

ABSTRAK

ANALISIS KUALITAS AIRTANAH DANGKAL DAN HUBUNGANNYA DENGAN KEPADATAN PERMUKIMAN DAERAH SIDOAGUNG DAN SEKITARNYA, KECAMATAN GODEAN, KABUPATEN SLEMAN, DAERAH ISTIMEWA YOGYAKARTA

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Permukiman merupakan bagian dari lingkungan hidup yang perkembangannya dipengaruhi oleh pertambahan jumlah penduduk. Peningkatan kepadatan permukiman berpotensi memengaruhi kualitas airtanah dangkal akibat limbah domestik yang dihasilkan. Kecamatan Godean, Kabupaten Sleman, merupakan salah satu wilayah dengan perkembangan permukiman yang cukup pesat sehingga dapat memberikan kontaminasi nitrat yang cukup besar terhadap kualitas airtanah. Berdasarkan hal tersebut, penelitian ini bertujuan untuk menganalisis kualitas airtanah dangkal serta hubungannya dengan kepadatan permukiman di Kecamatan Godean. Metode penelitian meliputi pengambilan data sekunder berupa kepadatan permukiman, geomorfologi, dan geologi regional, serta data primer berupa pengukuran geolistrik resistivitas metode *Vertical Electrical Sounding* (VES) konfigurasi Schlumberger, pengamatan hidrogeologi. Analisis yang dilakukan berupa analisis kandungan Amonia, Nitrit, dan Nitrat. Analisis tipe airtanah menggunakan diagram stiff, diagram piper, diagram durov dan diagram gibbs. Analisis sifat fisik airtanah berupa pH, DHL dan TDS. Hasil penelitian menunjukkan bahwa daerah penelitian tersusun atas Satuan Intrusi Andesit dan Satuan Endapan Merapi Muda dengan bentuk lahan berupa bukit terisolasi serta dataran aluvial. Daerah penelitian termasuk dalam CAT Yogyakarta–Sleman yang dibentuk oleh Sistem Akuifer Merapi dengan lapisan akuifer berupa material pasir dan termasuk akuifer bebas. Tipe airtanah termasuk kedalam fasies $\text{Ca}(\text{Mg})\text{HCO}_3$ yang dipengaruhi oleh interaksi antara air dan batuan serta pertukaran ion. Secara umum kualitas fisik airtanah dipengaruhi oleh litologi didaerah penelitian. Konsentrasi lokasi penelitian tidak memenuhi standar baku mutu yang telah ditentukan. Tingginya konsentrasi nitrat ini diduga dipengaruhi oleh aktivitas permukiman.

Kata kunci: airtanah dangkal, geolistrik, kualitas airtanah, kepadatan permukiman, kontaminasi nitrat, fasies airtanah, kecamatan godean

ABSTRACT

ANALYSIS OF SHALLOW GROUNDWATER QUALITY AND ITS RELATIONSHIP WITH SETTLEMENT DENSITY IN, SIDOAGUNG AREA AND SURROUNDINGS, GODEAN DISTRICT, SLEMAN REGENCY, SPECIAL REGION OF YOGYAKARTA

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Settlements are an integral part of the living environment, and their development is closely associated with population growth. Increasing settlement density may affect shallow groundwater quality due to domestic wastewater generation. Godean District, Sleman Regency, is a rapidly developing settlement area that potentially contributes to nitrate contamination of shallow groundwater. This study aims to analyze shallow groundwater quality and its relationship with settlement density in Godean District. The research utilized secondary data, including settlement density, geomorphology, and regional geology, as well as primary data from Schlumberger-configured Vertical Electrical Sounding (VES) surveys and hydrogeological observations. Groundwater quality was evaluated through analyses of ammonia, nitrite, and nitrate concentrations. Hydrochemical characteristics were interpreted using Stiff, Piper, Durov, and Gibbs diagrams, while physical groundwater properties were assessed through pH, electrical conductivity (EC), and total dissolved solids (TDS) measurements. The results indicate that the study area consists of the Andesite Intrusion Unit and the Young Merapi Depositional Unit, characterized by isolated hills and alluvial plains. The area is part of the Yogyakarta–Sleman Groundwater Basin within the Merapi Aquifer System and contains an unconfined sandy aquifer. Groundwater is classified as the $\text{Ca}(\text{Mg})\text{HCO}_3$ facies, reflecting water–rock interaction and ion exchange processes. In general, groundwater physical quality is influenced by local lithology. Nitrate concentrations exceed the established water quality standards, and the elevated nitrate levels are likely associated with residential activities.

Keywords: shallow groundwater, electrical resistivity survey, groundwater quality, settlement density, nitrate contamination, hydrochemical facies, Godean District.