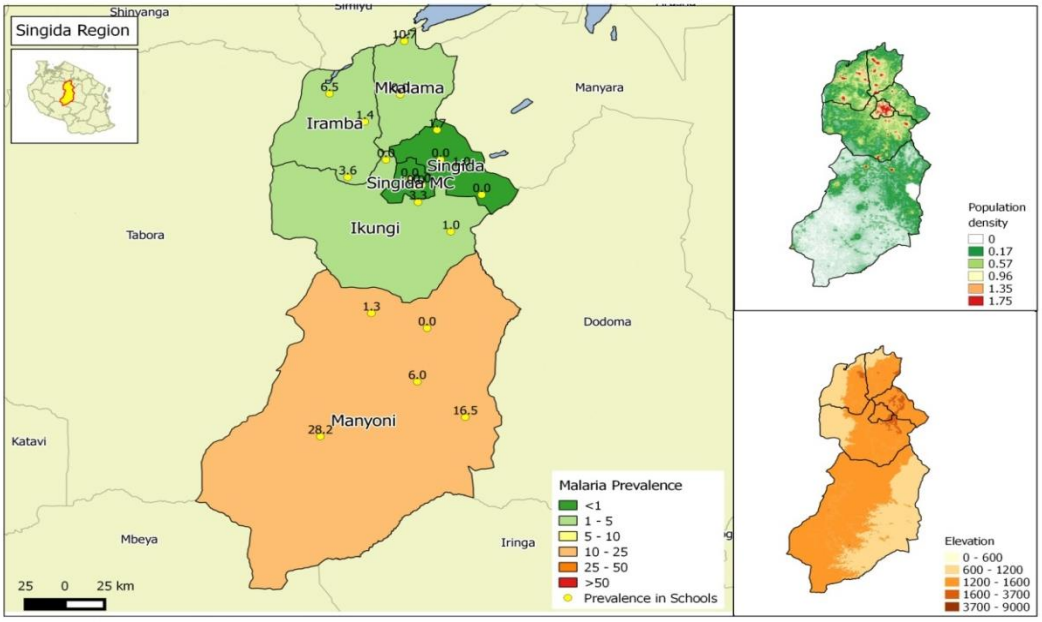


Figure 29: Malaria prevalence, precipitation and elevation map by council in Singida region

Tabora

Total schools: 26

Schools per council: Igunga (4), Kaliua (5), Nzega (5), Sikonge (2), Tabora MC (3), Urambo (3), Uyui (4)

Table 24: Tabora - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=2,349)		Sleeping under a net (N=2,387)		Absent from school (N=2,453)		Fever last two weeks (N=2,458)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	100.0	2,494	30.0	748	99.1	2,328	74.5	1,590	43.0	1,055	45.2	1,110
Age**												
<9	18.8	463	25.9	120	99.0	410	73.6	315	49.0	220	50.7	228
9-12	40.2	991	26.7	265	99.1	917	74.7	705	44.4	435	46.5	455
>12	41.0	1,012	35.5	359	99.2	978	75.3	746	39.3	393	41.8	419
Sex**												
Male	47.5	1,181	34.7	410	98.7	1,101	71.8	813	42.7	497	44.0	512
Female	52.5	1,307	25.9	338	99.5	1,223	77.5	969	43.4	558	46.4	598
Residence												
Urban	9.5	238	13.4	32	99.6	236	85.2	201	41.6	99	51.3	122
Rural	90.5	2,256	31.7	716	99.1	2,092	73.7	1,585	43.2	956	44.5	988
Council												
Igunga	15.0	374	15.8	59	100.0	342	67.5	241	38.9	142	39.2	143
Kaliua	17.6	438	35.6	156	97.5	421	57.2	247	32.0	140	35.2	153
Nzega	26.2	653	41.7	272	99.5	575	86.6	518	44.7	285	46.6	295
Sikonge	6.2	155	23.2	36	100.0	154	75.3	116	63.8	97	74.8	116
Tabora MC	9.5	238	13.4	32	99.6	236	85.2	201	41.6	99	51.3	122
Urambo	9.7	242	37.2	90	100.0	221	78.6	176	31.4	76	39.2	94
Uyui	15.8	394	26.1	103	98.4	379	74.4	287	56.5	216	47.7	187

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missings values: age n=25, inconsistent age=3, sex n=6, education of parents n=277*

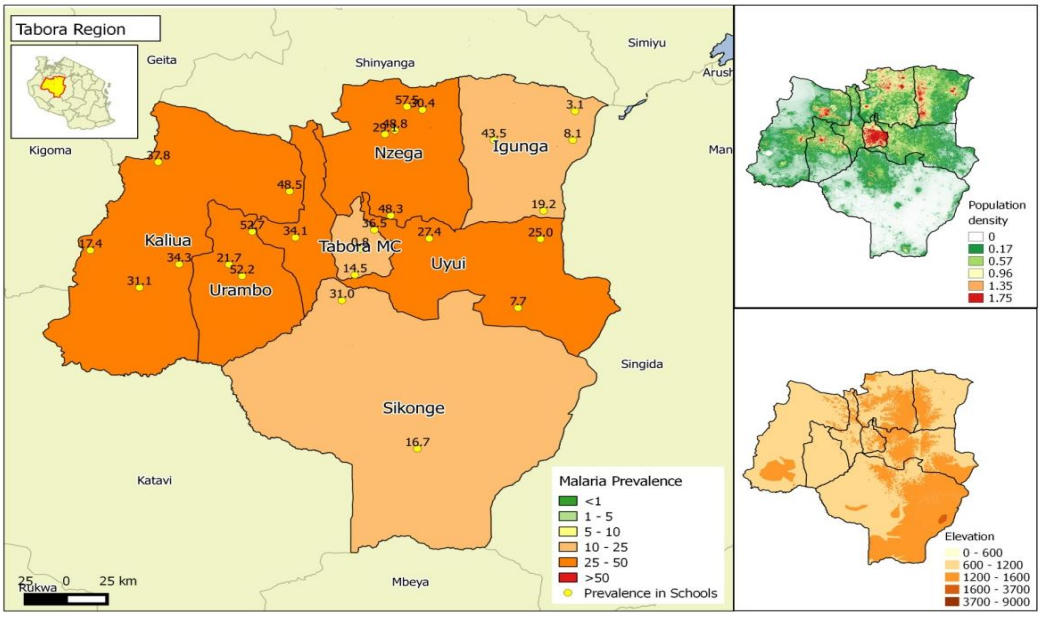


Figure 30: Malaria prevalence, precipitation and elevation map by council in Tabora region

Rukwa

Total schools: 14
Schools per council: Kalambo (3), Nkasi (4), Sumbawanga DC (4), Sumbawanga MC (3)

Table 25: Rukwa - core variables by sex, age and council

Background characteristics	**Total***		**Malaria positive**		**At least one net at home** (N=1,189)		**Sleeping under a net** (N=1,232)		**Absent from school** (N=1,247)		**Fever last two weeks** (N=1,231)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	100.0	1,251	20.3	254	81.5	969	48.1	593	34.0	424	36.1	444
Age**												
<9	17.6	218	16.5	36	77.5	148	45.2	95	33.9	74	34.1	73
9-12	35.2	436	19.5	85	80.7	335	47.0	202	36.6	159	37.9	162
>12	47.3	586	22.5	132	83.4	477	50.1	291	31.7	185	35.1	203
Sex**												
Male	53.4	666	24.6	164	81.5	515	49.0	322	33.7	224	36.4	239
Female	46.6	581	15.5	90	81.6	451	46.9	268	34.1	197	35.4	202
Residence												
Urban	20.6	258	1.2	3	82.9	209	47.4	120	26.7	68	28.0	70
Rural	79.4	993	25.3	251	81.1	760	48.3	473	35.9	356	38.1	374
Council												
Kalambo	20.1	252	34.9	88	85.4	182	38.8	93	45.2	114	45.2	113
Nkasi	29.2	365	44.4	162	80.5	289	50.0	182	39.7	145	45.0	163
Sumbawanga DC	30.1	376	0.3	1	79.2	289	52.8	198	25.9	97	26.6	98
Sumbawanga MC	20.6	258	1.2	3	82.9	209	47.4	120	26.7	68	28.0	70

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*
**) *Missings values: age n=10, inconsistent age=1, sex n=4, education of parents n=66*

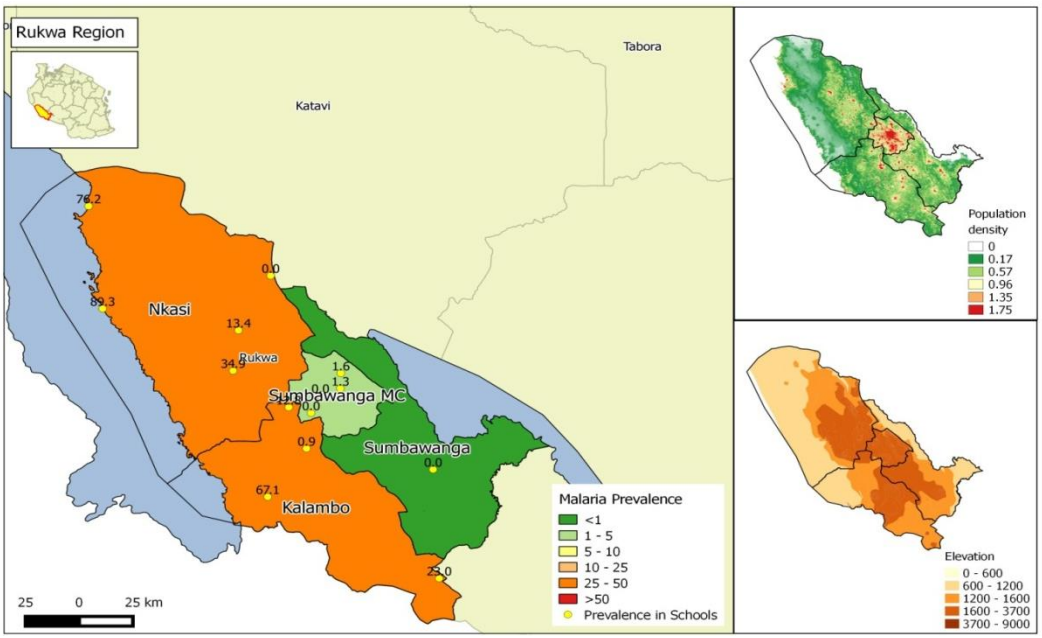


Figure 31: Malaria prevalence, precipitation and elevation map by council in Rukwa region

Kigoma

Total schools: 24

Schools per council: Buhigwe (2), Kakonko (3), Kasulu (3), Kasulu TC (2), Kibondo (4), Kigoma DC (3), Kigoma MC (3), Uvinza (4)

Table 26: Kigoma - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=2,250)		Sleeping under a net (N=2,298)		Absent from school (N=2,303)		Fever last two weeks (N=2,301)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**2,311**	**30.3**	**701**	**89.0**	**2,002**	**62.4**	**1,435**	**31.3**	**721**	**39.1**	**899**
Age												
<9	17.5	405	24.0	97	91.2	361	68.8	276	38.2	154	42.3	170
9-12	33.7	779	30.3	236	90.7	695	64.5	499	34.9	271	45.5	353
>12	48.8	1,127	32.7	368	86.9	946	58.8	660	26.3	296	33.5	376
Sex**												
Male	50.1	1,156	32.2	372	88.5	997	61.0	699	29.3	337	36.6	421
Female	49.9	1,152	28.3	326	89.4	1,002	64.0	735	33.4	384	41.6	478
Residence												
Urban	20.3	469	23.2	109	85.4	393	69.9	327	30.0	140	42.7	199
Rural	79.7	1,842	32.1	592	89.9	1,609	60.5	1,108	31.6	581	38.1	700
Council												
Buhigwe	8.5	197	46.7	92	90.1	172	52.6	103	25.4	50	36.0	71
Kakonko	11.1	257	34.2	88	95.8	230	45.5	115	30.9	79	40.0	102
Kasulu DC	13.6	314	25.8	81	89.3	276	68.1	213	21.2	66	22.4	70
Kasulu TC	7.5	174	2.3	4	74.9	128	64.2	111	28.5	49	39.5	68
Kibondo	17.5	404	42.6	172	88.3	340	53.1	213	40.8	165	49.4	199
Kigoma DC	12.5	290	24.8	72	83.4	242	66.2	192	43.1	125	51.0	148
Kigoma MC	12.8	295	35.6	105	91.7	265	73.2	216	30.8	91	44.6	131
Uvinza DC	16.4	380	22.9	87	93.1	349	72.1	272	25.4	96	29.1	110

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missing values: sex n=3*

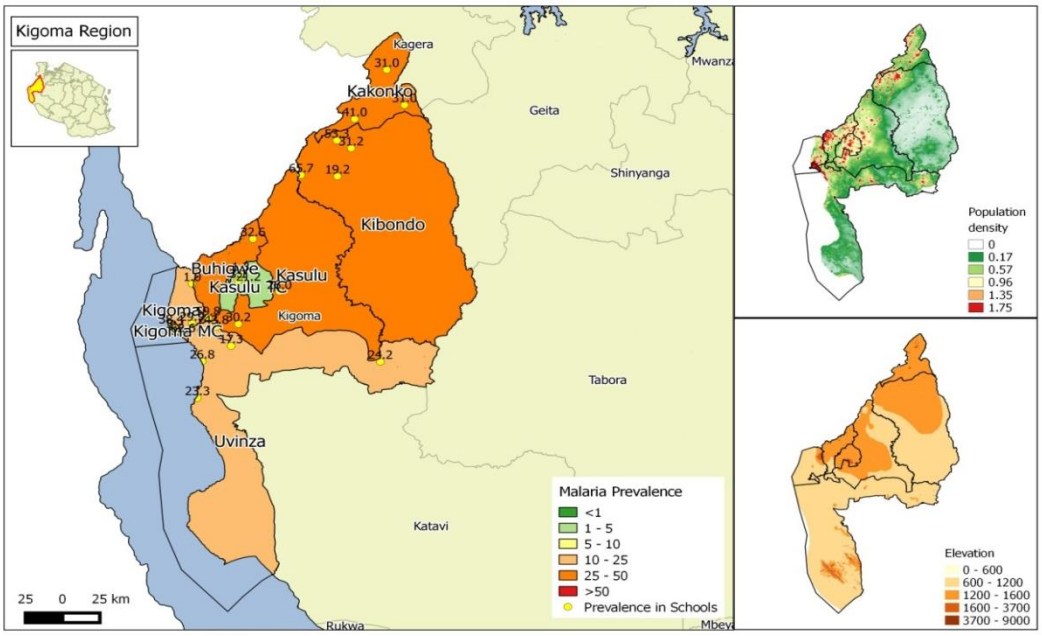


Figure 32: Malaria prevalence, precipitation and elevation map by council in Kigoma region

Shinyanga

Total schools: 17

Schools per council: Kahama TC (2), Kishapu (3), Msalala (2), Shinyanga MC (3), Shinyaga DC (5), Ushetu DC (2)

Table 27: Shinyanga - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=1,523)		Sleeping under a net (N=1,542)		Absent from school (N=1,590)		Fever last two weeks (N=1,590)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**1,590**	**35.1**	**558**	**99.5**	**1,516**	**65.4**	**1,009**	**28.6**	**454**	**24.8**	**394**
Age**												
<9	18.1	288	27.8	80	97.7	253	65.7	176	31.3	90	28.5	82
9-12	39.7	631	32.2	203	99.8	603	69.7	427	34.7	219	30.3	191
>12	42.1	669	41.0	274	100.0	658	61.5	405	21.5	144	17.9	120
Sex**												
Male	48.9	777	38.2	297	99.7	733	65.2	488	27.4	213	23.9	186
Female	51.1	812	32.1	261	99.4	782	65.7	520	29.6	240	25.5	207
Residence												
Urban	28.4	451	5.8	26	100.0	441	95.9	426	31.3	141	27.5	124
Rural	71.6	1,139	46.7	532	99.4	1,075	53.1	583	27.5	313	23.7	270
Council												
Kahama TC	13.5	215	3.3	7	100.0	212	94.3	200	26.0	56	22.3	48
Kishapu	15.4	245	30.2	74	100.0	244	91.4	223	35.9	88	28.6	70
Msalala	13.0	206	52.9	109	99.5	203	52.0	106	47.6	98	44.2	91
Shinyanga	29.9	476	39.3	187	98.9	451	26.5	123	11.6	55	8.8	42
Shinyanga	14.8	236	8.1	19	100.0	229	97.4	226	36.0	85	32.2	76
Ushetu	13.3	212	76.4	162	99.4	177	70.8	131	34.0	72	31.6	67

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missing values: age=2, sex n=1*

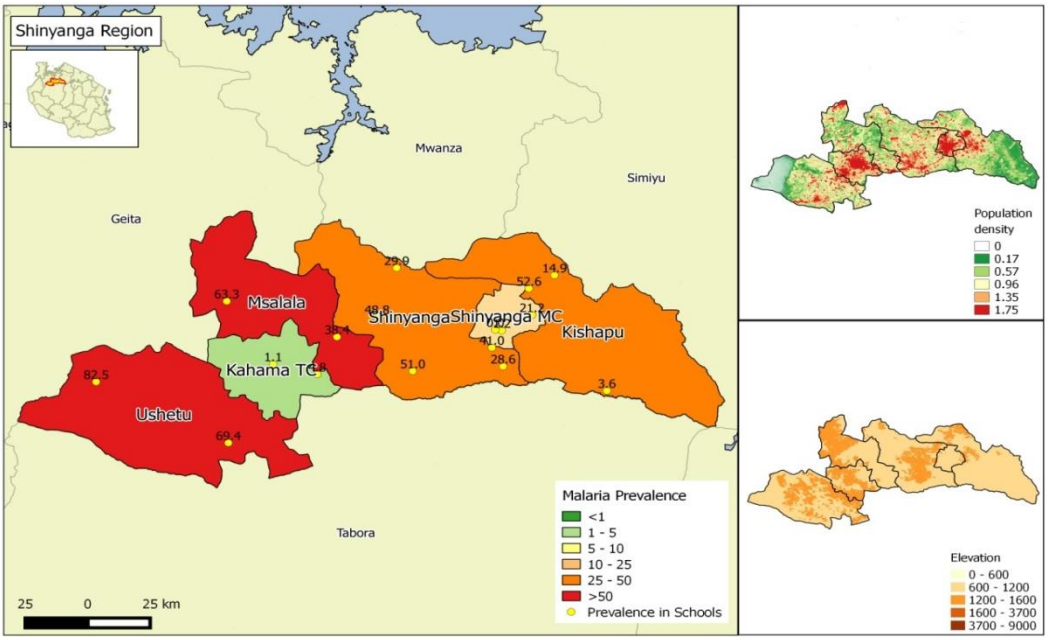


Figure 33: Malaria prevalence, precipitation and elevation map by council in Shinyanga region

Kagera

Total schools: 31

Schools per council: Biharamulo (4), Bukoba DC (4), Karagwe (4), Kyerwa (4), Missenyi (3), Muleba (5), Ngara (5)

Table 28: Kagera - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=2,722)		Sleeping under a net (N=2,723)		Absent from school (N=2,699)		Fever last two weeks (N=2,742)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.**	**2,79**	**31.**	**87**	**98.7**	**2,68**	**86.**	**2,34**	**39.**	**1,07**	**36.**	**1,00**
Age**												
<9	15.7	435	27.	12	97.8	402	80.	339	48.	203	41.	179
9-12	42.5	1,17	30.	35	98.9	1,12	84.	963	43.	489	39.	449
>12	41.8	1,15	33.	38	98.8	1,12	88.	1,00	33.	375	32.	368
Sex												
Male	49.6	1,38	33.	46	99.0	1,34	85.	1,16	37.	497	35.	484
Female	50.4	1,41	28.	40	98.4	1,34	86.	1,17	42.	580	37.	522
Residence												
Urban	5.2	145	0.7	1	98.6	142	89.	127	24.	33	26.	36
Rural	94.8	2,65	32.	87	98.7	2,58	85.	2,21	40.	1,04	37.	970
Council												
Biharamulo	12.4	347	42.	14	98.5	334	78.	269	24.	82	39.	137
Bukoba DC	11.5	323	32.	10	99.7	316	79.	257	54.	174	33.	108
Bukoba MC	5.2	145	0.7	1	98.6	140	89.	127	24.	33	26.	36
Karagwe	11.3	317	34.	10	99.7	309	93.	286	22.	68	19.	63
Kyerwa	11.0	307	16.	51	99.7	290	89.	261	44.	130	50.	151
Missenyi	7.6	212	66.	14	100.	198	96.	196	84.	175	61.	128
Muleba	22.5	629	18.	11	98.7	614	87.	540	32.	187	24.	144
Ngara	18.5	519	38.	19	96.4	485	81.	407	44.	228	46.	239

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missing values: age=34*

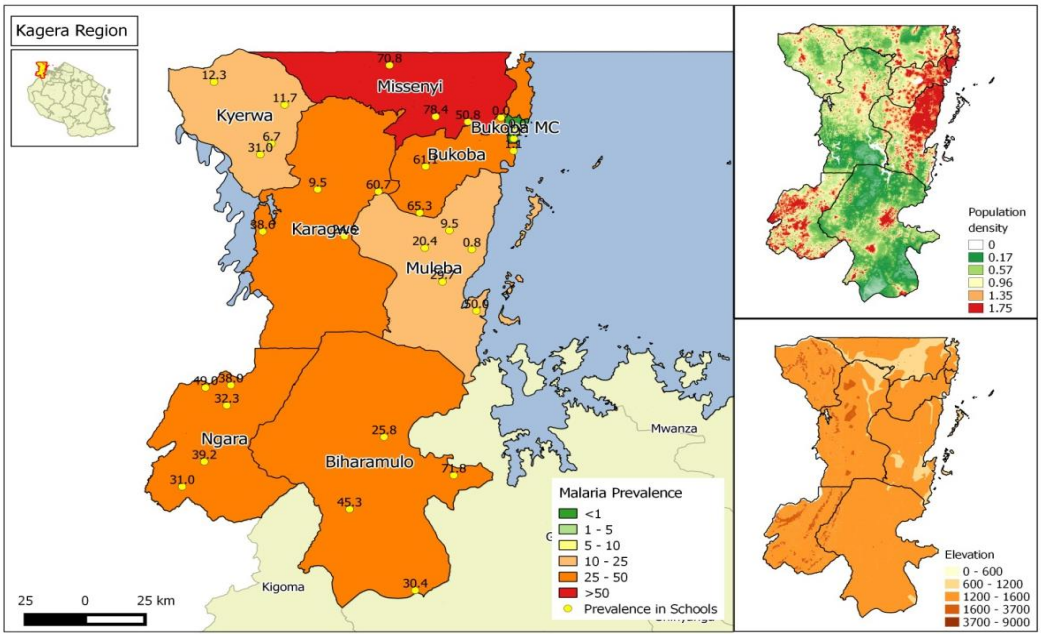


Figure 34: Malaria prevalence, precipitation and elevation map by council in Kagera region

Mwanza

Total schools: 28

Schools per council: Ilemela (4), Kwimba (4), Magu (3), Missungwi (4), Nyamagana MC (4), Sengerema (5), Ukerewe (4)

Table 29: Mwanza - core variables by sex, age and council

Background characteristics	**Total**[*]		**Malaria positive**		**At least one net at home** (N=2,649)		**Sleeping under a net** (N=2,704)		**Absent from school** (N=2,698)		**Fever last two weeks** (N=2,729)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	100.0	2,744	40.0	1,097	99.5	2,637	92.5	2,501	91.7	2,474	29.1	795
Age[**]												
<9	16.0	438	32.2	141	99.8	405	92.5	393	90.6	385	37.2	162
9-12	42.4	1,161	39.6	460	99.4	1,114	91.2	1,044	90.7	1,039	30.8	356
>12	41.7	1,142	43.3	495	99.7	1,116	93.9	1,062	93.2	1,048	24.3	276
Sex												
Male	50.5	1,385	41.1	569	99.4	1,339	92.4	1,261	91.3	1,244	25.6	353
Female	49.5	1,359	38.9	528	99.7	1,298	92.6	1,240	92.1	1,230	32.7	442
Residence												
Urban	14.9	408	0.2	1	99.2	385	93.5	372	96.0	388	25.2	101
Rural	85.1	2,336	46.9	1,096	99.6	2,252	92.3	2,129	90.9	2,086	29.8	694
Council												
Ilemela	14.2	389	13.1	51	99.7	377	95.8	368	47.5	177	25.8	100
Kwimba	12.1	332	34.3	114	99.0	305	86.0	283	99.1	326	22.3	74
Magu	9.1	249	54.2	135	99.6	247	93.5	231	98.8	245	41.0	102
Misungwi	14.0	384	54.4	209	98.9	371	87.8	331	99.7	370	30.4	115
Nyamagana MC	14.9	408	0.2	1	99.2	385	93.5	372	96.0	388	25.2	101
Sengerema	21.1	579	62.2	360	100.0	552	98.6	561	99.7	570	27.5	159
Ukerewe	14.7	403	56.3	227	100.0	400	88.8	355	99.3	398	35.7	144

[*]*) Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

[**]*) Missing values: age=1, inconsistent n=2, education of parents n=450*

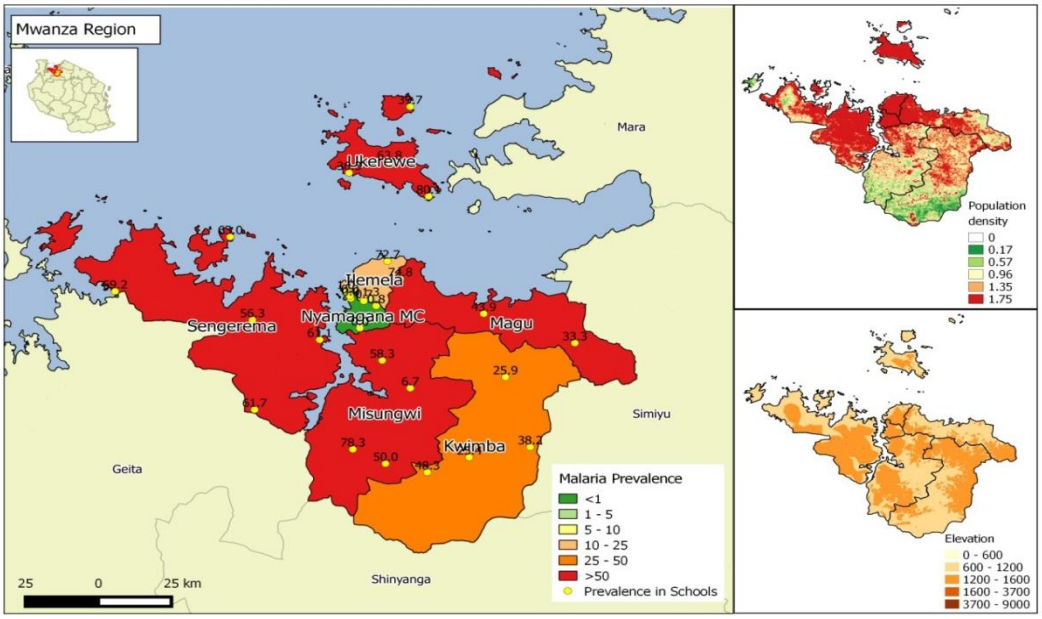


Figure 35: Malaria prevalence, precipitation and elevation map by council in Mwanza region

Mara

Total schools: 23

Schools per council: Bunda (4), Butiama (3), Musoma DC (2), Musoma MC (2), Rorya (4), Serengeti (4), Tarime DC (3), Tarime TC (1)

Table 30: Mara - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=1,885)		Sleeping under a net (N=1,881)		Absent from school (N=1,895)			Fever last 2 weeks (N=1,871)
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**1,952**	**36.4**	**710**	**99.8**	**1,881**	**88.9**	**1,673**	**49.1**	**931**	**49.2**	**920**
Age**												
<9	19.8	381	31.0	118	99.7	361	90.1	326	50.5	185	52.0	184
9-12	43.6	837	35.6	298	99.9	808	88.9	720	50.2	406	48.3	387
>12	36.6	703	40.7	286	99.7	684	88.3	601	47.0	324	48.7	334
Sex**												
Male	50.4	979	39.1	383	99.7	945	88.2	836	46.6	441	46.5	438
Female	49.6	962	33.6	323	99.9	928	89.6	829	51.4	482	51.5	473
Residence												
Urban	11.4	222	5.4	12	100.0	219	97.3	213	36.9	79	44.9	97
Rural	88.6	1,730	40.3	698	99.8	1,662	87.8	1,460	50.7	852	49.7	823
Council												
Bunda	19.8	386	31.1	120	100.0	368	93.0	347	29.1	109	32.2	119
Butiama	11.7	228	64.5	147	100.0	223	77.1	172	96.5	220	60.1	137
Musoma DC	8.9	174	39.1	68	100.0	155	94.5	138	50.9	86	75.0	111
Musoma MC	6.8	133	4.5	6	100.0	130	97.7	127	35.9	46	45.4	59
Rorya	15.7	307	27.0	83	99.7	299	87.3	262	33.7	97	22.7	68
Serengeti	20.3	397	42.1	167	99.2	384	89.6	345	56.6	219	68.3	263
Tarime DC	12.2	238	47.5	113	100.0	233	83.4	196	51.7	121	55.6	125
Tarime TC	4.6	89	6.7	6	100.0	89	96.6	86	38.4	33	44.2	38

*) Total number of children interviewed may differ for age and sex, due to missing values (not shown)

**) Missing values: age=30, inconsistent n=1, sex n=11, education of parents n=348

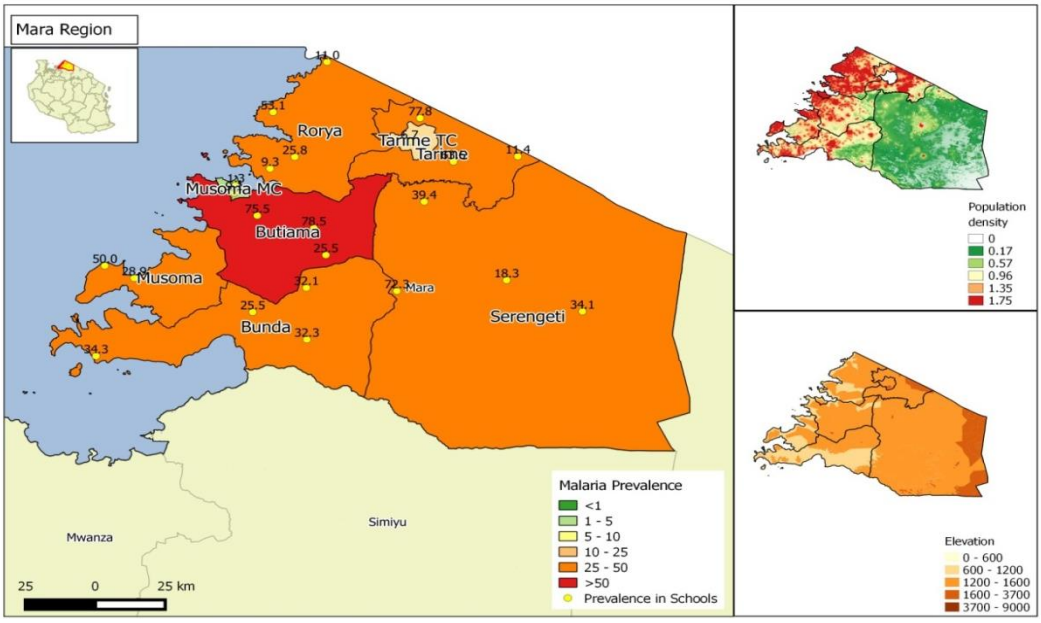


Figure 36: Malaria prevalence, precipitation and elevation map by council in Mara region

Manyara

Total schools: 19

Schools per council: Babati DC (4), Babati TC (2), Hanang' (4), Kiteto DC (4), Mbulu (3), Simanjiro (2)

Table 31: Manyara - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=1.428)		Sleeping under a net (N=1,580)		Absent from school (N=1,599)		Fever last two weeks (N=1,573)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**1,616**	**0.1**	**1**	**84.9**	**1,213**	**60.8**	**961**	**26.3**	**421**	**23.1**	**364**
Age**												
<9	14.4	230	0.0	0	80.4	152	52.1	114	28.2	64	25.7	57
9-12	36.9	590	0.0	0	83.8	434	59.5	346	32.9	193	30.5	174
>12	48.7	777	0.1	1	87.1	613	64.3	489	20.6	158	16.8	128
Sex												
Male	50.4	811	0.1	1	83.9	601	57.8	458	25.1	201	20.6	162
Female	49.6	799	0.0	0	86.0	610	64.1	501	27.7	219	25.9	202
Residence												
Urban	7.1	114	0.9	1	96.4	107	77.9	88	28.3	32	29.5	33
Rural	92.9	1,502	0.0	0	84.0	1,106	59.5	873	26.2	389	22.7	331
Council												
Babati DC	23.3	377	0.0	0	88.5	330	73.0	271	27.7	103	21.3	79
Babati TC	7.1	114	0.9	1	96.4	107	77.9	88	28.3	32	29.5	33
Hanang DC	21.2	342	0.0	0	77.0	191	43.8	141	21.1	71	16.3	53
Kiteto DC	23.0	371	0.0	0	81.2	293	62.0	227	34.9	128	32.5	117
Mbulu DC	12.9	209	0.0	0	95.5	128	51.0	105	1.4	3	1.4	3
Simanjiro DC	12.6	203	0.0	0	81.6	164	63.9	129	41.8	84	40.5	79

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missing values: age=13, inconsistent age n=5, invalid age n=1*

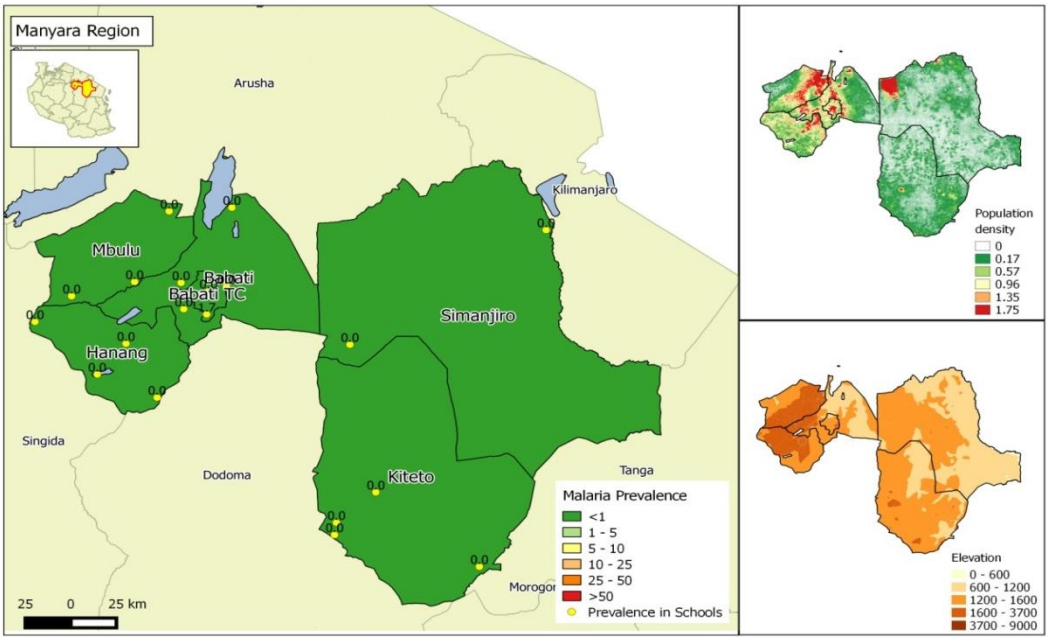


Figure 37: Malaria prevalence, precipitation and elevation map by councilt in Manyara region

Njombe

Total schools: 13

Schools per council: Ludewa (2), Makambako TC (2), Makete (2), Njombe TC (2), Wanging'ombe (3), Njombe DC (2)

Table 32: Njombe - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=862)		Sleeping under a net (N=932)		Absent from school (N=947)		Fever last two weeks (N=942)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**1,009**	**1.1**	**11**	**68.3**	**589**	**41.5**	**387**	**19.0**	**180**	**18.4**	**173**
Age**												
<9	23.2	231	0.0	0	53.1	85	34.0	65	24.2	47	22.2	43
9-12	39.8	396	1.0	4	70.6	245	43.3	159	18.5	69	18.7	69
>12	36.9	367	1.9	7	73.8	253	44.8	161	16.2	59	15.1	55
Sex**												
Male	52.2	523	1.1	6	67.0	292	42.7	202	17.2	83	17.0	82
Female	47.8	479	1.0	5	69.5	292	40.6	184	20.8	95	19.6	89
Residence												
Urban	30.3	306	0.0	0	63.5	191	42.6	129	23.8	72	23.4	71
Rural	69.7	703	1.6	11	70.9	398	41.0	258	16.8	108	16.0	102
Council												
Ludewa	16.8	170	5.9	10	94.8	110	41.0	64	30.5	51	33.7	57
Makambako TC	13.2	133	0.0	0	58.8	77	33.6	44	11.4	15	12.1	16
Makete	18.0	182	0.0	0	73.8	90	23.8	30	9.4	12	3.9	5
Njombe DC	12.0	121	0.8	1	61.9	73	47.1	57	15.0	18	13.0	15
Njombe TC	17.1	173	0.0	0	67.1	114	49.4	85	33.3	57	32.2	55
Wanging'ombe	22.8	230	0.0	0	61.0	125	47.3	107	11.7	27	11.0	25

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*

**) *Missing values: age=13, inconsistent n=2, sex n=7.*

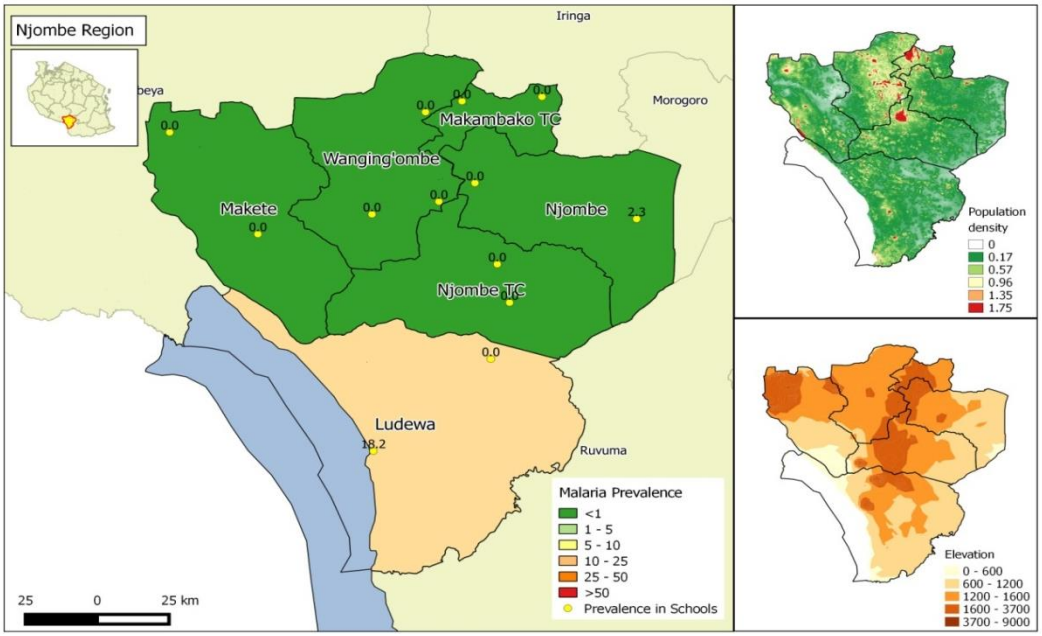


Figure 38: Malaria prevalence, precipitation and elevation map by council in Njombe region

Katavi

Total schools: 9

Schools per council: Mpanda (3), Mpanda MC (2), Nsimbo (2), Mlele (2)

Table 33: Katavi - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=682)		Sleeping under a net (N=693)		Absent from school (N=692)		Fever last two weeks (N=683)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**699**	**39.9**	**279**	**91.9**	**627**	**78.9**	**547**	**38.2**	**264**	**37.5**	**256**
Age**												
<9	13.3	92	40.2	37	89.5	77	79.8	71	39.3	35	42.5	37
9-12	31.2	216	41.2	89	93.0	198	78.5	168	36.6	79	35.8	77
>12	55.6	385	39.7	153	92.1	348	79.2	304	39.4	150	37.9	142
Sex**												
Male	51.4	358	43.0	154	92.6	323	78.4	279	36.7	130	36.7	128
Female	48.6	339	36.6	124	91.5	303	79.7	267	39.6	133	38.3	127
Residence												
Urban	18.0	126	14.3	18	97.6	120	92.7	115	27.8	35	33.1	41
Rural	82.0	573	45.5	261	90.7	507	75.9	432	40.5	229	38.5	215
Council												
Mlele DC	22.9	160	15.0	24	92.7	139	77.7	122	46.8	73	48.4	74
Mpanda DC	32.6	228	47.8	109	89.7	201	77.1	175	49.1	111	49.8	112
Mpanda TC	18.0	126	14.3	18	97.6	120	92.7	115	27.8	35	33.1	41
Nsimbo DC	26.5	185	69.2	128	90.3	167	73.0	135	24.5	45	16.0	29

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*
**) *Missing values: age=6, sex n=2*

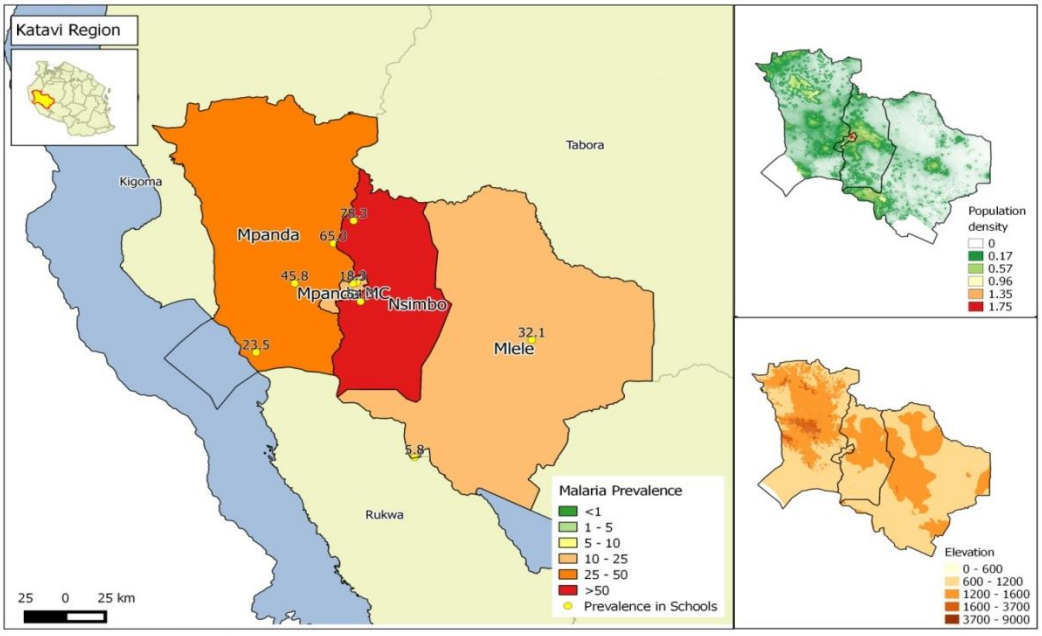


Figure 39: Malaria prevalence, precipitation and elevation map by council in Katavi region

Simiyu

Total schools: 17

Schools per council: Bariadi DC (2), Bariadi TC (2), Busega (2), Itilima (4), Maswa (4), Meatu (3)

Table 34: Simiyu - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=1,342)		Sleeping under a net (N=1,329)		Absent from school (N=1,429)		Fever last two weeks (N=1,429)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**1,429**	**69.0**	**443**	**89.3**	**1,199**	**54.9**	**730**	**45.5**	**633**	**48.0**	**651**
Age**												
<9	16.9	236	72.9	64	96.2	201	63.1	130	43.8	98	47.5	104
9-12	37.2	519	69.2	160	89.8	441	58.1	286	48.3	245	50.0	249
>12	46.0	642	67.9	206	86.2	526	50.0	300	43.8	275	46.4	283
Sex**												
Male	49.2	665	66.2	225	86.4	539	51.6	319	44.3	287	46.5	296
Female	50.8	687	72.1	192	91.8	595	57.5	370	47.3	315	48.2	316
Residence												
Urban	7.5	107	92.5	8	94.6	88	63.8	60	33.0	32	29.9	29
Rural	92.5	1,322	67.1	435	89.0	1,111	54.3	670	46.4	601	49.4	622
Council												
Bariadi DC	14.4	206	56.3	90	90.9	169	54.6	101	55.9	113	43.7	90
Bariadi TC	7.5	107	92.5	8	94.6	88	63.8	60	33.0	32	29.9	29
Busega DC	10.4	148	72.3	41	86.8	125	71.8	102	44.8	64	49.0	72
Itilima DC	22.4	320	64.4	114	87.0	268	52.9	163	41.4	132	45.0	144
Maswa DC	25.5	365	55.6	162	90.7	312	52.8	178	52.1	186	58.8	200
Meatu DC	19.8	283	90.1	28	88.8	237	47.9	126	38.8	106	47.0	116

*) *Total number of children interviewed may differ for age and sex, due to missing values (not shown)*
**) *Missing values: age=32, sex n=77*

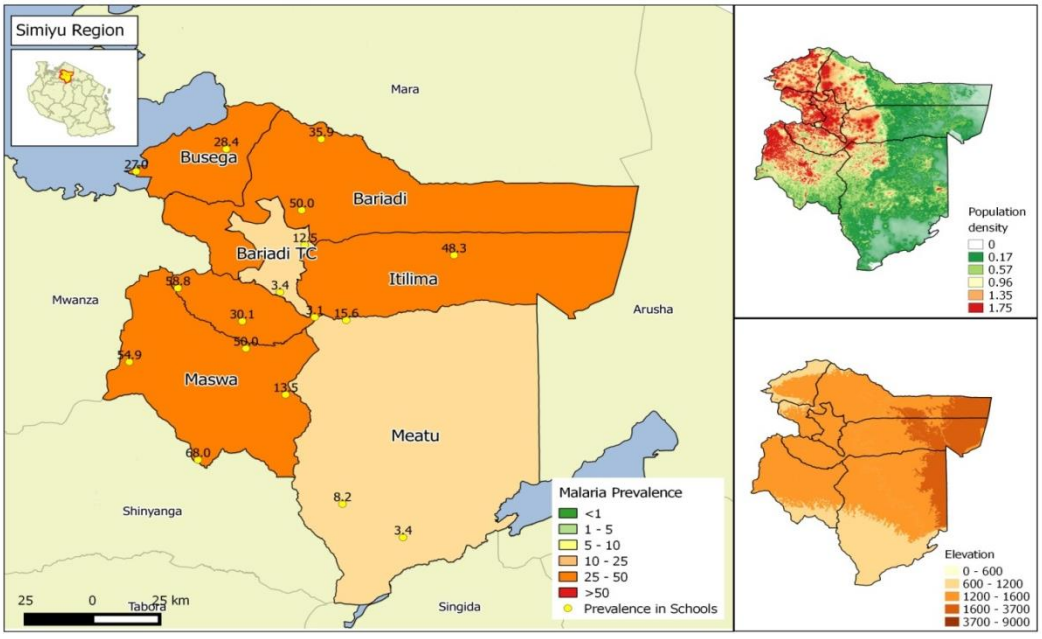


Figure 40: Malaria prevalence, precipitation and elevation map by council in Simiyu region

Geita

Total schools: 19
Schools per council: Bukombe (3), Chato (4), Geita DC (5), Geita TC (2), Mbogwe (3), Nyang'hwale (2)

Table 35: Geita - core variables by sex, age and council

Background characteristics	Total*		Malaria positive		At least one net at home (N=1,702)		Sleeping under a net (N=1,810)		Absent from school (N=1,948)		Fever last two weeks (N=1,974)	
	%	N	%	N	%	N	%	N	%	N	%	N
Total	**100.0**	**1,998**	**53.7**	**1,072**	**94.5**	**1,608**	**55.2**	**1,000**	**37.9**	**738**	**37.3**	**736**
Age**												
<9	10.2	199	53.8	107	98.7	148	60.5	101	42.8	83	40.6	80
9-12	36.8	720	55.0	396	94.3	564	55.6	353	40.1	281	37.3	264
>12	53.0	1,037	52.5	544	94.0	862	53.9	522	35.2	356	36.6	376
Sex**												
Male	49.5	956	56.1	536	93.8	753	49.9	430	35.9	335	34.7	327
Female	50.5	974	50.4	491	95.0	799	59.6	530	39.7	376	39.5	380
Residence												
Urban	10.8	216	47.2	102	91.0	182	59.6	112	66.3	138	57.1	120
Rural	89.2	1,782	54.4	970	94.9	1,426	54.7	888	34.5	600	34.9	616
Council												
Bukombe DC	13.8	275	42.5	117	100.0	253	70.7	188	28.7	77	32.2	88
Chato DC	20.0	400	22.3	89	84.9	314	45.3	177	35.5	138	22.8	91
Geita DC	34.6	692	67.2	465	98.0	549	53.4	329	39.2	264	42.6	289
Geita TC	10.8	216	47.2	102	91.0	182	59.6	112	66.3	138	57.1	120
Mbogwe DC	12.2	243	70.4	171	98.1	206	55.8	126	28.1	68	35.0	85
Nyang'hwale	8.6	172	74.4	128	95.4	104	55.3	68	31.7	53	36.8	63

*) Total number of children interviewed may differ for age and sex, due to missing values (not shown)
**) Missing values: age=40, inconsistent n=2, sex n=68

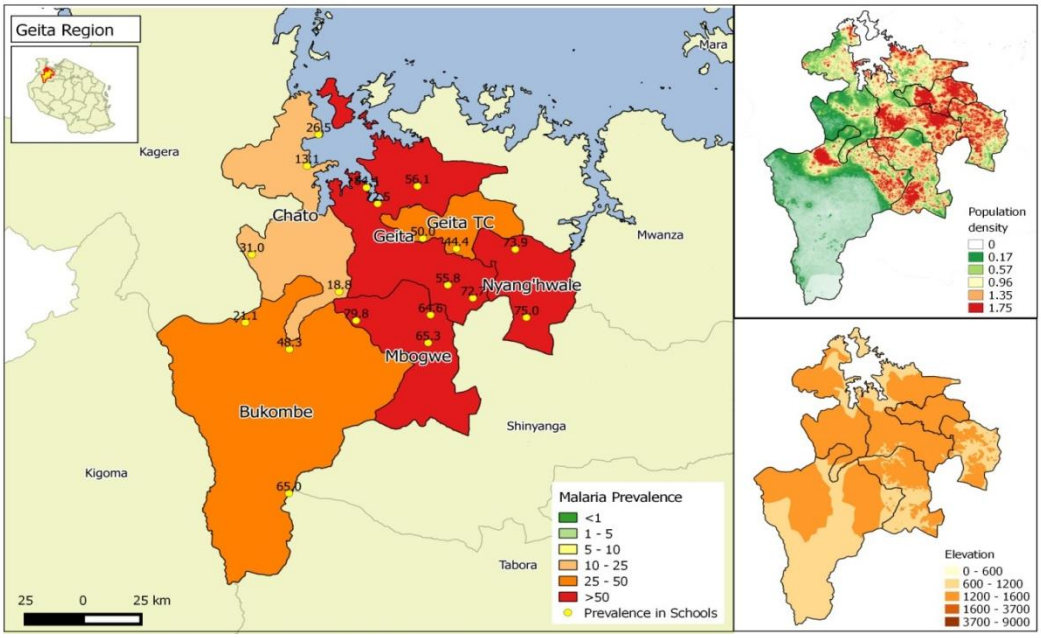


Figure 41: Malaria prevalence, precipitation and elevation map by council in Geita region

Data Quality Tables

Table 36: Completeness of the filled interview forms per region

Region	Total		100% complete	>50% complete	<=50% complete
	N	%	%	%	%
Total	**49,113**	**100**	**71.80**	**28.00**	**0.20**
Dodoma	2,326	4.7	81.0	19.0	0.0
Arusha	2,145	4.4	60.5	39.4	0.0
Kilimanjaro	1,644	3.3	67.0	32.3	0.7
Tanga	2,402	4.9	68.3	31.7	0.0
Morogoro	2,532	5.2	60.3	39.7	0.0
Pwani	1,395	2.8	61.1	38.9	0.0
Dar Es Salaam	3,040	6.2	89.3	10.7	0.0
Lindi	1,724	3.5	76.7	23.3	0.1
Mtwara	2,278	4.6	88.1	11.8	0.1
Ruvuma	2,083	4.2	80.6	19.3	0.1
Iringa	1,024	2.1	69.5	30.4	0.1
Mbeya	2,917	5.9	64.9	35.0	0.1
Singida	1,711	3.5	73.3	26.6	0.1
Tabora	2,494	5.1	70.8	29.0	0.2
Rukwa	1,251	2.5	76.9	23.1	0.0
Kigoma	2,311	4.7	77.1	22.8	0.2
Shinyanga	1,590	3.2	86.7	13.3	0.0
Kagera	2,799	5.7	71.8	28.1	0.1
Mwanza	2,744	5.6	60.4	39.6	0.0
Mara	1,952	4.0	66.5	33.5	0.0
Manyara	1,616	3.3	61.6	38.3	0.1
Njombe	1,009	2.1	65.4	29.3	5.3
Katavi	699	1.4	69.5	30.2	0.3
Simiyu	1,429	2.9	66.0	33.9	0.1
Geita	1,998	4.1	71.3	28.6	0.1

Variables: *School_class age sex a1 a2 a3 b0 b1 b2 b3 b4 b5 b6 c1 c2 c3 c4 c5*
Counted: *True missing values*
Not counted: *Invalid, inconsistent, not asked, not applicable*

Table 37: Missing, invalid and/or inconsistent values of collected variables

Background characteristics	Total number of children	Percentage of missing and invalid/inconsistent values*							
		School class	Age	Sex	People in household	Number of nets	Generally sleeping under a net	Absent due to sickness	Temperature
Total	**49,113**	**0.3**	**0.8**	**0.5**	**1.5**	**3.5**	**2.7**	**1.5**	**30.7**
Region									
Dodoma	2,326	0.4	0.6	0.0	0.5	0.9	0.3	0.4	1.5
Arusha	2,145	0.5	1.5	0.3	1.6	7.0	2.9	1.9	5.8
Kilimanjaro	1,644	0.3	0.8	0.1	1.4	6.3	2.4	1.5	1.3
Tanga	2,402	0.5	0.8	0.2	3.0	6.6	1.9	0.7	17.6
Morogoro	2,532	0.1	0.1	0.0	1.1	2.4	3.8	3.4	0.5
Pwani	1,395	0.4	1.6	0.1	0.9	1.3	9.5	2.8	72.3
Dar Es Salaam	3,040	0.0	0.1	0.1	0.4	2.5	0.8	0.1	100.0
Lindi	1,724	0.0	0.3	0.1	0.8	0.1	0.2	0.8	48.7
Mtwara	2,278	0.0	0.4	0.0	0.2	0.4	0.3	0.3	73.1
Ruvuma	2,083	0.0	0.0	0.2	0.5	0.5	0.2	0.2	87.8
Iringa	1,024	1.7	1.8	0.2	2.1	3.6	2.9	0.4	99.9
Mbeya	2,917	0.7	1.0	0.3	0.9	3.9	2.0	1.0	1.0
Singida	1,711	1.2	1.3	0.6	2.2	2.7	1.4	1.3	10.3
Tabora	2,494	0.2	1.1	0.2	3.6	3.0	4.3	1.6	1.9
Rukwa	1,251	0.3	0.9	0.3	0.3	5.0	1.5	0.3	1.8
Kigoma	2,311	0.0	0.0	0.1	0.6	2.6	0.6	0.3	57.6
Shinyanga	1,590	0.0	0.1	0.1	1.8	1.3	3.0	0.0	0.4
Kagera	2,799	0.0	1.2	0.0	0.8	1.4	2.7	3.6	1.8
Mwanza	2,744	0.1	0.1	0.0	2.3	2.8	1.5	1.7	4.1
Mara	1,952	0.1	1.6	0.6	0.8	0.9	3.6	2.9	60.8
Manyara	1,616	0.6	1.2	0.4	2.0	11.6	2.2	1.1	39.7
Njombe	1,009	0.4	1.5	0.7	0.8	14.6	7.6	6.1	86.8
Katavi	699	0.4	0.9	0.3	1.1	2.4	0.9	1.0	5.4
Simiyu	1,429	0.4	2.2	5.4	5.8	2.1	7.0	2.7	36.8

Background characteristics	Total number of children	Percentage of missing and invalid/inconsistent values*							
		School class	Age	Sex	People in household	Number of nets	Generally sleeping under a net	Absent due to sickness	Temperature
Geita	1,998	0.1	2.1	3.4	2.8	7.9	9.4	2.5	1.1
Residence									
Urban	13,490	0.3	0.6	0.3	1.0	1.9	1.8	1.3	46.7
Age									
<9	9,075	0.0	-	0.4	3.0	5.6	4.4	2.2	33.6
9-12	18,892	0.0	-	0.4	1.1	3.2	2.7	1.4	30.3
>12	20,730	0.1	-	0.4	1.1	2.7	1.9	1.2	29.9
missing	416	25.2		5.5	3.1	6.7	5.3	1.9	28.8
Sex									
Male	24,205	0.2	0.7	-	1.6	3.6	2.7	1.6	30.6
Female	24,681	0.3	0.9	-	1.4	3.3	2.6	1.4	30.8
missing	227	4.8	10.1		4.4	7.5	11	4	27.8
mRDT result									
Pos	38,475	0.3	0.9	0.4	1.5	3.6	2.3	1.5	32.3
Neg	10,627	0.1	0.8	0.8	1.6	2.9	3.9	1.4	25.0
missing	11	0.0	9.1	0.0	0.0	0.0	0.0	9.1	100
Education**									
No school	3,736	0.2	1.1	0.9	3.2	5.1	5.6	1.8	13.2
Primary	23,445	0.4	1.0	0.6	1.4	4.1	2.9	1.6	17.4
Secondary	4,547	0.3	0.8	0.5	1.2	2.6	2.7	2.6	17.9
Diploma or	525	0.2	0.8	0.2	2.3	1.7	2.1	2.5	19.6
Missing	16,860	0.2	0.5	0.2	1.3	2.5	1.7	0.9	57

*) “Not applicable” was not counted as missing. Invalid and inconsistent values are values which are per validation rules impossible

**) not asked in Phase I

List of schools

Table 38: List of Schools

Region	Council	School	Type	Y-Coord	X-Coord	Altitude	Tested	Pos	Prev (%)
Dodoma	Bahi	Chipanga B	Rural	-6.23394	35.36016	1000	118	15	12.71
Dodoma	Bahi	Chonde	Rural	-5.75321	35.44304	1000	83	13	15.66
Dodoma	Chamwino	Lowasa	Rural	-5.84034	36.36521	1200	78	3	3.85
Dodoma	Chamwino	Handali	Rural	-6.33658	36.00072	1000	120	2	1.67
Dodoma	Chamwino	Igunguli	Rural	-6.89018	35.94782	800	98	6	6.12
Dodoma	Chemba	Changamka	Rural	-5.35993	36.24129	1600	77	2	2.60
Dodoma	Chemba	Cheku	Rural	-5.08955	35.89342	1400	115	1	0.87
Dodoma	Chemba	Pangalua	Rural	-5.38614	35.9147	1200	59	0	0.00
Dodoma	Dodoma MC	Chamwino	Urban	-5.06162	35.73754	1200	55	0	0.00
Dodoma	Dodoma MC	Ihumwa	Urban	-5.06167	35.89367	1400	116	0	0.00
Dodoma	Dodoma MC	Mhande	Urban	-5.06249	35.80289	1400	55	0	0.00
Dodoma	Dodoma MC	Chihikwi	Urban	-5.06042	35.68032	1400	117	3	2.56
Dodoma	Kondoa	Masange	Rural	-4.60022	35.80404	1400	111	0	0.00
Dodoma	Kondoa	Ikengwa	Rural	-4.71033	36.06517	1400	57	1	1.75
Dodoma	Kondoa	Salanka	Rural	-4.49326	35.73187	1600	120	0	0.00
Dodoma	Kongwa	Zoissa	Rural	-5.69007	36.41206	1600	85	0	0.00
Dodoma	Kongwa	Msunjile	Rural	-5.95611	36.35576	1200	118	0	0.00
Dodoma	Kongwa	Suguta	Rural	-6.29743	36.68441	1200	148	6	4.05
Dodoma	Kongwa	Ihanda	Rural	-6.02766	36.70775	1600	116	3	2.59
Dodoma	Kongwa	Hembahemba	Rural	-6.02625	36.70624	1600	79	0	0.00
Dodoma	Mpwapwa	Mbori	Rural	-6.27275	36.37833	1200	100	25	25.00
Dodoma	Mpwapwa	Wangi	Rural	-6.44492	36.16524	1000	70	1	1.43
Dodoma	Mpwapwa	Kiboriani	Rural	-6.17039	36.33134	1000	102	0	0.00
Dodoma	Mpwapwa	Chipogoro	Rural	-6.51703	36.0243	1400	129	5	3.88
Arusha	Arusha DC	Oltrument	Rural	-3.31434	36.60927	1600	88	0	0.00
Arusha	Arusha DC	Oltoroto	Rural	-3.33711	36.68948	1600	120	0	0.00
Arusha	Arusha DC	Mzimuni	Rural	-3.50506	36.80613	1200	90	0	0.00
Arusha	Arusha DC	Imbibia	Rural	-3.26699	36.56514	1800	120	0	0.00
Arusha	Arusha DC	Lesiraa	Rural	-3.3993	36.50513	1400	78	0	0.00
Arusha	Arusha MC	Elerai	Urban	-3.36998	36.65582	1400	100	0	0.00
Arusha	Arusha MC	Meru	Urban	-3.37238	36.6892	1400	120	0	0.00
Arusha	Arusha MC	Kimandolu	Urban	-3.37534	36.67386	1400	64	0	0.00
Arusha	Karatu	Mikocheni	Rural	-3.44905	35.36095	1200	63	0	0.00
Arusha	Karatu	Endashangwet	Rural	-3.42841	35.5605	1400	78	0	0.00
Arusha	Karatu	Kambi Ya Simba	Rural	-3.28248	35.813	1600	120	0	0.00
Arusha	Karatu	Ayalaliyo	Rural	-3.61787	35.65966	1800	55	0	0.00
Arusha	Longido	Magadini	Rural	-2.61622	35.97457	800	91	1	1.10
Arusha	Longido	Kitendeni	Rural	-2.84315	37.24129	1800	75	0	0.00
Arusha	Meru	Mikungani	Rural	-3.56787	36.95436	1000	56	0	0.00
Arusha	Meru	Karangai	Rural	-3.47681	36.86647	1200	70	0	0.00
Arusha	Meru	Kilimani	Rural	-3.37137	36.84771	1200	104	0	0.00
Arusha	Meru	Akheri	Rural	-3.34914	36.77718	1600	98	0	0.00
Arusha	Meru	Ushili	Rural	-3.32553	36.76691	1800	85	0	0.00
Arusha	Monduli	Oltukai	Rural	-3.53323	35.92088	1200	78	0	0.00
Arusha	Monduli	Eluwai	Rural	-3.22223	36.36485	1800	97	0	0.00
Arusha	Monduli	Lolkisale	Rural	-3.4655	36.2514	1400	56	0	0.00
Arusha	Ngorongoro	Sakala	Rural	-2.04898	35.58972	2100	64	0	0.00
Arusha	Ngorongoro	Soitsambu	Rural	-1.90838	35.42318	2100	79	0	0.00
Arusha	Ngorongoro	Oloirobi	Rural	-3.20985	35.45831	2700	96	0	0.00
Kilimanjaro	Hai	Msamadi	Rural	-3.3157	37.19614	1000	81	0	0.00
Kilimanjaro	Hai	Nkwasaringe	Rural	-3.2275	37.21256	1400	124	0	0.00
Kilimanjaro	Moshi DC	Soko	Rural	-3.50358	37.48923	1000	56	1	1.79
Kilimanjaro	Moshi DC	Marimeni	Rural	-3.25564	37.30583	1400	101	0	0.00
Kilimanjaro	Moshi DC	Kombo	Rural	-3.22926	37.26087	1400	85	0	0.00
Kilimanjaro	Moshi DC	Usagara	Rural	-3.25599	37.55818	1800	130	0	0.00

Region	Council	School	Type	Y-Coord	X-Coord	Altitude	Tested	Pos	Prev (%)
Kilimanjaro	Moshi MC	Magereza	Urban	-3.33855	37.31438	1000	70	0	0.00
Kilimanjaro	Moshi MC	Chemchem	Urban	-3.3568	37.3496	1000	72	0	0.00
Kilimanjaro	Mwanga	Rangaa	Rural	-3.62939	37.65785	1400	63	1	1.59
Kilimanjaro	Mwanga	Kivisini	Rural	-3.56845	37.63612	1000	83	0	0.00
Kilimanjaro	Rombo DC	Kastamu	Rural	-3.37437	37.63581	1000	81	1	1.23
Kilimanjaro	Rombo DC	Kirai	Rural	-3.22262	37.61588	1600	163	0	0.00
Kilimanjaro	Same	Kavambughu	Rural	-4.02731	37.69216	1000	98	0	0.00
Kilimanjaro	Same	Marwa	Rural	-3.27197	37.45297	1900	56	0	0.00
Kilimanjaro	Same	Ijinyu	Rural	-4.05988	37.94833	800	64	0	0.00
Kilimanjaro	Same	Chabaru	Rural	-4.19979	37.95198	1600	98	0	0.00
Kilimanjaro	Same	Kitubwa	Rural	-4.41923	38.0149	1000	108	0	0.00
Kilimanjaro	Siha	Makiwaru	Rural	-3.22543	36.995	1400	56	0	0.00
Kilimanjaro	Siha	Kandashi	Rural	-3.18899	36.95181	1400	55	0	0.00
Tanga	Bumbuli	Mgwashi	Rural	-4.65748	38.36782	1800	110	1	0.91
Tanga	Bumbuli	Gangacha	Rural	-4.90518	38.4587	1400	77	0	0.00
Tanga	Handeni DC	Kwamagombe	Rural	-5.51213	38.01703	600	111	11	9.91
Tanga	Handeni DC	Kwedikabu	Rural	-5.87317	38.61141	200	55	21	38.18
Tanga	Handeni DC	Kwedizinga	Rural	-5.4109	38.49687	400	100	36	36.00
Tanga	Handeni DC	Kitumbi	Rural	-5.74015	38.47428	400	74	15	20.27
Tanga	Handeni TC	Bangu	Urban	-5.47683	37.97407	800	97	22	22.68
Tanga	Kilindi	Kitingi	Rural	-5.86738	37.32537	1200	89	27	30.34
Tanga	Kilindi	Kimembe	Rural	-5.52971	37.58912	1000	60	13	21.67
Tanga	Kilindi	Kwamaligwa	Rural	-5.35076	37.47099	1200	65	1	1.54
Tanga	Korogwe DC	Vuje	Rural	-5.04153	38.38437	1400	76	0	0.00
Tanga	Korogwe DC	Kijango	Rural	-4.928	38.60814	600	56	15	26.79
Tanga	Korogwe DC	Kwasunga	Rural	-5.08362	38.34174	600	85	2	2.35
Tanga	Korogwe DC	Mkomazi	Rural	-4.64599	38.07789	600	90	1	1.11
Tanga	Korogwe TC	Kilole	Urban	-5.17172	38.46505	400	87	0	0.00
Tanga	Lushoto DC	Kivingo	Rural	-4.46579	38.53382	400	101	20	19.80
Tanga	Lushoto DC	Kinko	Rural	-4.65669	38.27981	1900	120	0	0.00
Tanga	Lushoto DC	Majulai	Rural	-4.61031	38.32676	1600	120	0	0.00
Tanga	Mkinga	Mwakikoya	Rural	-4.67948	39.13757	200	55	7	12.73
Tanga	Mkinga	Kuze	Rural	-4.91111	38.70974	600	69	15	21.74
Tanga	Muheza DC	Masuguru	Rural	-5.15523	38.62101	1000	55	1	1.82
Tanga	Muheza DC	Mtindiro	Rural	-5.28369	38.76633	400	116	49	42.24
Tanga	Muheza DC	Amani	Rural	-5.70698	38.2605	600	55	1	1.82
Tanga	Pangani	Pangani	Rural	-5.42626	38.97147	0	56	1	1.79
Tanga	Pangani	Sange	Rural	-5.68202	38.83333	200	56	16	28.57
Tanga	Tanga MC	Kiruku	Urban	-4.99543	39.05474	200	55	10	18.18
Tanga	Tanga MC	Kwamkembe	Urban	-5.22265	38.97496	200	65	27	41.54
Tanga	Tanga MC	Changa	Urban	-5.22264	38.65778	400	129	1	0.78
Tanga	Tanga MC	Makorora	Urban	-5.07942	39.08676	200	118	0	0.00
Morogoro	Gairo DC	Ibuti	Rural	-6.14093	36.91556	1400	84	0	0.00
Morogoro	Gairo DC	Msingisi	Rural	-6.31687	36.88184	1600	96	0	0.00
Morogoro	Kilombero DC	Machipi	Rural	-8.06764	36.60594	600	126	55	43.65
Morogoro	Kilombero DC	Msufini	Rural	-7.81329	36.87366	1200	144	5	3.47
Morogoro	Kilombero DC	Mpofu	Rural	-8.2273	36.18335	400	66	31	46.97
Morogoro	Kilombero DC	Chisano	Rural	-8.7533	35.90403	400	80	35	43.75
Morogoro	Kilombero DC	Tanganyika	Rural	-9.20137	35.79327	400	68	20	29.41
Morogoro	Kilosa DC	Manzese	Rural	-6.79328	36.98908	800	60	3	5.00
Morogoro	Kilosa DC	Mkundi	Rural	-6.31818	37.30988	800	108	16	14.81
Morogoro	Kilosa DC	Mkung'hulu	Rural	-6.77589	36.65673	1000	96	34	35.42
Morogoro	Kilosa DC	Kisanga	Rural	-7.3672	36.75612	1200	55	11	20.00
Morogoro	Kilosa DC	Malui	Rural	-6.86826	37.05277	600	120	54	45.00
Morogoro	Morogoro DC	Njianne	Rural	-6.80625	38.05743	400	62	11	17.74
Morogoro	Morogoro DC	Kizinga	Rural	-6.77027	37.82727	600	66	15	22.73
Morogoro	Morogoro DC	Kalundwa	Rural	-6.90048	37.84156	600	130	61	46.92
Morogoro	Morogoro DC	Bonye	Rural	-7.39506	37.73505	400	128	21	16.41
Morogoro	Morogoro MC	Msongeni	Urban	-6.80291	37.73263	600	55	6	10.91
Morogoro	Morogoro MC	Uhuru	Urban	-7.0971	36.88526	800	85	1	1.18
Morogoro	Morogoro MC	Luhungo	Urban	-6.7055	37.93422	800	55	2	3.64

Region	Council	School	Type	Y-Coord	X-Coord	Altitude	Tested	Pos	Prev (%)
Morogoro	Morogoro MC	Mtawala	Urban	-6.81432	37.65321	600	110	2	1.82
Morogoro	Morogoro MC	Kihonda	Urban	-6.76444	37.64357	600	141	1	0.71
Morogoro	Mvomero DC	Bunduki	Rural	-7.02096	37.62819	1600	90	0	0.00
Morogoro	Mvomero DC	Melela	Rural	-6.88133	37.38848	600	76	19	25.00
Morogoro	Mvomero DC	Mlumbiro	Rural	-6.21377	37.7772	400	79	21	26.58
Morogoro	Mvomero DC	Dihombo	Rural	-6.2804	37.53792	600	113	10	8.85
Morogoro	Ulanga DC	Iragua	Rural	-8.58741	36.43296	400	102	63	61.76
Morogoro	Ulanga DC	Sofi	Rural	-8.88706	36.30848	400	82	41	50.00
Morogoro	Ulanga DC	Uponera	Rural	-8.70893	36.71291	1400	55	16	29.09
Pwani	Bagamoyo	Ruvu Darajani	Rural	-6.69657	38.68673	200	110	12	10.91
Pwani	Bagamoyo	Msigi	Rural	-6.52952	38.43774	200	117	81	69.23
Pwani	Bagamoyo	Hondogo	Rural	-6.20832	38.39246	400	55	23	41.82
Pwani	Bagamoyo	Kwang'Andu	Rural	-5.94573	38.23215	400	55	13	23.64
Pwani	Kibaha DC	Mperamumbi	Rural	-6.73856	38.487	200	54	31	57.41
Pwani	Kibaha DC	Ngeta	Rural	-6.83244	38.79389	200	56	39	69.64
Pwani	Kibaha TC	Visiga	Urban	-6.71498	38.79777	200	74	17	22.97
Pwani	Kibaha TC	Jitihada	Urban	-6.75609	38.92417	200	115	9	7.83
Pwani	Kisarawe	Kanga	Rural	-7.17134	38.81923	400	86	65	75.58
Pwani	Kisarawe	Msimbu	Rural	-7.12787	39.02083	200	58	36	62.07
Pwani	Mafia	Kipingwi	Rural	-7.91641	39.79474	0	60	34	56.67
Pwani	Mafia	Micheni	Rural	-7.98742	39.63505	0	60	19	31.67
Pwani	Mkuranga	Kitumbo	Rural	-7.13114	39.22521	200	114	95	83.33
Pwani	Mkuranga	Nganje	Rural	-7.47077	39.29157	200	54	17	31.48
Pwani	Mkuranga	Kilimahewa	Rural	-7.36418	39.05697	200	67	45	67.16
Pwani	Rufiji	Msona	Rural	-7.79452	38.08299	200	62	27	43.55
Pwani	Rufiji	Mchukwi	Rural	-7.7767	39.00226	200	116	75	64.66
Pwani	Rufiji	Ndundutawa	Rural	-8.17711	39.2378	200	82	37	45.12
DSM	Ilala	Buguruni Moto	Urban	-6.82838	39.2451	200	106	1	0.94
DSM	Ilala	Bwawani	Urban	-6.8647	39.2349	200	110	0	0.00
DSM	Ilala	Kimwani	Urban	-7.0011	39.0705	200	105	0	0.00
DSM	Ilala	Kipunguni	Urban	-6.90779	39.1747	200	100	0	0.00
DSM	Ilala	Kitunda	Urban	-6.90315	39.19874	200	106	2	1.89
DSM	Ilala	Kombo	Urban	-6.83809	39.2328	200	106	1	0.94
DSM	Ilala	Liwiti	Urban	-6.83872	39.21482	200	107	0	0.00
DSM	Ilala	Maktaba	Urban	-6.80982	39.2819	0	105	0	0.00
DSM	Ilala	Ulongoni	Urban	-6.8679	39.1497	200	106	1	0.94
DSM	Kinondoni	Ali Hassan Mwinyi	Urban	-6.80297	39.25734	200	100	1	1.00
DSM	Kinondoni	Goba	Urban	-6.74047	39.166	200	94	2	2.13
DSM	Kinondoni	Kimara Baruti	Urban	-6.80684	39.18101	200	99	0	0.00
DSM	Kinondoni	Mbezi	Urban	-6.75208	39.12511	200	97	1	1.03
DSM	Kinondoni	Mbweni	Urban	-6.57725	39.13153	200	98	0	0.00
DSM	Kinondoni	Mikocheni	Urban	-6.76602	39.2558	200	100	0	0.00
DSM	Kinondoni	Mkunguni B	Urban	-6.79431	39.273	200	98	0	0.00
DSM	Kinondoni	Msasani	Urban	-6.76174	39.2681	200	99	2	2.02
DSM	Kinondoni	Tandale	Urban	-6.79563	39.2416	200	98	0	0.00
DSM	Kinondoni	Ukwamani	Urban	-6.7334	39.22667	200	97	3	3.09
DSM	Temeke	Bwawani	Urban	-6.88639	39.28219	200	101	2	1.98
DSM	Temeke	Chekeni Mwasonga	Urban	-6.99702	39.443	200	102	16	15.69
DSM	Temeke	Kigunga	Urban	-6.8684	39.2439	200	132	2	1.52
DSM	Temeke	Kizuiani	Urban	-6.91115	39.2779	200	102	1	0.98
DSM	Temeke	Mbande	Urban	-6.97363	39.2129	200	44	0	0.00
DSM	Temeke	Mtoni Sabasaba	Urban	-6.86722	39.2821	200	102	1	0.98
DSM	Temeke	Nzasa	Urban	-6.92466	39.2497	200	101	1	0.99
DSM	Temeke	Raha Leo	Urban	-6.82471	39.3174	200	101	0	0.00
DSM	Temeke	Unubini	Urban	-6.84306	39.2616	200	102	2	1.96
DSM	Temeke	Vetenary	Urban	-6.85797	39.2515	200	131	0	0.00
DSM	Temeke	Vijibweni	Urban	-6.85888	39.311	200	91	1	1.10
Lindi	Kilwa	Darajani	Rural	-8.5005	38.92025	400	123	66	53.66
Lindi	Kilwa	Kinjumbi	Rural	-8.38169	39.19411	200	124	60	48.39

Region	Council	School	Type	Y-Coord	X-Coord	Altitude	Tested	Pos	Prev (%)
Lindi	Kilwa	Lihimalyo Kusini	Rural	-9.33884	39.62303	200	124	9	7.26
Lindi	Kilwa	Nanjirinji	Rural	-9.66576	39.10685	200	124	36	29.03
Lindi	Lindi DC	Kitomanga	Rural	-9.66002	39.53764	200	105	22	20.95
Lindi	Lindi DC	Madangwa	Rural	-10.2127	39.85937	200	105	10	9.52
Lindi	Lindi DC	Milola A	Rural	-9.94984	39.32605	400	100	53	53.00
Lindi	Lindi MC	Mnazi Mmoja	Urban	-10.1081	39.61578	200	56	16	28.57
Lindi	Lindi MC	Stadium	Urban	-9.99312	39.71387	200	57	4	7.02
Lindi	Liwale	Liwale	Rural	-9.79718	37.90194	600	73	8	10.96
Lindi	Liwale	Mpengere	Rural	-9.71321	37.71671	800	73	40	54.79
Lindi	Nachingwea	Nachingwea	Rural	-10.3766	38.77641	400	123	6	4.88
Lindi	Nachingwea	Kiegei	Rural	-10.4102	37.91545	600	119	57	47.90
Lindi	Nachingwea	Mbondo	Rural	-10.3651	38.2384	400	75	27	36.00
Lindi	Nachingwea	Ngunichile	Rural	-10.1196	38.47718	400	123	31	25.20
Lindi	Ruangwa	Mbekenyera	Rural	-9.99039	38.96151	400	108	44	40.74
Lindi	Ruangwa	Nangumbu	Rural	-10.4635	39.05565	400	112	30	26.79
Mtwara	Masasi DC	Chiungutwa	Rural	-10.8846	38.97655	400	98	25	25.51
Mtwara	Masasi DC	Mitonji	Rural	-10.9459	39.03596	400	99	35	35.35
Mtwara	Masasi DC	Mkwera	Rural	-10.3795	39.03615	400	98	63	64.29
Mtwara	Masasi DC	Mnavira	Rural	-11.0791	39.26258	200	99	15	15.15
Mtwara	Masasi TC	Mkuti	Urban	-10.7233	38.82019	600	77	12	15.58
Mtwara	Masasi TC	Mumbaka	Urban	-10.8044	38.8893	400	77	59	76.62
Mtwara	Mtwara DC	Kitere	Rural	-10.3513	39.77894	200	136	85	62.50
Mtwara	Mtwara DC	Kitunguli	Rural	-10.5299	40.28668	200	135	84	62.22
Mtwara	Mtwara DC	Naumbu	Rural	-10.2361	40.12243	200	136	9	6.62
Mtwara	Mtwara DC	Njengwa	Rural	-10.5516	39.78378	200	136	63	46.32
Mtwara	Mtwara MC	Ligula	Urban	-10.279	40.18184	200	123	0	0.00
Mtwara	Mtwara MC	Mkangala	Urban	-10.3391	40.13366	200	126	29	23.02
Mtwara	Nanyumbu	Lukula	Rural	-11.3511	38.38553	200	82	23	28.05
Mtwara	Nanyumbu	Michiga A	Rural	-10.9258	38.16745	400	80	22	27.50
Mtwara	Nanyumbu	Nandete	Rural	-10.9021	38.80449	400	81	26	32.10
Mtwara	Newala DC	Butiama	Rural	-10.9422	39.27707	800	112	13	11.61
Mtwara	Newala DC	Mkunya	Rural	-10.9921	39.38944	400	112	24	21.43
Mtwara	Newala DC	Mmulunga	Rural	-10.5795	39.36828	600	111	85	76.58
Mtwara	Tandahimba	Amani	Rural	-10.4012	39.3796	600	90	13	14.44
Mtwara	Tandahimba	Chaume	Rural	-10.6251	39.4556	600	91	50	54.95
Mtwara	Tandahimba	Kilidu-Mkoreha	Rural	-10.7675	39.63491	400	89	33	37.08
Mtwara	Tandahimba	Mkwiti	Rural	-10.7657	39.62736	400	90	57	63.33
Ruvuma	Mbinga	Kiwanjani	Rural	-10.9399	35.0158	1600	116	2	1.72
Ruvuma	Mbinga	Litumbandyosi	Rural	-10.3829	35.0901	1200	116	33	28.45
Ruvuma	Mbinga	Maguu	Rural	-11.0424	34.7815	1400	116	0	0.00
Ruvuma	Mbinga	Mpepai	Rural	-11.1277	35.2142	1000	116	5	4.31
Ruvuma	Namtumbo	Karume	Rural	-10.1987	35.89695	1000	84	34	40.48
Ruvuma	Namtumbo	Ligera	Rural	-10.5437	37.08315	1000	84	26	30.95
Ruvuma	Namtumbo	Suluti	Rural	-10.6819	36.07849	1000	84	25	29.76
Ruvuma	Nyasa	Kimbango	Rural	-11.1188	34.9803	1400	99	0	0.00
Ruvuma	Nyasa	Mkalole	Rural	-11.2723	34.898	1400	94	52	55.32
Ruvuma	Songea DC	Magagura	Rural	-10.8432	35.2674	1000	110	10	9.09
Ruvuma	Songea DC	Matetereka	Rural	-9.83625	35.2413	1000	111	0	0.00
Ruvuma	Songea DC	Ngadinda	Rural	-10.1923	35.7016	1000	112	33	29.46
Ruvuma	Songea MC	Huduma	Urban	-10.6653	35.5998	1200	96	1	1.04
Ruvuma	Songea MC	Miembeni	Urban	-10.6372	35.6551	1200	96	2	2.08
Ruvuma	Songea MC	Mletele	Urban	-10.6303	35.7014	1000	97	11	11.34
Ruvuma	Songea MC	Songea	Urban	-10.682	35.6413	1200	98	0	0.00
Ruvuma	Tunduru	Ligoma	Rural	-11.1013	37.4875	600	114	56	49.12
Ruvuma	Tunduru	Lukumbule	Rural	-11.5227	37.3591	600	114	65	57.02
Ruvuma	Tunduru	Namiungo	Rural	-10.8789	37.644	600	113	58	51.33
Ruvuma	Tunduru	Nandembo	Rural	-10.9679	37.2317	800	113	62	54.87
Iringa	Iringa DC	Iguluba	Rural	-7.40135	35.91954	1400	57	0	0.00
Iringa	Iringa DC	Ngano	Rural	-7.47634	35.47634	1000	55	0	0.00
Iringa	Iringa DC	Lupalama B	Rural	-7.86452	35.55394	1600	114	0	0.00
Iringa	Iringa MC	Gangilonga	Urban	-7.77352	35.70507	1600	69	0	0.00

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Iringa	Iringa MC	Hoho	Urban	-7.72468	35.64208	1600	68	0	0.00
Iringa	Kilolo DC	Nyanzwa	Rural	-7.35318	36.28377	600	77	6	7.79
Iringa	Kilolo DC	Uhambingeto	Rural	-7.5508	35.9473	1600	120	2	1.67
Iringa	Kilolo DC	Mwatasi	Rural	-7.74004	35.70911	1600	111	0	0.00
Iringa	Mafinga TC	Mafinga	Urban	-8.30261	35.28425	1800	64	0	0.00
Iringa	Mufindi	Vikula	Rural	-8.32239	35.54466	1900	120	0	0.00
Iringa	Mufindi	Kinyangesi	Rural	-8.58661	34.85558	1600	105	0	0.00
Iringa	Mufindi	Kitasengwa	Rural	-8.65337	35.32355	1600	64	1	1.56
Mbeya	Busokelo	Isange	Rural	-9.18138	33.82658	1800	88	1	1.14
Mbeya	Busokelo	Kingili	Rural	-9.42195	33.84713	800	79	48	60.76
Mbeya	Chunya	Kanga	Rural	-8.57364	33.06271	1000	118	8	6.78
Mbeya	Chunya	Kapalala	Rural	-8.06512	32.68481	1000	134	49	36.57
Mbeya	Chunya	Kaloleni	Rural	-8.43343	33.03416	1000	64	7	10.94
Mbeya	Chunya	Majengo	Rural	-8.04757	33.21929	1400	44	11	25.00
Mbeya	Ileje	Isoko	Rural	-9.50584	33.49638	1600	56	5	8.93
Mbeya	Ileje	Ibungu	Rural	-9.52841	33.38755	1400	99	0	0.00
Mbeya	Kyela	Ipyana	Rural	-9.62416	33.87786	600	72	5	6.94
Mbeya	Kyela	Kajunjumele	Rural	-9.60588	33.91831	600	78	6	7.69
Mbeya	Kyela	Ushirika	Rural	-9.58797	33.71217	600	84	66	78.57
Mbeya	Mbarali	Motomoto	Rural	-8.777	33.64188	1400	119	5	4.20
Mbeya	Mbarali	Lyambogo	Rural	-8.86853	34.035	1400	108	0	0.00
Mbeya	Mbarali	Kapunga	Rural	-8.7061	34.06284	1200	80	0	0.00
Mbeya	Mbarali	Nyeregete	Rural	-8.61852	34.34602	1200	101	1	0.99
Mbeya	Mbarali	Mawindi	Rural	-8.61852	34.47815	1200	93	1	1.08
Mbeya	Mbeya DC	Ilindi	Rural	-8.60372	33.52306	1600	113	0	0.00
Mbeya	Mbeya DC	Idunda	Rural	-8.90885	33.62942	1800	62	0	0.00
Mbeya	Mbeya DC	Chang'Ombe	Rural	-8.67085	33.0516	1000	74	3	4.05
Mbeya	Mbeya MC	Hasanga	Urban	-8.91024	33.53174	1800	69	0	0.00
Mbeya	Mbeya MC	Mwasote	Urban	-8.89423	33.53414	1800	80	0	0.00
Mbeya	Mbeya MC	Itagano	Urban	-8.84377	33.47308	1900	55	0	0.00
Mbeya	Mbeya MC	Mwasanga	Urban	-8.94557	33.49506	1800	99	0	0.00
Mbeya	Mbozi	Ipanzya	Rural	-9.07723	32.76567	1200	59	0	0.00
Mbeya	Mbozi	Idiwili	Rural	-9.1493	33.16091	1600	70	0	0.00
Mbeya	Mbozi	Myovizi	Rural	-8.94267	33.07622	1600	108	0	0.00
Mbeya	Mbozi	Insani	Rural	-8.90033	32.75518	1800	122	0	0.00
Mbeya	Momba	Chuo	Rural	-8.56151	32.31275	1000	80	16	20.00
Mbeya	Momba	Chisitu	Rural	-9.08507	32.3322	1400	86	56	65.12
Mbeya	Rungwe	Magereza	Rural	-9.2884	33.6466	1400	58	0	0.00
Mbeya	Rungwe	Ibililo	Rural	-9.21143	33.51509	1400	166	2	1.20
Mbeya	Rungwe	Kiloba	Rural	-9.37501	33.74012	1000	120	23	19.17
Mbeya	Tunduma	Majengo	Rural	-9.30383	32.76543	1400	79	0	0.00
Singida	Ikungi	Kisuluda	Rural	-4.67619	34.57982	1600	72	0	0.00
Singida	Ikungi	Ntewa	Rural	-5.15357	34.95176	1600	100	1	1.00
Singida	Ikungi	Utaho	Rural	-4.95762	34.764	1600	92	3	3.26
Singida	Iramba	Tintigulu	Rural	-4.23656	34.25623	1200	108	7	6.48
Singida	Iramba	Mugundu	Rural	-4.42283	34.45839	1600	70	1	1.43
Singida	Iramba	Mwanduigembe	Rural	-4.79128	34.36043	1400	55	2	3.64
Singida	Manyoni	Mangoli	Rural	-6.3865	35.03431	1200	121	20	16.53
Singida	Manyoni	Majengo	Rural	-5.79481	34.81559	1400	70	0	0.00
Singida	Manyoni	Mlowa	Rural	-5.69562	34.49605	1400	79	1	1.27
Singida	Manyoni	Heka	Rural	-6.15084	34.75953	1400	83	5	6.02
Singida	Meatu DC	Mwamagembe	Rural	-6.51455	34.20327	1400	71	20	28.17
Singida	Mkalama	Endasiku	Rural	-3.88766	34.68512	1200	56	6	10.71
Singida	Mkalama	Maelu	Rural	-4.24226	34.66149	1600	120	0	0.00
Singida	Singida DC	Mughunga	Rural	-4.90806	35.12895	1600	55	0	0.00
Singida	Singida DC	Mpipiti	Rural	-4.47762	34.87286	1600	120	2	1.67
Singida	Singida DC	Kinyamwenda	Rural	-4.73191	35.01272	1800	100	1	1.00
Singida	Singida DC	Mrama	Rural	-4.67474	34.89284	1800	93	0	0.00
Singida	Singida MC	Manguanjuki	Urban	-4.80638	34.71639	1600	76	0	0.00
Singida	Singida MC	Kititimo	Urban	-4.84435	34.78635	1600	55	0	0.00
Singida	Singida MC	Mahembe	Urban	-4.85332	34.75085	1600	115	0	0.00

Region	Council	School	Type	Y-Coord	X-Coord	Altitude	Tested	Pos	Prev (%)
Tabora	Igunga	Hindishi	Rural	-4.11552	33.98984	1200	130	4	3.08
Tabora	Igunga	Makomero	Rural	-4.30268	33.97727	1200	62	5	8.06
Tabora	Igunga	Itale	Rural	-4.30248	33.5393	1400	62	27	43.55
Tabora	Igunga	Buhekela	Rural	-4.76141	33.81457	1200	120	23	19.17
Tabora	Kaliua	Poza Moyo	Rural	-5.10675	31.79264	1200	67	23	34.33
Tabora	Kaliua	Uhindi	Rural	-4.44498	31.67718	1200	90	34	37.78
Tabora	Kaliua	Ng'Wande	Rural	-4.63509	32.40573	1400	134	65	48.51
Tabora	Kaliua	Zugimlole	Rural	-5.25697	31.57282	1200	61	19	31.15
Tabora	Kaliua	Majengo	Rural	-5.01673	31.30034	1200	86	15	17.44
Tabora	Nzega	Nzega Ndogo	Rural	-4.10671	33.14312	1200	158	48	30.38
Tabora	Nzega	Kakulungu	Rural	-4.79176	32.96674	1400	145	70	48.28
Tabora	Nzega	Isese	Rural	-4.08619	33.05659	1200	127	73	57.48
Tabora	Nzega	Idubula	Rural	-4.2402	32.99024	1400	82	40	48.78
Tabora	Nzega	Kidete	Rural	-4.26478	32.93527	1400	141	41	29.08
Tabora	Sikonge	Ibaya	Rural	-5.34077	32.69639	1200	71	22	30.99
Tabora	Sikonge	Kapumba	Rural	-6.30198	33.11463	1200	84	14	16.67
Tabora	Tabora MC	Mtakuja	Urban	-5.176	32.76784	1200	55	8	14.55
Tabora	Tabora MC	Kalumwa	Urban	-4.88451	32.87604	1400	63	23	36.51
Tabora	Tabora MC	Rufita	Urban	-5.00761	32.79608	1400	120	1	0.83
Tabora	Urambo	Mlangale	Rural	-4.89586	32.19827	1200	55	29	52.73
Tabora	Urambo	Imalamakoye	Rural	-5.1082	32.0693	1200	120	26	21.67
Tabora	Urambo	Wema	Rural	-5.18395	32.14228	1200	67	35	52.24
Tabora	Uyui	Malongwe	Rural	-5.38962	33.6736	1400	65	5	7.69
Tabora	Uyui	Mwamdalaigwe	Rural	-4.94377	33.79788	1200	56	14	25.00
Tabora	Uyui	Chessa	Rural	-4.93378	32.43791	1200	138	47	34.06
Tabora	Uyui	Itobela	Rural	-4.94013	33.18064	1400	135	37	27.41
Rukwa	Kalambo	Nondo	Rural	-8.46413	31.32133	1200	79	53	67.09
Rukwa	Kalambo	Mbuluma	Rural	-8.03564	31.41019	1800	47	6	12.77
Rukwa	Kalambo	Mkombo	Rural	-8.85427	32.04791	1400	126	29	23.02
Rukwa	Nkasi	Kanchui	Rural	-7.07295	30.56177	800	84	64	76.19
Rukwa	Nkasi	Kisambala	Rural	-7.56387	30.62133	800	56	50	89.29
Rukwa	Nkasi	Ifundwa	Rural	-7.66757	31.1971	1800	142	19	13.38
Rukwa	Nkasi	Kate Msanda	Rural	-7.86087	31.17439	1900	83	29	34.94
Rukwa	Sumbawanga DC	Muungano	Rural	-8.063	31.5048	1800	70	0	0.00
Rukwa	Sumbawanga DC	Ilembo	Rural	-8.233	31.4856	1800	108	1	0.93
Rukwa	Sumbawanga DC	Kamyalile	Rural	-8.3332	32.0224	1800	64	0	0.00
Rukwa	Sumbawanga DC	Rukwa	Rural	-7.4058	31.3336	2100	134	0	0.00
Rukwa	Sumbawanga MC	Wipanga	Urban	-7.87256	31.63102	2200	63	1	1.59
Rukwa	Sumbawanga MC	Majengo	Urban	-7.94578	31.62921	1900	153	2	1.31
Rukwa	Sumbawanga MC	Mtimbwa	Urban	-7.98052	31.54443	1900	42	0	0.00
Kigoma	Buhigwe	Kigogwe	Rural	-4.79927	29.8507	1000	102	61	59.80
Kigoma	Buhigwe	Mugera	Rural	-4.25265	30.125	1400	95	31	32.63
Kigoma	Kakonko	Gwanumpu	Rural	-3.42382	30.7449	1600	83	34	40.96
Kigoma	Kakonko	Itumbiko	Rural	-3.32691	31.0487	1400	87	27	31.03
Kigoma	Kakonko	NGwarama	Rural	-3.08342	30.9406	1600	87	27	31.03
Kigoma	Kasulu DC	Kakirungu	Rural	-4.84044	30.03565	1200	106	32	30.19
Kigoma	Kasulu DC	Mwali	Rural	-4.56104	30.09635	1400	104	22	21.15
Kigoma	Kasulu DC	Nyenge	Rural	-4.61702	30.2856	1400	104	27	25.96
Kigoma	Kasulu TC	Juhudi	Urban	-4.54051	30.03563	1400	96	3	3.13
Kigoma	Kasulu TC	Mwibuye	Urban	-4.49212	30.04931	1400	78	1	1.28
Kigoma	Kibondo	Biturana	Rural	-3.62574	30.72354	1600	93	29	31.18
Kigoma	Kibondo	Bunyambo	Rural	-3.57199	30.6359	1600	105	56	53.33
Kigoma	Kibondo	Kibuye	Rural	-3.8112	30.4182	1400	102	67	65.69
Kigoma	Kibondo	Kifura	Rural	-3.81983	30.64	1400	104	20	19.23
Kigoma	Kigoma DC	Mayange	Rural	-4.85889	29.90205	1000	96	42	43.75
Kigoma	Kigoma DC	Mwandiga	Rural	-4.83671	29.7537	1000	97	29	29.90
Kigoma	Kigoma DC	Nyarubanda	Rural	-4.56242	29.7537	1800	97	1	1.03
Kigoma	Kigoma MC	Kagera	Urban	-4.91537	29.69868	800	99	62	62.63
Kigoma	Kigoma MC	Katubuka	Urban	-4.8881	29.65062	800	97	5	5.15
Kigoma	Kigoma MC	Kibirizi	Urban	-4.8559	29.62594	800	99	38	38.38

Region	Council	School	Type	Y-Coord	X-Coord	Altitude	Tested	Pos	Prev (%)
Kigoma	Uvinza DC	Kazuramimba	Rural	-4.99213	29.99149	1200	98	17	17.35
Kigoma	Uvinza DC	Malagarasi	Rural	-5.10102	30.90165	1200	99	24	24.24
Kigoma	Uvinza DC	Mwakizega	Rural	-5.09833	29.81516	800	97	26	26.80
Kigoma	Uvinza DC	Sunuka	Rural	-5.35126	29.78625	800	86	20	23.26
Shinyanga	Kahama TC	Majengo	Urban	-3.81773	32.6032	1400	90	1	1.11
Shinyanga	Kahama TC	Kishima 'B'	Urban	-3.85966	32.76272	1200	125	6	4.80
Shinyanga	Kishapu DC	Ngofila	Rural	-3.92652	33.8076	1200	55	2	3.64
Shinyanga	Kishapu DC	Idukilo	Rural	-3.45543	33.61863	1200	74	11	14.86
Shinyanga	Kishapu DC	Songwa	Rural	-3.50975	33.52642	1200	116	61	52.59
Shinyanga	Msalala DC	Kadati	Rural	-3.707	32.83387	1200	86	33	38.37
Shinyanga	Msalala DC	Masabi	Rural	-3.56156	32.43601	1400	120	76	63.33
Shinyanga	Shinyanga DC	Ishinabulandi	Rural	-3.75063	33.39256	1200	83	34	40.96
Shinyanga	Shinyanga DC	Masengwa	Rural	-3.82704	33.43306	1200	56	16	28.57
Shinyanga	Shinyanga DC	Kidanda	Rural	-3.8465	33.1071	1200	96	49	51.04
Shinyanga	Shinyanga DC	Lyamidati	Rural	-3.62556	32.97816	1200	84	41	48.81
Shinyanga	Shinyanga DC	Mwajilugula	Rural	-3.42574	33.0493	1200	157	47	29.94
Shinyanga	Shinyanga MC	Mwamagunguli A	Urban	-3.61774	33.53739	1200	85	18	21.18
Shinyanga	Shinyanga MC	Kitangili	Urban	-3.68131	33.42866	1200	85	1	1.18
Shinyanga	Shinyanga MC	Ndala 'A'	Urban	-3.67772	33.40508	1200	66	0	0.00
Shinyanga	Ushetu DC	Sinwankere	Rural	-3.89034	31.96481	1400	114	94	82.46
Shinyanga	Ushetu DC	Nussa	Rural	-4.13914	32.44191	1200	98	68	69.39
Kagera	Biharamulo	Maendeleo	Rural	-2.63162	31.31137	1600	97	25	25.77
Kagera	Biharamulo	Kagoma	Rural	-2.79476	31.57389	1400	85	61	71.76
Kagera	Biharamulo	Kaniha	Rural	-3.28399	31.42876	1400	79	24	30.38
Kagera	Biharamulo	Lusahunga	Rural	-2.93895	31.18114	1600	86	39	45.35
Kagera	Bukoba DC	Mugajwale	Rural	-1.48077	31.46791	1400	95	58	61.05
Kagera	Bukoba DC	Nsheshe	Rural	-1.67781	31.44535	1400	72	47	65.28
Kagera	Bukoba DC	Karamagi	Rural	-1.41451	31.79897	1400	90	1	1.11
Kagera	Bukoba DC	Katoma	Rural	-1.27289	31.7519	1400	66	0	0.00
Kagera	Bukoba MC	Bilele	Urban	-1.32874	31.81374	1200	55	0	0.00
Kagera	Bukoba MC	Kitendaguro	Urban	-1.36238	31.80012	1400	90	1	1.11
Kagera	Karagwe	Omukakajinja	Rural	-1.58712	31.28997	1400	84	51	60.71
Kagera	Karagwe	Chonyonyo	Rural	-1.57829	31.06112	1600	84	8	9.52
Kagera	Karagwe	Misha	Rural	-1.7777	31.16239	1600	61	15	24.59
Kagera	Karagwe	Chamchuzi	Rural	-1.75761	30.85361	1600	88	34	38.64
Kagera	Kyerwa	Nyamilima	Rural	-1.21852	30.93681	1600	60	7	11.67
Kagera	Kyerwa	Rwele	Rural	-1.38319	30.88698	1600	90	6	6.67
Kagera	Kyerwa	Rugasha	Rural	-1.12114	30.67017	1400	57	7	12.28
Kagera	Kyerwa	Nyabikurungo	Rural	-1.43005	30.8446	1400	100	31	31.00
Kagera	Missenyi	Kyabajwa	Rural	-1.29093	31.62706	1400	65	33	50.77
Kagera	Missenyi	Mushasha	Rural	-1.26836	31.50574	1200	51	40	78.43
Kagera	Missenyi	Byeju	Rural	-1.05012	31.33182	1400	96	68	70.83
Kagera	Muleba	Muleba	Rural	-1.83346	31.642	1400	128	1	0.78
Kagera	Muleba	Nyarugando	Rural	-1.82766	31.46468	1400	98	20	20.41
Kagera	Muleba	Kabasharo	Rural	-2.09501	31.65955	1400	86	43	50.00
Kagera	Muleba	Mulambi	Rural	-1.97129	31.5312	1400	118	35	29.66
Kagera	Muleba	Mulela	Rural	-1.75312	31.55771	1600	199	19	9.55
Kagera	Ngara	Rwinyana	Rural	-2.84298	30.5505	1600	100	31	31.00
Kagera	Ngara	Rulenge	Rural	-2.73661	30.63384	1400	120	47	39.17
Kagera	Ngara	Rusumo	Rural	-2.41138	30.73371	1800	100	38	38.00
Kagera	Ngara	Ntobeye	Rural	-2.42166	30.63832	1400	100	49	49.00
Kagera	Ngara	Mugasha	Rural	-2.49729	30.71855	1400	99	32	32.32
Mwanza	Ilemela	Ibeshi	Rural	-2.53341	32.94742	1400	152	1	0.66
Mwanza	Ilemela	Nyafula	Rural	-2.39141	33.02088	1200	66	48	72.73
Mwanza	Ilemela	Kirumba	Rural	-2.5003	32.89151	1200	96	1	1.04
Mwanza	Ilemela	Bulola	Rural	-2.52518	32.96856	1400	75	1	1.33
Mwanza	Kwimba DC	Mwabilanda	Rural	-2.8062	33.38424	1400	108	28	25.93
Mwanza	Kwimba DC	Ndamhi	Rural	-3.14722	33.14357	1200	89	43	48.31
Mwanza	Kwimba DC	Igungunya	Rural	-3.09365	33.27278	1200	67	17	25.37
Mwanza	Kwimba DC	Busule	Rural	-3.05678	33.46065	1400	68	26	38.24

Region	Council	School	Type	Y-Coord	X-Coord	Altitude	Tested	Pos	Prev (%)
Mwanza	Magu DC	Sese	Rural	-2.45446	33.05971	1400	111	83	74.77
Mwanza	Magu DC	Bundilya	Rural	-2.57921	33.31732	1200	57	25	43.86
Mwanza	Magu DC	Mwashepi	Rural	-2.68446	33.59841	1200	81	27	33.33
Mwanza	Misungwi	Misungwi	Rural	-2.84591	33.09072	1200	60	4	6.67
Mwanza	Misungwi	Buganda	Rural	-2.74668	33.00422	1400	108	63	58.33
Mwanza	Misungwi	Lukanga	Rural	-3.06486	32.91375	1400	120	94	78.33
Mwanza	Misungwi	Mwamboku	Rural	-3.11627	33.01433	1400	96	48	50.00
Mwanza	Nyamagana MC	Bulale	Urban	-2.63106	32.93554	1400	120	0	0.00
Mwanza	Nyamagana MC	Miembeni	Urban	-2.52429	32.90692	1400	96	0	0.00
Mwanza	Nyamagana MC	Mirongo	Urban	-2.51542	32.90437	1400	60	0	0.00
Mwanza	Nyamagana MC	Shamaliwa	Urban	-2.55116	32.98566	1200	132	1	0.76
Mwanza	Sengerema DC	Kahumulo	Rural	-2.67227	32.81127	1200	90	55	61.11
Mwanza	Sengerema DC	Nyamizeze	Rural	-2.60155	32.60383	1400	144	81	56.25
Mwanza	Sengerema DC	Buhama	Rural	-2.30389	32.53542	1200	165	104	63.03
Mwanza	Sengerema DC	Luhorongoma	Rural	-2.4992	32.18024	1200	120	83	69.17
Mwanza	Sengerema DC	Kagunga	Rural	-2.92281	32.6106	1400	60	37	61.67
Mwanza	Ukerewe DC	Nantare	Rural	-2.15889	33.14755	1200	136	109	80.15
Mwanza	Ukerewe DC	Mwigoye	Rural	-2.07433	32.90202	1200	135	49	36.30
Mwanza	Ukerewe DC	Mukasika	Rural	-2.03604	33.02677	1400	69	44	63.77
Mwanza	Ukerewe DC	Bukiko	Rural	-1.83763	33.09034	1200	63	25	39.68
Mara	Bunda	Nansimo	Rural	-2.14537	33.35353	1200	108	37	34.26
Mara	Bunda	Mugaja	Rural	-1.98173	33.85808	1400	98	25	25.51
Mara	Bunda	Ikizu A	Rural	-1.89106	34.03104	1600	84	27	32.14
Mara	Bunda	Mihale	Rural	-2.08371	34.03263	1200	96	31	32.29
Mara	Butiama	Tonyo	Rural	-1.62245	33.87286	1400	94	71	75.53
Mara	Butiama	Kizaru	Rural	-1.66886	34.05512	1400	79	62	78.48
Mara	Butiama	Biatika	Rural	-1.76922	34.09391	1600	55	14	25.45
Mara	Musoma DC	Kurugongo A	Rural	-1.80889	33.38185	1200	84	42	50.00
Mara	Musoma DC	Lyasembe	Rural	-1.85529	33.47619	1200	90	26	28.89
Mara	Musoma MC	Kwangwa	Urban	-1.5382	33.79862	1400	55	5	9.09
Mara	Musoma MC	Nyasho A	Urban	-1.50879	33.80395	1200	78	1	1.28
Mara	Rorya	Komuge	Rural	-1.44766	33.91418	1400	54	5	9.26
Mara	Rorya	Buturi	Rural	-1.40393	33.9937	1200	66	17	25.76
Mara	Rorya	Muharango	Rural	-1.23735	33.92385	1400	96	51	53.13
Mara	Rorya	Kirongwe	Rural	-1.05053	34.09763	1400	91	10	10.99
Mara	Serengeti	Bonchugu	Rural	-1.97941	34.92031	1600	82	28	34.15
Mara	Serengeti	Ikorongo	Rural	-1.5708	34.41073	1400	99	39	39.39
Mara	Serengeti	Nyankomogo	Rural	-1.90313	34.32269	1400	112	81	72.32
Mara	Serengeti	Morotonga	Rural	-1.86292	34.67611	1600	104	19	18.27
Mara	Tarime DC	Nyankunguru B	Rural	-1.42168	34.50469	1400	96	61	63.54
Mara	Tarime DC	Nyamombara	Rural	-1.40188	34.71219	1900	88	10	11.36
Mara	Tarime DC	Korotambe	Rural	-1.25957	34.39729	1600	54	42	77.78
Mara	Tarime TC	Buhemba	Urban	-1.34672	34.36311	1600	89	6	6.74
Manyara	Babati DC	Sangara	Rural	-4.28214	35.62983	1600	120	0	0.00
Manyara	Babati DC	Mamire	Rural	-4.15602	35.84123	1400	94	0	0.00
Manyara	Babati DC	Kiru Ndogo	Rural	-4.13463	35.61626	1400	100	0	0.00
Manyara	Babati DC	Minjingu	Rural	-3.71232	35.86892	1200	63	0	0.00
Manyara	Babati TC	Himiti	Urban	-4.31187	35.74358	1600	58	1	1.72
Manyara	Babati TC	Sinai	Urban	-4.18184	35.75258	1400	56	0	0.00
Manyara	Hanang DC	Waranga	Rural	-4.77884	35.49749	1600	61	0	0.00
Manyara	Hanang DC	Gehandu	Rural	-4.64894	35.20031	1600	70	0	0.00
Manyara	Hanang DC	Hirbadaw	Rural	-4.3537	34.89125	1800	91	0	0.00
Manyara	Hanang DC	Gabadaw	Rural	-4.47635	35.34297	1800	120	0	0.00
Manyara	Kiteto DC	Sunya	Rural	-5.729	37.09767	1400	72	0	0.00
Manyara	Kiteto DC	Matui	Rural	-5.48143	36.3877	1400	59	0	0.00
Manyara	Kiteto DC	Nchinila	Rural	-5.54996	36.37862	1400	120	0	0.00
Manyara	Kiteto DC	Msente	Rural	-5.31089	36.58344	1600	120	0	0.00
Manyara	Mbulu DC	Getanyamba	Rural	-4.20962	35.07298	1800	67	0	0.00
Manyara	Mbulu DC	Qaloda	Rural	-4.12952	35.38592	2200	68	0	0.00
Manyara	Mbulu DC	Gwandumehi	Rural	-3.7331	35.55737	1900	74	0	0.00
Manyara	Simanjiro DC	Kimelok	Rural	-4.48201	36.45488	1400	82	0	0.00

Region	Council	School	Type	Y-Coord	X-Coord	Altitude	Tested	Pos	Prev (%)
Manyara	Simanjiro DC	Nyumba Ya Mungu	Rural	-3.83816	37.42877	1000	121	0	0.00
Njombe	Ludewa	Lupingu	Rural	-10.0924	34.5431	800	55	10	18.18
Njombe	Ludewa	Njelela	Rural	-9.76165	34.91721	1400	115	0	0.00
Njombe	Makambako TC	Mshikamano	Urban	-8.83462	34.82556	1800	61	0	0.00
Njombe	Makambako TC	Mbugani	Urban	-8.81886	35.0804	1600	72	0	0.00
Njombe	Makete	Mago	Rural	-9.31261	34.17528	1000	76	0	0.00
Njombe	Makete	Kinyika	Rural	-8.94665	33.89421	2700	106	0	0.00
Njombe	Njombe DC	Iditima	Rural	-9.25794	35.3819	1200	44	1	2.27
Njombe	Njombe DC	Ibumila	Rural	-9.12889	34.86671	1800	77	0	0.00
Njombe	Njombe MC	Yakobi	Urban	-9.42079	34.93795	1400	118	0	0.00
Njombe	Njombe MC	Msindu	Urban	-9.55883	34.97697	1400	55	0	0.00
Njombe	Wanging'ombe	Uhambule	Rural	-8.87388	34.7092	1600	111	0	0.00
Njombe	Wanging'ombe	Ivigo	Rural	-9.24136	34.53874	1600	54	0	0.00
Njombe	Wanging'ombe	Igima	Rural	-9.1958	34.75192	1800	65	0	0.00
Katavi	Mlele DC	Rungwa	Rural	-7.46435	31.39437	1000	104	6	5.77
Katavi	Mlele DC	Inyonga	Rural	-6.70895	32.06129	1400	56	18	32.14
Katavi	Mpanda DC	Vikonge	Rural	-6.08698	30.9342	1400	101	66	65.35
Katavi	Mpanda DC	Katuma	Rural	-6.34441	30.71319	1200	59	27	45.76
Katavi	Mpanda DC	Kapalamsenga	Rural	-6.78901	30.49405	1000	68	16	23.53
Katavi	Mpanda MC	Misunkumilo	Urban	-6.3453	31.04345	1200	71	13	18.31
Katavi	Mpanda MC	Makanyagio	Urban	-6.33818	31.06663	1200	55	5	9.09
Katavi	Nsimbo	Mnyamasi	Rural	-5.94111	31.04846	1400	115	90	78.26
Katavi	Nsimbo	Katisunga	Rural	-6.46111	31.08814	1400	70	38	54.29
Simiyu	Bariadi DC	Mwadobana	Rural	-2.58639	34.09086	1400	114	57	50.00
Simiyu	Bariadi DC	Matongo B	Rural	-2.3169	34.15645	1400	92	33	35.87
Simiyu	Bariadi TC	Gamondo B	Urban	-2.71783	34.10119	1600	48	6	12.50
Simiyu	Bariadi TC	Kidalimanda	Urban	-2.89718	34.01796	1400	59	2	3.39
Simiyu	Busega DC	Gusama	Rural	-2.35455	33.83767	1400	74	21	28.38
Simiyu	Busega DC	Yitwimila	Rural	-2.43951	33.5352	1200	74	20	27.03
Simiyu	Itilima	Lagangabilili	Rural	-2.9915	34.13458	1400	64	2	3.13
Simiyu	Itilima	Idoselo	Rural	-3.0072	33.89135	1400	113	34	30.09
Simiyu	Itilima	Ng'Walali	Rural	-2.75698	34.60255	1800	58	28	48.28
Simiyu	Itilima	Sawida B	Rural	-2.88178	33.675	1400	85	50	58.82
Simiyu	Maswa DC	Igumangobo	Rural	-3.28539	34.03694	1400	96	13	13.54
Simiyu	Maswa DC	Mwanundi	Rural	-3.53234	33.74253	1200	50	34	68.00
Simiyu	Maswa DC	Bukigi	Rural	-3.16141	33.51186	1400	113	62	54.87
Simiyu	Maswa DC	Mwashegeshi	Rural	-3.11033	33.9034	1400	106	53	50.00
Simiyu	Meatu DC	Mwabuma	Rural	-3.00327	34.24016	1400	122	19	15.57
Simiyu	Meatu DC	Mwamagembe	Rural	-3.69975	34.2278	1200	73	6	8.22
Simiyu	Meatu DC	Chambala	Rural	-3.82635	34.43116	1200	88	3	3.41
Geita	Bukombe DC	Kanembwa	Rural	-3.31506	31.49619	1400	95	20	21.05
Geita	Bukombe DC	Msonga	Rural	-3.43287	31.66823	1200	120	58	48.33
Geita	Bukombe DC	Bugando	Rural	-4.06814	31.66597	1200	60	39	65.00
Geita	Chato DC	Nyantimba	Rural	-3.0155	31.52111	1400	145	45	31.03
Geita	Chato DC	Bukamila B	Rural	-2.48641	31.78199	1200	49	13	26.53
Geita	Chato DC	Tumaini	Rural	-3.179	31.86231	1400	69	13	18.84
Geita	Chato DC	Magufuri	Rural	-2.62476	31.73696	1400	137	18	13.14
Geita	Geita DC	Butobela	Rural	-3.20729	32.3848	1400	139	101	72.66
Geita	Geita DC	Lwina	Rural	-3.14986	32.28681	1400	156	87	55.77
Geita	Geita DC	Kasota	Rural	-2.71377	32.16825	1400	155	87	56.13
Geita	Geita DC	Kitigiri	Rural	-2.72025	31.96917	1200	122	103	84.43
Geita	Geita DC	Nungwe	Rural	-2.79121	32.01294	1200	120	87	72.50
Geita	Geita TC	Mwagimagi	Urban	-2.9896	32.32054	1400	108	48	44.44
Geita	Geita TC	Mbabani	Urban	-2.94459	32.18949	1400	108	54	50.00
Geita	Mbogwe DC	Kashelo	Rural	-3.30621	31.9289	1400	89	71	79.78
Geita	Mbogwe DC	Ngemo	Rural	-3.28145	32.21941	1400	82	53	64.63
Geita	Mbogwe DC	Nyasato	Rural	-3.40441	32.20995	1400	72	47	65.28
Geita	Nyang'hwale	Albert Mnali	Rural	-3.29274	32.594	1400	84	63	75.00
Geita	Nyang'hwale	Shibumba	Rural	-2.99229	32.55029	1400	88	65	73.86

Investigators for 2014 – 15 School Malaria Parasitaemia Survey

Principal Investigator

Frank Chacky

Investigating Team

1. Dr. Susan Rumisha
2. Dr. Prosper Chaki
3. Dr. Renata Mandike
4. Dr. Sigsbert Mkude
5. Mr. Charles Dismas
6. Dr. Julius Massaga
7. Dr. Ally Mohamed

Data Collection Team

PHASE I

Dar es Salaam	Kigoma	Lindi
National Supervisor	**National Supervisor**	**National Supervisor**
Fabrizio Molteni	Fidelis Mgohamwende	Frank Chacky
RMFP	**RMFP**	**RMFP**
Ford Chisongella	Paul Muganyizi	Alex Hamis
District Team Lead:	**District Team Lead:**	**District Team Lead:**
James Msami	Christopher Msafiri	Dominick Kitego
Hemed Mfaume	Donasiano Gwambegu	James Kanyansa
Ally Adenani	Jonas Twakaniki	Rehema Mchukwi
	Rose Macha	Athuman Matindo
	Laurent Bwiswamo	Mfaume Hemed
	Abigael Kasumani	
Mtwara	**Ruvuma**	
National Supervisor	**National Supervisor**	
Prosper Chaki	Julius Massaga	
RMFP	**RMFP**	
Mary Mkama	Kibua Kakolwa	
District Team Lead:	**District Team Lead:**	
Leopold Francis	Hussein Mrope	
Rukia Mteremko	Geofrey Mwantwinza	
Mohamed Dadi	Hanifa Ulanga	
Lucy Millanzi	Leah Mhambule	
Mahmoud Kais	Maxensius Mahundi	
Stumai Mdeka	Felix Kinunda	
Lilian Winna[+2]		

[2] Deceased

PHASE II

Arusha	Kilimanjaro	Katavi
National Supervisors	**NationalSupervisor**	**Regional supervisor**
Joyce Assey	Frank Chacky	Pendael Machafuko
Manuela Runge	**RMFP**	**RMFP**
RMFP	Oscar Mafole	Bernard Mbushi
Sixta Komba	**District Team Lead:**	**District Team Lead:**
District Team Lead:	Orest Peter	Bariki Gemba
Happy Saiguran	Happiness Ndanshau	Noah Pius
Sebastian Mziray	Placidia Kamugisha	Grace Kunchela
Wilson Likindelaki	Anna Mboya	Shwaib Ojunju
Gustaph Materu	Issa Mushi	
Winfred Sungura	Raymond Urassa	
Anna Nanyanje	Justo Kwayu	
Sabasi Moshi		
Iringa	**Njombe**	**Mbeya**
National Supervisor	**National Supervisor**	**National Supervisor**
Erasto Kazyoba	Julius Massaga	Nabila Hemed
RMFP	**RMFP**	**RMFP**
Rashid Nguruka	Valeriana Makassy	Salehe Mwango
District Team Lead:	**District Team Lead:**	**District Team Lead:**
Nicholaus Ntabaye	Asteria Mpoto	Julius Kanju
Pius Myonga	Christopher Chogola	Charles Mwesiga
Peter Mwenda	Carlos Nyongole	Maria Luoga
Nimrod Chengula	Christopher Musika	Yona Myani
	Kelvine Mfuse	Melkzedeck Mgonga
	Calist Tossy	Simon Lupondo
		Edward Kambi
		Esther Mukome
		Henry Swalehe
Singida	**Rukwa**	**Dodoma**
National Supervisor	**National Supervisor**	**National Supervisor**
Florence Saka	Fidelis Silvano	Anna David
RMFP	**RMFP**	**RMFP**
Abdallah Balla	Emmanuel Mtika	Francis Bujiku
District Team Lead:	**District Team Lead:**	**District Team Lead:**
Steve Msambu	Ally Bubeba	Yahya Gwilla
Martha Kinyau	Elina Yessaya	Melkzedeck Kongola
Elizabeth Yona	Mcdenis Kisila	Shaban Kayanda
LeonarMazengo	Chrisant Kamando	Restituta Gama
Henry Eliondora		Itika Shimwela
Philipo Kitundu		Peter Mungo
		Charles Magonera[3]

[3]+ Deceased

Tanga	Manyara
National Supervisor	**National Supervisor**
Joseph Lekule	Prosper Chaki
RMFP	**RHMT**
Olga Mushi	Frederick Kasase
District Team Lead:	**District Team Lead:**
Penina Nnkwema	Goodluck Solomon
Maulam Magolima	John Kaaya
Neema Nkini	Francis Umbu
Jumanne Njiku	Samweli Madangi
Ramadhani Hussein	Solomon Kweka
Selemani Mchauru	
Richard Nyiti	
Martin Mndolwa	
Fatuma Ussi	
Selemani Mngoya	

PHASE III

Kagera	Mwanza	Geita
National Supervisor	**National Supervisor**	**National Supervisor**:
Baraka Nyakuya	Esther Green	Caleb Joel
RMFP	**RMFP**	**RMFP**
Julian Mugengi	Saula Beichumila	Veronica Mazigi
District Team Leaders	**District Team Leaders**	**District Team Leaders:**
Deodart Ngaiza	Julieth Mawalla	George Ndukwa
Gasper Rwegasira	Evarist Mganga	Paul Mgassa
Posiani Katabarwa	Dismas Dotto	Alex Mpondaguzi
Ernest Lukumba	Winston Nongwe	Philipo Ngika
Esther Moshi	Abrahman Mgonja	Gabriel Wangese
Madina Kibiriti	Sospeter Ndegi	Sospeter Boyo
Edward Nditije	Joyce Kasimbasi	
Goreth Zilyahuruma		

Shinyanga	Simiyu	Mara
National Supervisor	**National Supervisor**	**National Supervisor**
Immaculata Kessy	Erasto Kazyoba	Issa Garimo
RMFP:	**RMFP**	**RMFP**
Irene Mukerebe	Mugune Maeka	Tukae Lisso
District Team Leaders:	**District Team Leaders:**	**District Team Leaders:**
Upendo Myavidogo	James Mvanga	Melinda Chafora
Obote Catrol	Martha Mbelwa	Mwajuma Omary
Charles Mlonganile	Musa Amosi	Eliezer Thomas
Timothy Sosoma	Joaniter Peter	Ernest Gamba
Kuchibanda S. Kuchibanda	Mashaka Abdul	Venus Onunga
Peter Balole	Pellagia B. Kabuhaya	Fadhili Kanyogoto
		Masatu Mtaki

Tabora

National Supervisor

RMFP

Malela Kamugisha[+4]

District Team Leaders:

Devotha Mselle
Adriano Luhola
Agness Fungama
Thabiti Makonda
Hassan Kapamba
Elizabeth Msabila
Sikujua Kabuye

Morogoro

National Supervisor

Witness Mchampaka

RMFP

Florence Saka

District Team Leaders:

Grace Kanyankole
Wendy Robert
Mary Mawalla
Ernest Rugiga
Evance Mlaponi
Anna Mariki

Pwani

National supervisor

Renata Mandike

RMFP

Mhando Muya

District Team Leaders:

Zena Mtajuka
Chalo Kalunde
Elinasi Nnko
William Mwaga
Rukia Maumba
Ally Shaha
Neema Thomas

[4]Deceased

Data Management Team: Supervisors and Data Entry Clerks

	PHASE I	PHASE II	PHASE III
Supervisor	Frank Chacky Susan Rumisha	Frank Chacky Pendael Machafuko Manuela Runge Susan Rumisha	Frank Chacky Pendael Machafuko Manuela Runge Susan Rumisha
Data entry clerks	Ally Mateka Immaculate Kessy Simon Mushi FortunataChuwa Joyce Assey	Immaculata Kessy Haki Molteni Joyce Assey Brenda Muchunguzi. Rehema Mlay Anna Nyambo Mohamed Athumani Alphonsina Jovin Tayamika Mattao	Immaculata Kessy Haki Molteni Joyce Assey Brenda Muchunguzi Rehema Mlay Anna Nyambo Mohamed Athumani Alphonina Jovin
Data Cleaning	Manuela Runge Susan Rumisha Frank Chacky	Manuela Runge Pendaeli Machafuko Susan Rumisha Frank Chacky	Manuela Runge Pendaeli Machafuko Susan Rumisha Frank Chacky
Data Analysis	Manuela Runge Susan Rumisha Frank Chacky	Manuela Runge Susan Rumisha Pendael Machafuko	Manuela Runge Susan Rumisha Pendael Machafuko

Report Writing

PHASE I	PHASE II	PHASE III	Combined Phases (I – III)
Frank Chacky Pendaeli Machafuko Susan Rumisha Prosper Chaki	Frank Chacky Pendael Machafuko Manuela Runge	Frank Chacky Pendael Machafuko Susan Rumisha	Frank Chacky Manuela Runge Fabrizio Molteni Susan Rumisha Prosper Chaki Erasto Kazyoba Witness Mchwampaka Renata Mandike Ally Mohamed

Data Collection Forms

Table 39: Pupil ID Cards

Name ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/_ _/_ _ _
Name ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/__/_ _ _
Name ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/__/_ _ _
Name ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/__/_ _ _
Name ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/_ _/_ _ _	**Name** ______________________ **ID** _ _/_ _/__/_ _ _

Table 40: Fomu ya utambulisho wa shule (Phase I)

	Mkoa	Halmashauri					
Na	**Jina la shule**	**Kata**	**Kijiji/Mtaa**	**Geo location**		**Nambari ya simu ya Mkuu wa shule (mobile)**	**Jumla ya wanafunzi**
				X	**Y**		

Table 41: mRDT summary reporting form (phase I)

	Mkoa	**Halmashauri**		
Jina la shule	**Kata**	**Kijiji/Mtaa**	**Idadi ya wanafunzi waliopimwa**	**Waliokutwa na vimelea**

MKOA: _____

HALMASHAURI: _____

Table 42: Fomu ya utambulisho wa shule & mRDT summary reporting form

Na	Jina la shule	Kata	Kijiji/Mtaa	Geo location		Nambari ya simu ya Mwalimu Mkuu (mobile)	Jumla ya wanafunzi	Idadi ya wanafunzi waliopimwa malaria	Idadi ya wanafunzi waliokutwa na vimelea	Tarehe ya utafiti
				X	Y					
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										

MKOA: _____

HALMASHAURI: _____

JINA LA SHULE: _____

Tarehe: ____/_____/_____

Table 43: Tool 2_Malaria RDT registers

Na	Pupils' ID	Control	P.f.	Pan	Tafsiri (pos, neg)	Remarks (e.g. invalid, repeated test)	Lot Number	Expiry Date
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								

Questionnaire – PHASE I

Table 44: Tool 4: Hojaji la Mwanafunzi

Utambulisho wa Mhojiwa	
Mkoa: ....., Wilaya.....	**Kata....., Kijiji/mtaa.....**
Msimbo wa Shule: |____|____|____|____|____|____|____|____|____|	**Jina la Shule:**
Namba ya Utambulisho wa Mwanafunzi |____|____|____|____|____|____|____|____|____|	**Tarehe ya Utafiti:**|____|____|/|____|____|/|____|____||____|____|
Jina la Ubini wa mwanafunzi	**Jina la kwanza la mwanafunzi**
Darasa la |____|	**Tarehe ya Kuzaliwa** (99/99/9999 = Haijulikani) |____|____|/|____|____|/|____|____|____|____|
Umri: |____|____| **Miaka**	**Jinsi:** ☐**Mwanamume** ☐**Mwanamke**
Jina la ubini la mzazi/mlezi	**Jina la kwanza la mzazi/mlezi**
Familia	
A1. Watu wangapi wanaoishi nyumbani/Kaya yenu? [___ [___]	
Matumizi ya vyandarua majumbani	
B1. Kuna vyandarua vingapi katika familia yenu? [___ |___]	
B2. Je, kwa kawaida una lala katika chandarua?1 = Ndiyo; 2 = Hapana .....[__]	
B3. Je ulilala kwenye chandarua usiku wa kuamkia leo? 1 = Ndiyo; 2 = Hapan [__]	
B4. Je kwa kawaida mnalala wangapi ndani ya chandarua unachotumia? [_ _]	
B4. Je umeshawahi kupata chandarua hapa shuleni 1 = Ndiyo; 2 = Hapana; 3 = Sijui [__]	
Kukosa Shule Na Kupatwa Na Ugonjwa Siku Za Karibuni	
C1. Katika kipindi cha muhula huu, je umeshawahi kutokuhudhuria shule kwa sababu ya kuumwa? 1 = Ndiyo; 2 = Hapana [__]	
C2. Katika kipindi cha wiki 2 zilizopita, je, umeshawahi kutokuhudhuria shule kwa sababu ya kuumwa? 1 = Ndiyo; 2 = Hapana [__]	
C3. Katika kipindi cha wiki 2, ulishapatwa na homa au mwili kuwa na joto**?** 1 = Ndiyo; 2 = Hapana; [__]	
C4. Je uliambiwa unaumwa malaria? 1 = Ndiyo; 2 = Hapana; 3 = Sijui ,4=haihusiki [__]	
C5. Je ulipelekwa kituo cha afya/hospitali/zahanati 1 = Ndiyo; 2 = Hapana; 3 = Sijui **;**4=haihusiki [__]	
C6. Je ulitibiwa 1 = Ndiyo; 2 = Hapana; 3 = Sijui4=haihusiki [__]	
Hali ya Afya sehemu hii ijazwe na mpimaji	
Amepimwa Malaria kwa kutumia mRDT:	**Matokeo ya kipimo cha mRDT:** Chanya☐Hasi ☐
Hali ya Afya sehemu hii ijazwe na mtoa dawa	
Kama matokeo ya kipimo cha mRDT ni chanya:	**Je amepewa dawa:** Ndiyo☐Hapana ☐
Kama matokeo ya kipimo cha mRDT ni chanya na hajapewa dawa:	**Toa sababu:**
Kipimo cha joto la mwili	**C⁰** |____|____|

FORM/PUPIL ID: _____
JINA LA SHULE: _____
MSIMBO WA SHULE: _____
TAREHE: _____/_____/_____/

Questionnaire – Phase II

Table 45: Tool 3: Hojaji la Mwanafunzi

Utambulisho wa Mhojiwa	
Jina:	**Interviewer:**
Darasa la |_____|	
Umri: |_____|_____| **Miaka**	**Jinsi:** ☐**Mwanamume** ☐**Mwanamke**
Part A: Familia	
A1. Watu wangapi wanaishi nyumbani/katika kaya yenu? [___[___] ☐ Sijui	
A2. Je, kuna watoto wangapi walio na umri wa kwenda shule katika kaya yenu [___[___] ☐ Sijui	
A3. Niambie kiwango cha elimu cha mzazi/mlezi wako ☐ Hajasoma; ☐ Darasa la Saba; ☐Kidato Cha nne ☐Diploma ☐Digrii au Zaidi ☐Sijui	
A4. Kazi ya mzazi au mlezi	
Part B: Matumizi ya vyandarua majumbani	
B1. Je, kuna vyandarua vingapi katika familia yenu? [___|___] ☐Sijui	
B2. Je, kwa kawaida una lala ndani ya chandarua? **[Ikiwa hapana, nenda swali namba B5]** ☐ Ndiyo; ☐ Hapana; ☐Sijui.....	
B3. Je, ulilala ndani ya chandarua usiku wa kuamkia leo? ☐Ndiyo; ☐ Hapana; ☐Sijui	
B4. Je, kwa kawaida ni watoto wangapi wa rika lako wanalala ndani ya chandarua unachotumia [____] ☐Sijui ☐Haihusiki	
B5. Je umeshawahi kupata chandarua hapa shuleni ☐ Ndiyo; ☐ Hapana; ☐Sijui	
Part C: Kukosa Shule Na Kupatwa Na Ugonjwa Siku Za Karibuni	
C1. Je, katika kipindi cha wiki 2 zilizopita umeshawahi kutokuhudhuria shule kwa sababu ya kuumwa? ☐ Ndiyo; ☐ Hapana; ☐Sijui	
C2. Katika kipindi cha wiki 2 zilizopita, ulishapatwa na homa au mwili kuwa wa moto**?** ☐ Ndiyo; ☐ Hapana; ☐Sijui **[Ikiwa hapana, nenda swali namba D1]**	
C3. Je uliambiwa unaumwa malaria? ☐Ndiyo; ☐ Hapana; ☐Sijui ☐Haihusiki	
C4. Je ulipelekwa kwenye kituo cha kutolea tiba? (zahanati/kituo cha afya/hospitali) ☐ Ndiyo; ☐ Hapana; ☐Sijui ☐Haihusiki	
C5. Je ulipata matibabu ☐ Ndiyo; ☐ Hapana; ☐Sijui ☐Haihusiki	
Part D: Hali ya Afya sehemu hii ijazwe na mpimaji	
D1. Matokeo ya kipimo cha mRDT: Chanya ☐ Hasi ☐	
Part E: Hali ya Afya sehemu hii ijazwe na mtoa dawa	
D2. Kipimo cha joto la mwili C^{o}|____|____|	
D3. Kama matokeo ya kipimo cha mRDT ni chanya; Je amepewa dawa? ☐Ndiyo; ☐ Hapana; ☐Sijui: ☐Haihusiki	
D4. Kama matokeo ya kipimo cha mRDT ni chanya na hajapewa dawa; Toa sababu: ☐Haihusiki	

FORM/CHILD ID: _____

JINA LA SHULE: _____

MSIMBO WA SHULE: _____

Questionnaire – PHASE III

Table 46: Tool 3: Hojaji la Mwanafunzi

Jina la mhojaji:	
Utambulisho wa Mhojiwa	
Jina la Mwanafunzi:	**Darasa la** |_____|
Umri: |_____|_____| **Miaka**	**Jinsi ya mwanafunzi** ☐**ME** ☐**KE**
Part A: Familia	
A1. Watu wangapi wanaishi nyumbani/Kaya yenu? [___ [___] kama hajui weka 0	
A2. Je, kuna watoto wengine wangapi walio na umri wa kwenda shule katika kaya yenu? [___ [___] ☐ hajui ☐ hakuna	
A3. Taja kiwango cha elimu cha mkuu wa kaya yako ☐ hajasoma ☐ darasa la saba ☐ sekondari ☐diploma ☐ elimu ya juu ☐ sijui	
Part B: Matumizi ya vyandarua na dawa ya ukoko majumbani	
B1. Je, unafahamu chandarua/net ni kitu gani? Aeleze anavyofahamu ☐ Ndiyo; ☐ Hapana; **Kama hapana, nenda swali la B6**	
B2. Kuna vyandarua/net ngapi katika kaya/familia yenu? [___|___] ☐Sijui	
B3. Je, kwa kawaida una lala katika chandarua/net?☐Ndiyo; ☐ Hapana **Kama hapana, nenda swali la B6**	
B4. Je, ulilala kwenye chandarua/net usiku wa kuamkia leo? ☐ Ndiyo; ☐ Hapana	
B5. Je, kwa kawaida mnalala wangapi ndani ya chandarua/net moja ? [_ _]	
B6. Je, katika miezi 12 iliyopita nyumba yenu imewahi kunyunyiziwa dawa ya ukoko? ☐ Ndiyo; ☐ Hapana; ☐Sijui	
Part C: Kukosa Shule Na Kupatwa Na Ugonjwa Siku Za Karibuni	
C1. Katika kipindi cha wiki 2 zilizopita, je, umeshawahi kutokuhudhuria shule kwa sababu ya kuumwa? ☐ Ndiyo; ☐ Hapana;	
C2. Katika kipindi cha wiki 2 zilizopita, ulishapatwa na homa au mwili kuwa na joto kali**?** ☐ Ndiyo; ☐ Hapana; **Kama hapana, nenda swali la D1**	
C3. Je, ulipelekwa kituo cha afya/hospitali/zahanati kwa matibabu? ☐Ndiyo; ☐ Hapana; **Kama hapana, nenda swali la D1**	
C4. Je, uliambiwa unaumwa malaria? ☐Ndiyo; ☐ Hapana;	
C6. Je, ulitibiwa ☐ Ndiyo; ☐ Hapana;	

Part D: Hali ya Afya sehemu hii ijazwe na mpimaji	
D1. Matokeo ya kipimo cha mRDT; Chanya ☐ Hasi ☐	D2. Kipimo cha joto la mwili C^{o} |____|____|
Part E: Hali ya Afya sehemu hii ijazwe na mtoa dawa	
D3. Kama matokeo ya kipimo ni chanya. Je, alipewa dawa? ☐ Ndiyo ☐ Hapana kama hapana toa sababu	

Malaria RDT Quality Assurance

Checked by: _____ Date_____School identifier: _____

1. Per each school:
    a. select randomly 20% of the mRDT cassette and check with the result filled into tool2

Table 47: Quality Assurance for mRDT test results form

No.	Absolute frequency of			Remarks
	rechecked mRDTS	Con-cordance	Discon-cordance	

Data Completeness Checklist

REGION: _____SUPERVISOR: _____ DATE: ___/___/____

Complete = ✓ Not complete = X, specify in remarks

Tool 1: same number of questionnaires as selected pupils

Tool 2: one form per school, with the same number of selected pupils tested

Tool 3: one form per council, check if the school is listed in that form

Table 48: Checklist for the completeness of collected data

No	School identifier	No. of selected pupils	Tool1	Tool2	Tool3	Remarks (What is missing? what is the problem?)