

INTISARI

Ngasinan merupakan kawasan zona transisi gunungapi Kuartir Sumbing dan gunungapi Neogen Kulon Progo. Sistem lereng dipengaruhi oleh gunungapi Sumbing, tetapi system material bawah permukaan dipengaruhi oleh gunungapi Neogen Kulon Progo. Perlapisan material gunungapi Kuartir yang menumpang pada gunungapi Neogene membentuk material tanah super tebal dengan relief yang bergelombang, sehingga menciptakan sebuah Kawasan berpotensi tinggi untuk berbagai pemanfaatan pertanian, namun mempunyai kerawanan longsor yang tinggi. Material gunungapi Kuartir dan Neogen memiliki karakteristik pedologi dan fisika yang menarik. Tujuan utama penelitian ini adalah untuk mengkaji perlapisan material tanah supertebal dan bidang gelincir dengan pendekatan metode geopedofisika serta identifikasi lingkungan terhadap area rawan longsor di Ngasinan.

Penelitian dilakukan dengan pendekatan ilmu geopedofisika lingkungan, yakni geomorfologi (morfologi, material, proses), pedologi, geofisika dan ilmu lingkungan. Metode yang dilakukan pengambilan foto udara, pengukuran metode geofisika, pengambilan dan pengujian sampel tanah, serta wawancara mendalam. Foto udara dilakukan pada seluruh wilayah desa Ngasinan mencakup 6 dusun. Metode geofisika yang digunakan adalah geolistrik, seismik refraksi dan MASW (*Multichannel Analysis Surface Wave*). Sampel endapan material diambil pada beberapa singkapan dan lintasan geolistrik. Pengujian laboratorium yang dilakukan pada sampel endapan material yakni tekstur, KTK (Kapasitas Tukar Kation), kandungan air, EC (*Electrical Conductivity*), kadar air kering angin, BV (Berat Volume), BJ (Berat Jenis), XRF (*X-Ray Fluorescence*) dan XRD (*X-Ray Diffraction*). Wawancara mendalam dilakukan terhadap perangkat desa dan warga yang memiliki lahan atau kebun campur sekitar longsor.

Hasil penelitian memperlihatkan karakteristik material memiliki tekstur yang sebagian besar lempung/ *clay*. Penampang bawah permukaan hasil geofisika menunjukkan perlapisan-perlapisan yang berbeda karakteristiknya ditinjau dari nilai resistivitas, V_p dan V_s . Perlapisan material tanah tebal yang mudah terdispersi memiliki nilai KTK relatif tinggi, konduktivitas tinggi, kandungan air besar, mengandung banyak Silika (XRF) dan terdapat mineral lempung (XRD). Perlapisan material tanah juga dapat menjadi bidang gelincir apabila banyak terdapat rekahan yang terisi air, karena karakteristik material yang mudah terdispersi. Batas antar perlapisan dengan karakteristik yang berbeda dapat menjadi bidang gelincir semu. Bidang gelincir disebut bidang gelincir semu karena bidang gelincir tersebut berada pada endapan material sangat tebal (belum dijumpai batuan yang masif). Karakteristik material tanah supertebal yang terdapat bidang gelincir semu, menjadikan Ngasinan rawan longsor. Informasi terkait karakteristik material digunakan untuk mitigasi longsor dan pengelolaan lingkungan.

Kata kunci: endapan material tebal, longsor, geopedofisika, lingkungan

ABSTRACT

Ngasinan is a transition zone area between the Quaternary Sumbing volcano and the Neogene Kulon Progo volcano. The Sumbing volcano influences the slope system, but the Neogene Kulon Progo volcano influences the subsurface material system. The layering of Quaternary volcanic material overlapping the Neogene volcano forms very thick soil material with undulating relief, thus creating an area with high potential for various agricultural uses but with a high landslide vulnerability. Quaternary and Neogene volcanic materials have interesting pedological and physical characteristics. The main objective of this study is to examine the layering of super-thick material and slip planes using the geopedophysics method approach and environmental identification of landslide-prone areas in Ngasinan.

The study employed an environmental geopedophysical science approach, encompassing geomorphology (morphology, materials, and processes), pedology, geophysics, and environmental science. Various methods were utilized, including aerial photography, geophysical measurements, soil sample collection and testing, and in-depth interviews. Aerial photography covered the entire Ngasinan village area, including six hamlets. Geophysical methods involved geoelectric, seismic refraction, and MASW (Multichannel Analysis of Surface Wave). Material deposits were sampled at multiple outcrops and along geoelectric tracks. Laboratory tests on material samples included assessments of texture, CEC, water content, EC, wind-dry water content, Bulk Density, Particle Density, XRF, and XRD. Additionally, in-depth interviews were conducted with village officials and residents who owned mixed land/gardens in areas prone to landslides.

The results of the research show that the characteristics of the material have a texture that is mostly clay. The subsurface cross-section of geophysical results shows layers with different characteristics in terms of resistivity values, V_p , and V_s . A thick layer of soil material that is easily dispersed has a relatively high CEC value, high conductivity, large water content, a lot of silica, and contains clay minerals. Layers of soil material can also become sliding planes if there are many cracks filled with water, because the characteristics of the material are that it is easily dispersed. Boundaries between layers with different characteristics can become pseudo-sliding planes. The sliding plane is called a pseudo-sliding plane because the sliding plane is located in very thick deposits of material (no massive rocks have been found). The characteristics of super-thick soil material, which contains pseudo-sliding planes, make Ngasinan prone to landslides. Information related to material characteristics is used for landslide mitigation and environmental management.

Keywords: super thick material, landslide, geopedophysics, environment