INTISARI

Dataran Aluvial Limboto-Gorontalo merupakan bagian dari wilayah Cekungan Airtanah Gorontalo di Kabupaten Gorontalo dan merupakan wilayah pusat pertumbuhan penduduk, perekonomian dan pembangunan. Dataran aluvial Limboto-Gorontalo merupakan daerah yang dilalui oleh jalur sesar utama Gorontalo dan keterdapatan danau Limboto di dalamnya. Fenomena tersebut mengindikasikan proses geologis yang rumit dan unik, dan secara tidak langsung berpengaruh terhadap kondisi akuifer dan potensi airtanah wilayah setempat Penelitian ini bertujuan untuk mengkaji kondisi akuifer, potensi airtanah bebas, dan zonasi tata guna airtanah beserta rekomendasinya.

Metode penelitian yang digunakan adalah metode survey yaitu dengan melakukan pengamatan dan pengukuran langsung dilapangan. Teknik pengambilan sampel yang digunakan adalah sampel acak sistimatik *(systimatic random sampling*) untuk pengukuran geolistrik dan pengukuran data hidrogeologi lapangan. Analisis data dilakukan dengan menggunakan pendekatan terintegrasi antara geologi, geomorfologi berbasis PJ dan SIG, serta pendekatan geofisika dan hidrogeologi lapangan.

Hasil penelitian menunjukkan bahwa: 1) Secara hidrogeologi, lokasi penelitian merupakan wilayah pelepasan *(discharge area)* sistem CAT Gorontalo, tipologi sistem akuifer dataran alluvial, dengan jenis akuifer terdiri atas lapisan akuifer tidak tertekan, semi tertekan dan tertekan. Karakteristik litologi bawah permukaan lokasi penelitian umumnya menunjukkan silang siur antara material lempung *(aquiklud),* lempung pasiran dan pasir lempungan *(aquitard),* pasir dan krikil *(aquifer).* Jenis litologi penyusun akuifer tidak tertekan terdiri pasir dengan nilai resistivitas 20-150 ohm-meter. Ketebalan akuifer tidak tertekan khususnya di wilayah bagian Barat Danau Limboto teridentifikasi memiliki ketebalan akuifer yang relatif seragam dengan ketebalan rata-rata 5 meter, sedangkan di wilayah bagian Utara dan Selatan cukup bervariasi yaitu dari ketebalan 1,5 meter hingga ketebalan 27,5 meter, 2). Zona potensi airtanah bebas terdiri atas 4 (empat) kategori yaitu zona potensi tinggi dan sangat tinggi, zona potensi sedang, dan zona potensi rendah tersebar di wilayah bagian Utara dan Selatan lokasi penelitian, 3). Zona penurapan airtanah bebas terdiri atas 4 (empat) zona penurapan yaitu zona penurapan I (kelas tinggi) dengan karakteristik potensi airtanah baik dari segi kuantitas dan kualitas, dapat diturap dan dimanfaatkan tanpa faktor pembatas, zona penurapan II (kelas sedang) memiliki potensi airtanah yang cukup baik dari segi kuantitas dan potensi kualitas yang terbatas secara lokal, dapat diturap dan dimanfaatkan dengan pengawasan, dan zona penurapan III (kelas rendah) merupakan zone dengan kuantitas airtanah rendah, dapat diturap dengan sangat terbatas.

ABSTRACT

The Limboto-Gorontalo Alluvial Plain is part of the Gorontalo Groundwater Basin in Gorontalo Regency and is now a center of population growth, economy, and development. The geological formation and physical characteristics of the area affect the properties of the aquifer system and local groundwater potential. Limboto-Gorontalo Alluvial Plain is an area traversed by the main Gorontalo fault line, and it is also where Lake Limboto is located. These phenomena indicate a complex and unique geological process and implications for the regional aquifer condition and groundwater potential of the local area. Integrating approaches of remote sensing (RS), geographic information systems (GIS), vertical electrical sounding (VES) and multi influencing factor (MIF) methods will facilitate a conceptual and spatial understanding of the aquifer system and its potential.

This study aimed to examine the aquifer condition, zone of shallow groundwater potential, and groundwater use zonation and to prepare relevant recommendations. It employed several methods, namely 1) an approach that integrates hydrogeological, geophysical, geological, and geomorphological aspects based on RS and GIS for aquifer condition analysis 2) an approach that combined RS, GIS, and MIF to determine the spatial distribution of groundwater potentials, 3) an approach that combined of groundwater potential zonation, groundwater utilization and demand factors in determining groundwater use zonation and directives.

The results showed that (1) Hydrogeologically, the research location was the discharge area of the Gorontalo groundwater basin system, the aquifer system had the typology of that of an alluvial plain. This aquifer types consisted of unconfined, semi-confined, and confined aquifers. Generally, characteristics of the subsurface lithology showed a cross between material clay (aquiclud), sandy loam (aquitard), sand and gravel (aquifer). Lithology type of unconfined aquifer consists of sand material with resistivity value of 20-150 ohm-meter. The thickness of the unconfined aquifer especially in the Western region of Lake Limboto showed relatively uniform with an average of 5 meters. Whereas, aquifer thickness in Noterhern and Southern region it varies from 1,5 to 27,5 meters. (2) The groundwater potential was differentiated into low, medium, high, and very high. High to very high groundwater potentials zone were scattered around Lake Limboto, medium potential zone distributed in the Western area of the Limboto lake, and low potential zone distributed in the Northern and Southern regions of the study site. (4) The study site consists of three zones of groundwater withdrawal. Zone I (high class) was characterized by good groundwater potential in terms of quantity and quality that had no particular limiting factors, it is recommended for domestic utilization and other purposes. Zone II (medium class) was characterized by good groundwater potential in terms of quantity and quality that had local limiting factors, it is recommended domestic utilization and other purposes with supervision. Meanwhile, zone III (low class) had low groundwater quantity, creating a limiting factor that allows extraction for domestic.