Grant agreement no. 243964

QWeCI

Quantifying Weather and Climate Impacts on Health in Developing Countries

M5.2.b: Malaria seasonal forecast

Start date of project: 1st February 2010 Duration: 42 months

Lead contractor :	KNUST
Coordinator of deliverable :	KNUST
Evolution of deliverable	
Due date :	M30
Date of first draft :	15 September 2012
Start of review :	20 September 2012
Deliverable accepted :	21 September 2012

Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013)		
Dissemination Level		
PU	Public	PU
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

The report on M5.2a is made up of two parts:

a. Report on confirmed malaria cases (data) between January – December, 2010 at some of the hospitals of the study sites, and
b. Report on entomological survey

a. Report on confirmed malaria cases (data) between January and December, 2010 at some of the hospitals of the study sites

The following activities have been carried out:

1. Establishment of the QWeCI weather stations

For the purpose of getting a good monitoring network for recording the meteorological variables, some solar-powered automatic weather stations have been installed at the existing GMet weather stations and one at Emena hospital. The equipment was supplied by the University of Cologne to support the QWeCI project and the Meteorology and Climate Science programme at KNUST. The QWeCI weather stations are located at Emena Hospital, Kumasi Airport, Owabi and KNUST (Agromet Station).

2. Morbidity surveillance: the following activities have been carried out:

- Determination of plasmodium species using RDTs
- Collection of laboratory confirmed malaria data from the hospitals (six sites : Jan – Dec, 2010); 2 peri-urban hospitals, 2 rural hospitals and 2 urban hospitals
- Identification of home districts of the patients

3. Record of GPS coordinates: the GPS coordinates of the following have been recorded:

- Study sites (health facilities and weather stations)
- Home district of the patients (but not their identifiable home address)

4. Meteorological data collection: data on the following parameters have been collected during the study period:

- Surface Temperatures at 2 and 4 m
- Rainfall
- Relative Humidity at 2 and 4 m
- Sunshine hours
- Evaporation
- Wind speed
- Soil matrix potential
- Soil heat flux
- Incoming and outgoing shortwave and long-wave radiation
- Surface pressure

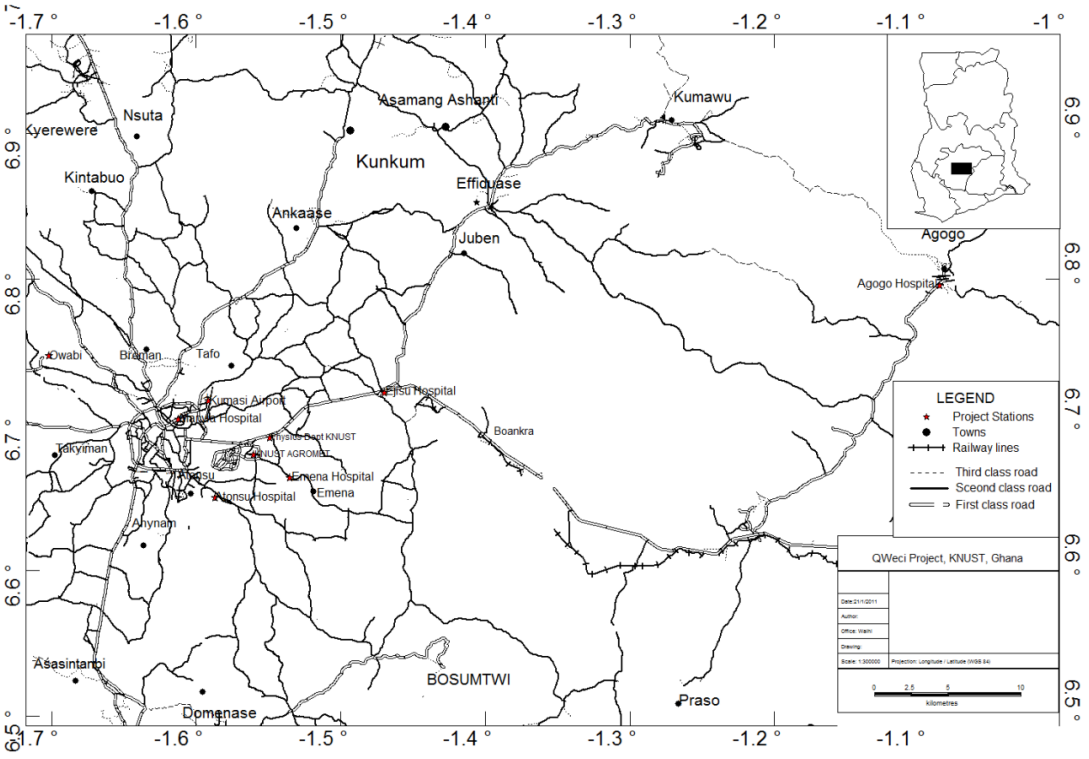

Figure 1: Map of Ashanti region, shown in the map QWeCI project sites

The map shown in Figure 1 was created using GPS way points taken during visit to some project hospitals as well as meteorological field sites. The meteorological parameter measured at the field site differs from one site to the other. For example the weather stations at KNUST Agromet, Emena, Airport, and Owabi where routine climate parameters listed above are measurements are shown.

5. Graphical plots, statistical analysis and interpretation of meteorological variables and malaria cases

Graphical plots of the meteorological variables and malaria cases data have been carried out for the period January to December, 2010. Statistical analysis of the meteorological variables and malaria data have also been carried out for the same period to find out the impact of the variability of the climate variables on malaria prevalence and incidence.

6. First preliminary results of rainfall comparisons with malaria prevalence

Data analysis has been carried out for the malaria cases reported at the QWeCI project hospitals for the period January to December 2010. Comparison of all the malaria cases recorded at the hospitals is shown in Fig.1. The results of the correlation of rainfall with the malaria cases are shown in Figs. 2, 3, 4, and 5. The result show increasing malaria cases with rainfall for Nkawie a rural community.

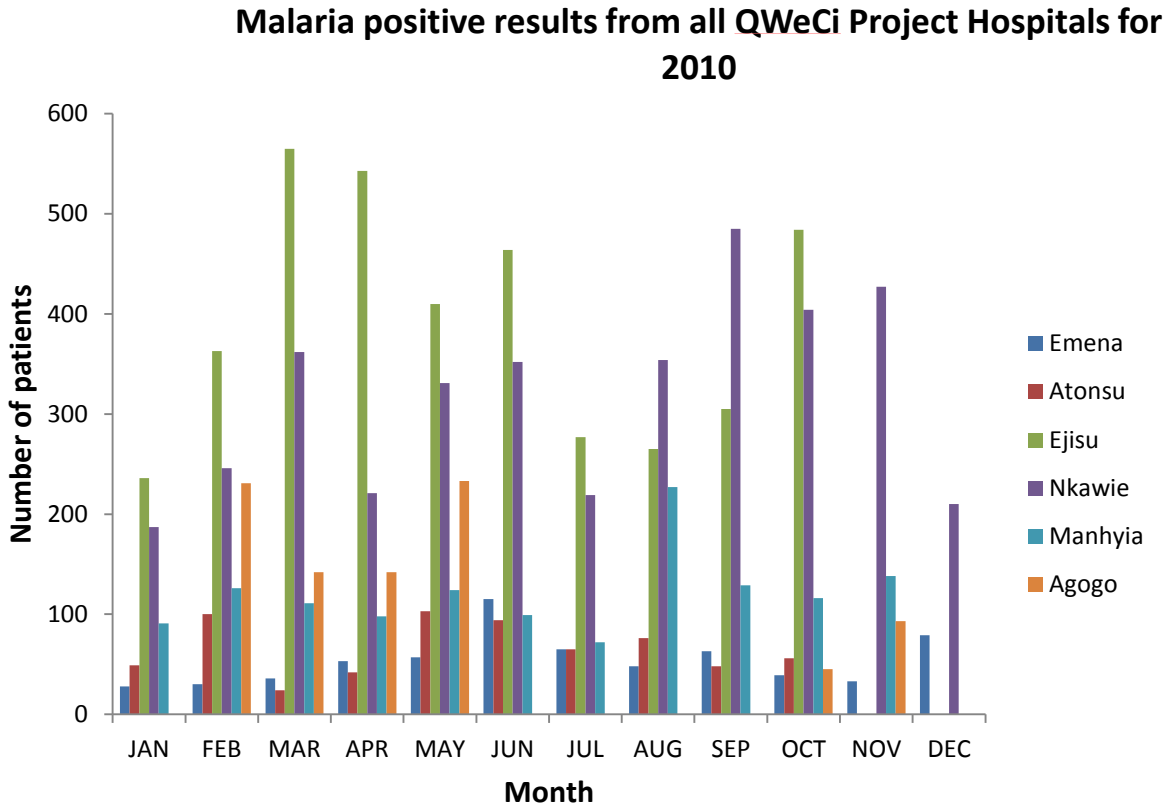

Fig.1: Summary of positive tested malaria cases from all the QWeCI project hospitals.

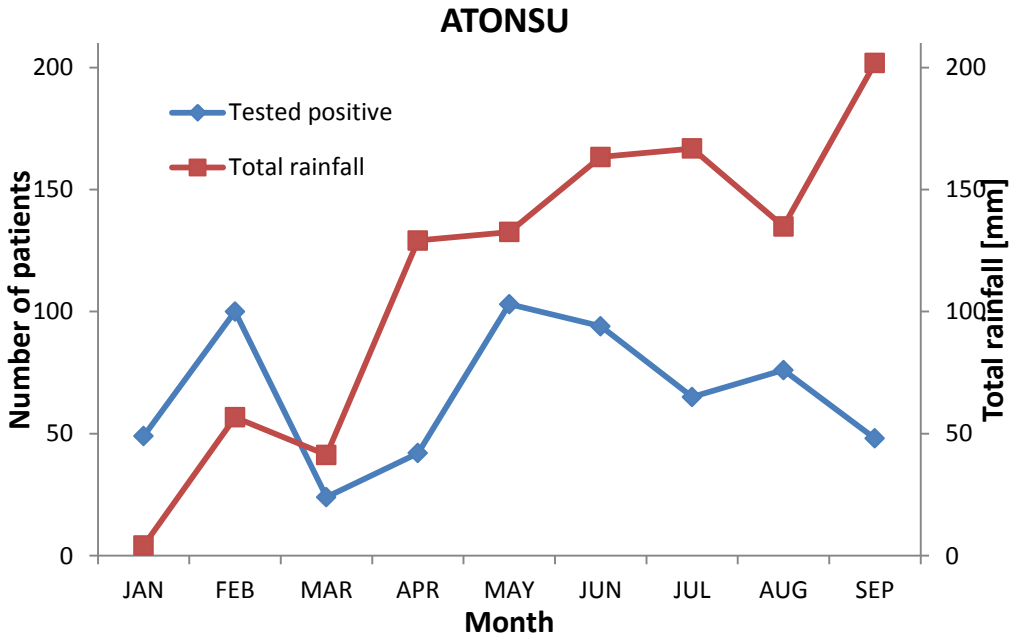

Fig.2: Comparison of malaria cases with rainfall in the year 2010 for Atonsu hospital

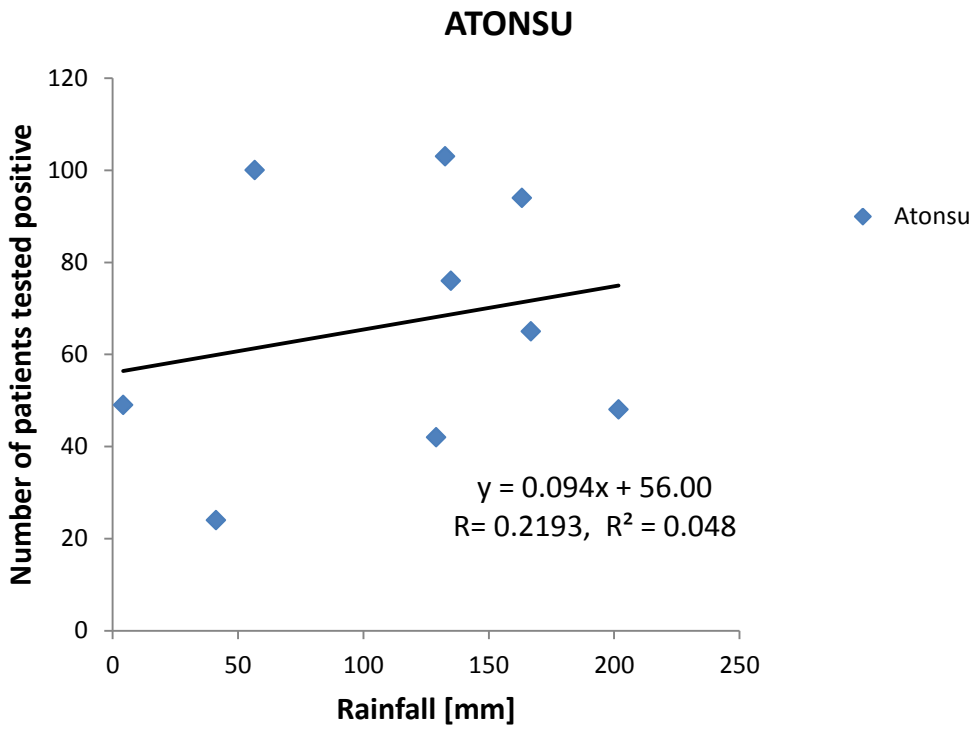

Fig. 3: Regression analysis of malaria cases with rainfall in the year 2010 for Atonsu hospital

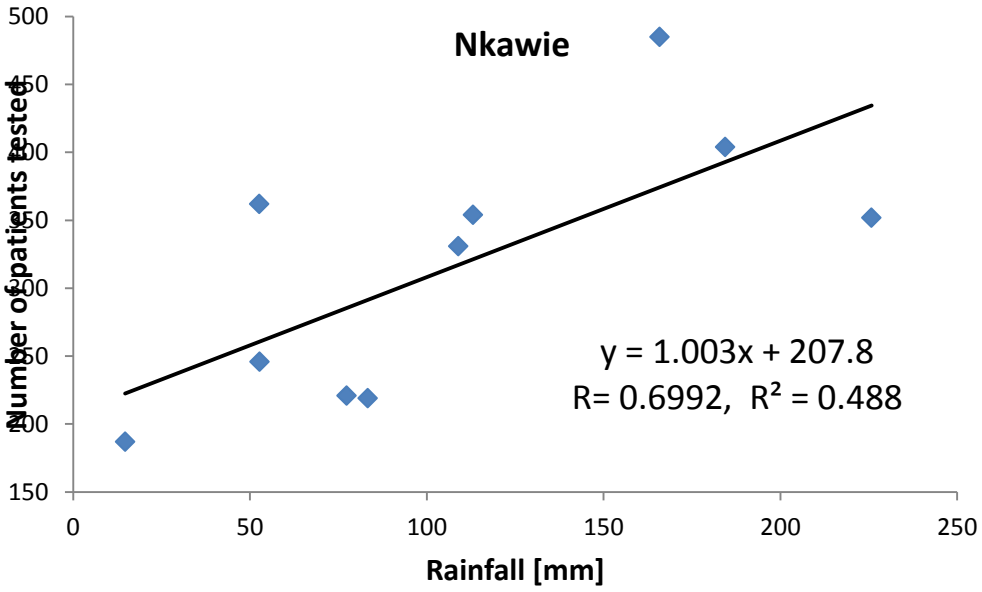

Fig.4: Regression analysis of malaria cases with rainfall in the year 2010 for Nkawie hospital

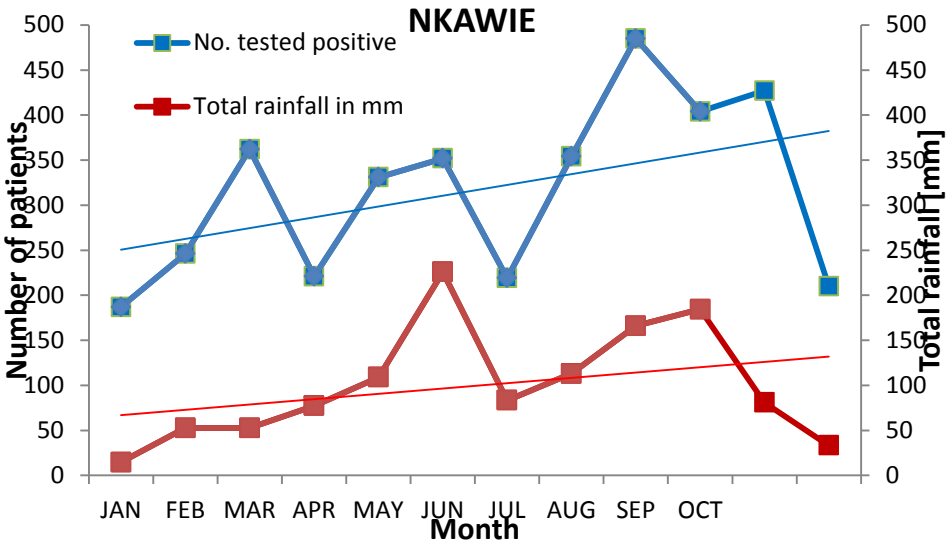

Fig.5: Comparison of malaria cases with rainfall in the year 2010 for Nkawie hospital

b. Report on entomological survey

The objectives of the entomological survey are to determine the effects of climate variables on:

- Circumsporozoites Protein Rate
- Human Blood Index
- Species of mosquito vectors

The study is being carried out in rural, peri-urban and urban areas in Ashanti Region, Ghana. The activities involve:

- using the **pyrethrum spray catch** (PSC) method to collect mosquitoes indoors.
- Morphological identification
- Microscopy
- Host blood meal identification

(precipitin ring test using the human anti-sera)

- ELISA (sporozoite detection & rate)
- PCR (*A. gambiae* s.s. molecular forms ss.1)

The following have been carried out:

- Training for MPhil students and mosquito collectors
- Search for open water bodies in the communities
- Taking temperature of the water bodies and noting other ecological factors
- Searching for breeding sites for the presence of larvae and taking larval dips
- Identification and systematically selecting houses to be sprayed
- Seeking informed consent from household heads
- Administer questionnaires to household heads
- Spray catch procedures, collection and storage of adult mosquitoes
- Enumeration of inhabitants of Pyrethrum spray Catch houses (PSC)
- Taking GPS coordinates of PSC houses and larvae habitats

Summary

Meteorological parameters for climate impact of health studies are available from 1960 to date for Ashanti region of Ghana. Map for study sites have been developed. Rainfall, humidity, temperature data are available for malaria prevalence monitoring over the study region. Data analysis and statistical studies are in progress. Malaria data from all the project hospitals has been collected and recorded for 2010.