

Hingga saat ini, beberapa daerah di Kulon Progo, Provinsi Daerah Istimewa Yogyakarta, masih dikategorikan sebagai daerah dengan insidensi kasus malaria tinggi (*HCI-High Case Incidence*). Teknologi Penginderaan jauh (PJ) dan sistem informasi geografis (SIG) diharapkan dapat digunakan sebagai pilihan untuk pemantauan dan pengendalian malaria.

Tujuan penelitian ini adalah (1) mengkaji manfaat data PJ untuk menyadap informasi karakteristik fisik lahan untuk zonasi wilayah endemik malaria, dan (2) menentukan zona prioritas penanganan malaria berdasarkan zona wilayah endemik malaria.

Penelitian ini tidak melibatkan faktor-faktor sosial ekonomi. Data utama berupa citra Landsat TM (*Thematic Mapper*) perekaman Juni 1996. Citra ini digunakan untuk menyadap informasi bentuklahan dan penggunaan lahan dengan bantuan foto udara pankromatik hitam putih skala 1:20.000, peta topografi, dan peta geologi. Citra landsat TM juga digunakan untuk membuat peta kerapatan vegetasi melalui transformasi NDVI (*Normalized Difference Vegetation Index*). Peta kerapatan alur, tekstur tanah, kedalaman muka air tanah, dan kualitas air berupa daya hantar listrik (DHL) diperoleh melalui deduksi bentuklahan, cek lapangan, dan pengukuran langsung di lapangan. Peta curah hujan, temperatur udara, dan kelembaban udara diperoleh melalui interpolasi data klimatik sekunder. Lokasi-lokasi sampel dipilih berdasarkan metode *stratified random sampling*.

Tiap zona wilayah endemik malaria diperoleh dengan cara menumpangsusunkan sembilan parameter. Setiap kelas parameter dikalikan dengan faktor penimbang. Total jumlahnya diklasifikasikan dalam 3 kelas, yaitu wilayah endemik malaria tinggi, sedang, dan rendah. Urutan prioritas penanganan ditentukan berdasarkan pada zonasi tersebut. Untuk mengetahui hubungan antara parameter-parameter yang digunakan dengan data penderita malaria, peta zonasi tersebut dibandingkan dengan peta sebaran API (*Annual Parasite Incidence*) rata-rata 1997-2001 tiap desa dilakukan analisis statistik berupa analisis regresi logistik multinominal dan tabel silang.

Hasil penelitian menunjukkan bahwa ketelitian interpretasi Landsat TM sebesar 87,23% untuk bentuklahan, 85,11% untuk penggunaan lahan, dan  $r^2 = 0,8737$  untuk kerapatan vegetasi. Range  $r^2$  adalah 0 hingga 1, dimana nilai kecil mengindikasikan kecocokan model rendah. Berdasarkan analisis statistik diketahui bahwa sembilan parameter yang digunakan adalah signifikan ( $p < 0,05$ ;  $r^2 = 0,665$ ). Urutan besar pengaruh sembilan parameter dari tingkat tertinggi ke rendah dalam kaitannya dengan status API adalah kerapatan alur, kelembaban, kedalaman muka air tanah, tekstur tanah, temperatur udara, curah hujan, penggunaan lahan, DHL, dan kerapatan vegetasi. Peta zonasi wilayah endemik malaria menunjukkan bahwa wilayah endemik malaria tinggi (prioritas penanganan I) seluas 9.987,66 hektar atau 46,39%, endemik malaria sedang (prioritas penanganan II) seluas 10.548,69 hektar atau 49%, dan 3,76% atau 808,61 hektar merupakan wilayah endemik malaria rendah (prioritas penanganan III).

Penanganan malaria direkomendasikan berdasarkan pada zona wilayah endemik malaria tinggi, status API, dan penggunaan lahan yang ada. Penanganan malaria harus dilakukan secara terintegrasi oleh pihak terkait dan peran aktif masyarakat.

## ABSTRACT

Up to now, some areas in Kulon Progo, Daerah Istimewa Yogyakarta Province, still are in the high malaria incidence (HCI-High Case Incidence) category. Remote sensing (RS) and geographic information system (GIS) technology could be as a choice for monitoring and controlling malaria transmission.

The aims of this research are (1) to examine the capability of remote sensing data for interpretation physical characteristics of land for zoning area of malaria endemicity, and (2) to determine zones of priority for malaria control according to the zone areas of malaria endemic.

This research did not include social economic factors. Primary data was Landsat TM (Thematic Mapper) digital images, taken in June 1996. It was used for interpretation of landform and landuse, supported with black and white panchromatic aerial photographs on the scale of 1:20,000, as well as topography map, and geology map. Landsat TM was also used to make vegetation density by transformation of NDVI (Normalized Difference Vegetation Index). Maps of drainage density, soil texture, water table, and water quality in the form of electric conductivity (EC), were obtained from deduction of landuse, ground check, and measurement in fieldworks. Maps of rainfall, air temperature, and relative humidity were obtained by interpolation of secondary climatic data. The locations of sample were chosen by using stratified random sampling method.

Each zone of malaria endemic area was made by overlaying nine of parameters. Each level of parameter was multiplied with weighting factor, then the total was classified into 3 classes, those were high, medium, and low area of malaria endemicity. The sequence of controlling priority was determined according to this map. To know about correlation between the parameters which were used with malaria sufferers, this map was compared with map of distribution of API (Annual Parasite Incidence) 1997-2001 in each village. Statistical analysis method by multinominal logistic regression and crosstabs were done.

The research results show that the interpretation accuracy of Landsat TM are 87.23% for landform, 85.11% for landuse, and  $r^2 = 0.8737$  for vegetation density,  $r^2$  value ranging from 0 to 1. Small values indicate that the model does not fit well. According to statistical analysis that all of the nine parameters are significant ( $p < 0.05$ ;  $r^2 = 0.665$ ). The sequence of nine parameters influencing API status from the highest to low level is drainage density, relative humidity, water table, air temperature, rainfall, landuse, EC, and vegetation density. Zone of malaria endemicity shows that area of high malaria endemicity (the first controlling priority) is 9,987.66 hectare or 46.39%, medium malaria endemicity (the second controlling priority) is 10,548.69 hectare or 49%, and 3.76% or 808.61 hectare is low malaria endemicity (the third controlling priority).

Malaria control is recommended on zone of high malaria endemicity, based also on API status and existing landuse. Malaria control must be done by integration of all the interrelated elements and active role of the community.