

## A-24: Macroepidemiology of malaria at a Grama Niladari level

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Malaria is endemic in 2/3 of Sri Lanka mainly in the Dry Zone where the major livelihood of residents is agriculture. Environmental factors such as land use pattern and rainfall are thought to influence malaria transmission by influencing the habitats of the vector mosquito in endemic regions. This is an attempt to find out the influence of land use pattern on malaria transmission by analysing routinely collected data available at a district level using GIS and statistical methods.

The Moneragala DS Division in the Moneragala District situated in the south east region of Sri Lanka was chosen for this study. The malaria incidence rate for the year 1992 in the DS Division was 124 cases per 1000 population per year and is the largest cause of morbidity in the area. Data on the population, land use patterns, rainfall and malaria incidence for the year 1992 were obtained from the different government departments. The Moneragala DS Division has 26 Grama Niladari (GN) areas each with an approximate average population of about 1500.

Maps with detailed information for the year 1992 were digitized using the ARC/INFO GIS package. The extent of land under cultivation by different crops in GN areas of the Moneragala Division was obtained using ARC/INFO.

Malaria data obtained from the Anti Malaria Campaign was adjusted manually to obtain the incidence of malaria in each GN area.

Data were analysed using a GN area as the unit of analysis. Malaria incidence was correlated with several land use pattern variables.

There was a significant correlation between malaria incidence and area of land under rain fed paddy cultivation ( $r=-0.51185, p=0.0427$ ) and dense forest ( $r=0.69986, p=0.0012$ ).

The positive correlation between the land area under dense forest and malaria incidence probably suggests that dense forest is a mosquito friendly environment.

The correlation between malaria incidence and the area of land occupied by homesteads was of borderline significance ( $r=0.43998$ ,  $p=0.0677$ ). This negative correlation suggests that with urbanization malaria risk is reduced.

There was no correlation between malaria incidence and areas occupied by static water bodies ( $r=-0.18708$ ,  $p=0.4573$ ), under chena cultivation ( $r=-0.09948$ ,  $p=0.6945$ ), under irrigated paddy ( $r=-0.23037$ ,  $p=.0.3577$ ), under sugarcane cultivation ( $r=-0.09935$ ,  $p=.0.6949$ ), having open forests ( $r=-0.194190$ ,  $p=0.4383$ ), having scrub forests ( $r=-0.01174$ ,  $p=.0.9631$ ), and grassland areas ( $r=-0.23373$ ,  $p=0.3506$ ).

This exercise indicates the feasibility of using information collected routinely at a Provincial/District/Divisional Secretariat level, for analyses of malaria risk in relation to other developmental aspects. It also emphasises the need for standardized methods of data collection at the regional level in all sectors including health, especially malaria, in order to use these data for planning purposes, which upto now have not been achieved. This exercise should be used to formulate a uniform, and more effective and reliable data collection strategy in all related sectors, islandwide, based on a convenient geographic denominator.

Several risk factors were identified at the GN level for malaria. These include areas having homesteads, dense forests and rain-fed paddy. These results are subject to the accuracy of the routine malaria data which was used in this analysis.