

# **Planning malaria control interventions in an endemic area of Sri Lanka using GIS.**

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## **Abstract**

Geographic Information Systems (GIS) could be a useful tool for decision making on malaria control, as they can help to analyze information on risk areas, risk populations and risk factors for the disease. Also, GIS could be effectively used in planning routine control activities and in predicting malaria epidemics. In this paper we describe GIS-aided risk mapping for malaria in a highly endemic area in Sri Lanka and the use of GIS-generated information for risk factor identification and planning purposes for malaria control interventions.

In Sri Lanka, an effective surveillance system for malaria is available, which provides incidence case data at Grama Niladhari (GN) level, which is the smallest geographical unit of administration. We used maps of malaria incidence and species composition of the Monaragala District, one of the most malarious districts in the country, to identify the population at risk in different malaria risk strata. We used environmental and geographic parameters such as climatic factors, land use patterns and demographic features, to identify risk factors, and we identified the most suitable disease control intervention (such as residual insecticide spraying, chemical larviciding and impregnated bed nets) for each GN. In addition, the areas most in need of mobile malaria case detection and treatment clinics at community level were identified. According to our findings, 63,200 houses in the malaria risk area need residual insecticide spraying to protect 72% of the population at risk. Twelve areas need larviciding to protect 8% of the population. 15,800 houses in the risk areas need to be provided with impregnated bed nets to protect 20% of the population. Sixteen mobile malaria clinics are recommended for case detection and treatment in remote areas of the district.

This study revealed that GIS-based risk mapping is a powerful tool in the decision making process in malaria control. The findings of this study will be useful to disease control managers to streamline the planning process of malaria control through selecting and targeting appropriate interventions, and to take immediate action to mobilize limited human and material resources in the most appropriate manner to combat the disease.