

## DAFTAR PUSTAKA

- Abera, G., & Wolde-Meskel, E. (2013). Soil Properties, and Soil Organic Carbon Stocks of Tropical Andosol under Different Land Uses. *Open Journal of Soil Science*, 3(3), 153-162. <https://doi.org/10.4236/ojss.2013.33018>
- Adiwibowo, S., & Subandrio, A. (2020). "Fertility of Volcanic Soils in Indonesia and Their Use in Agricultural Practices". *Indonesian Journal of Agronomy*, 24(1), 45-58
- Alfaro, M., Briceño, M., & Silva, M. (2006). Nitrogen leaching losses on a volcanic ash soil as affected by the source of fertiliser. *Agriculture, Ecosystems & Environment*, 113(1-4), 254–259. <https://doi.org/10.1016/j.agee.2005.10.008>
- Aravena, C., Valle, S. R., Vergara, R., González Chang, M., Martínez, O., Clunes, J., Caurapán, B., & Asenjo, J. (2025). Effect of agricultural management intensity on the organic carbon fractions and biological properties of a volcanic-ash-derived soil. *Sustainability*, 17(6), 2704.
- Armer, A. N. (2022). Pemetaan digital sifat kimia tanah vulkanik pasca letusan berkelanjutan Gunung Sinabung (2013–2020) [Skripsi, Universitas Andalas]. Program Studi Ilmu Tanah, Fakultas Pertanian, Universitas Andalas, Padang.
- Balai Penelitian Tanah. (2005). *Petunjuk Teknis Evaluasi Kesuburan Tanah*. Bogor: Balai Penelitian Tanah.
- Berlian, G. (2025). Distribusi Spasial Sifat Kimia Tanah Vulkanis Gunung Marapi Bagian Barat ke Selatan. Skripsi. Program Studi Ilmu Tanah, Fakultas Pertanian, Universitas Andalas. Padang.
- BMKG. 2024. *Laporan Pemantauan Cuaca dan Dampak Abu Vulkanis Erupsi Gunung Marapi*. Badan Meteorologi, Klimatologi, dan Geofisika, Jakarta.
- Brady, N. C., & Weil, R. R. (2017). *The Nature and Properties of Soils* (15th ed.). Pearson.
- Charter, D. dan Agtrisari I. 2002. *Desain dan Aplikasi Geographics Information System*. PT. Elex Media Komputindo Kelompok Gramedia. Jakarta.
- Choudhary, O. P., Bhattacharya, P., Meena, R. S., Sinha, N. K., & Pradhan, A. (2022). Landscape position and slope aspects impacts on soil organic carbon pool and biological indicators in a high-altitude ecosystem. *Environmental Research*, 212, 113239. <https://doi.org/10.1016/j.envres.2022.113239>
- Darmawijaya, I. 1980. *Klasifikasi Tanah. Dasar Teori Baru Penelitian Tanah dan Pelaksanaan Pertanian di Indonesia*. Balai Penelitian Tanah dan Kimia Gambung. Bandung.

- Dahlgren, R. A., Saigusa, M., & Ugolini, F. C. (2004). The nature, properties and management of volcanic soils. In D. L. Sparks (Ed.), *Advances in Agronomy*, 82, 113–182.
- Dharumarajan, S., Kalaiselvi, B., Suputhra, A., Lalitha, M., Vasundhara, R., Kumar, K. S. A., Nair, K. M., Hegde, R., Singh, S. K., and Lagacherie, P. 2021. *Digital soil mapping of soil organic carbon stocks in Western Ghats, South India*. *Geoderma Regional*, 25, e00387. <https://doi.org/10.1016/j.geodrs.2021.e00387>
- Fiantis, D. 2003. Modul Sistem Informasi Geografis. Fakultas Pertanian Universitas Andalas, Padang.
- Fiantis, D. 2006. Laju Pelapukan Kimia Debu Vulkanis Gunung Talang dan Pengaruhnya Terhadap Proses Pembentukan Mineral Liat Nonkristalin. Artikel Penelitian. Direktorat Jendral Pendidikan Tinggi. SURAT PERJANJIAN NO: 005/SP3/PP/DP2M/II/2006. Departemen Pendidikan Nasional. Fakultas Pertanian, Universitas Andalas.
- Fiantis, D., Ginting, F. I., Gusnidar, Nelson, M., & Minasny, B. 2019. *Volcanic Ash, insecurity for the people but securing fertile soil for the future*. *Sustainability (Switzerland)*, 11(11). <https://doi.org/10.3390/su11113072>
- Fiantis, D., Ginting, D., Nelson, M., Shamshuddin, J., & Van Ranst, E. (2019). Formation of andic soil properties under a wet tropical climate from tephra of Mount Talang eruption, West Sumatra, Indonesia. *Geoderma*, 331, 110–120. <https://doi.org/10.1016/j.geoderma.2018.06.017>
- Fiantis, D., Armer, A. N., Ginting, F. I., & Gusnidar. (2021). Mapping of volcanic soil chemical properties with digital soil mapping after the prolonged eruption of Mt. Sinabung (2013–2020). *IOP Conference Series: Earth and Environmental Science*, 1306, 012021. <https://doi.org/10.1088/1755-1315/1306/1/012021>
- Gorelick, N., Hancher, M., Dixon, M., Ilyushchenko, S., Thau, D., & Moore, R. (2017). Google Earth Engine: Planetary-scale geospatial analysis for everyone. *Remote Sensing of Environment*, 202, 18–27. <https://doi.org/10.1016/j.rse.2017.06.031>
- Harahap, I. 2007. Kajian Sifat Kimia Tanah Vulkanis Pasca Erupsi Gunung Talang 12 April 2005 Di Aie Batumbuk Kecamatan Gunung Talang Kabupaten Solok. [Skripsi] Universitas Andalas : Padang.
- Hardjowigeno, S. 2007. Ilmu Tanah. Jakarta : Akademia Pressindo. 296 hlm.
- Hengl, T., Sierdsema, H., Radović, A., & Dilo, A. (2009). Spatial prediction of species' distributions from occurrence-only records: Combining point pattern analysis, ENFA and regression-kriging. *Ecological Modelling*, 220(24), 3499–3511.

- Hinsinger, P. (2001). Bioavailability of soil inorganic P in the rhizosphere as affected by root-induced chemical changes: A review. *Plant and Soil*, 237(2), 173–195. <https://doi.org/10.1023/A:1013351617532>
- Jakšić, S., Ninkov, J., Milić, S., Vasin, J., Živanov, M., Jakšić, D., & Komlen, V. (2021). Influence of slope gradient and aspect on soil organic carbon content across land-use types in Serbia. *Sustainability*, 13(15), 8332. <https://www.mdpi.com/2071-1050/13/15/8332>
- Kumar, S., & Singh, S. (2010). "Nitrogen Dynamics in Volcanic Ash Soils." *Agricultural Sciences*.
- Liu, Z., Ostrenga, D., Vollmer, B., Deshong, B., MacRitchie, K., Greene, M., & Kempler, S. (2017). *Global Precipitation Measurement (GPM) mission products and services at the NASA Goddard Earth Sciences (GES) Data and Information Services Center (DISC)*. *Bulletin of the American Meteorological Society*, 98(3), 437–444. <https://doi.org/10.1175/BAMS-D-16-0023.1>
- Lu, T., Wang, J., Zhu, H., Zhong, Z., Wang, X., Jia, X., Shao, M., & Wei, X. (2025). *Soil moisture determines effects of climates and soil properties on nitrogen cycling: Examination of arid and humid soils*. *Journal of Environmental Management*, 373, 123831. <https://doi.org/10.1016/j.jenvman.2024.123831>
- McDaniel, P. A., & Wilson, M. A. (2007). Physical and chemical characteristics of ash-influenced soils of inland Northwest forests. In D. Page-Dumroese, R. Miller, J. Mital, P. A. McDaniel, & D. Miller (Eds.), *Volcanic-ash-derived forest soils of the Inland Northwest: Properties and implications for management and restoration* (pp. 31–45). U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.
- Nanzyo, M. (2002). Unique properties of volcanic ash soils. *Global Environmental Research*, 6(2), 99–112.
- Nanzyo, M., McKeague, J. A., & Itoh, K. (1993). *Volcanic ash soils: Formation and mineralogy of secondary minerals*. Japanese Society of Soil Science and Plant Nutrition. Diakses dari <https://www.sciencedirect.com/bookseries/developments-in-soil-science/vol/21/suppl/C>
- Page-Dumroese, D. S., Ferguson, D. E., McDaniel, P. A., & Johnson-Maynard, J. L. (2005). *Volcanic-ash-derived forest soils of the inland Northwest*. RMRS-P-44. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. [https://www.fs.usda.gov/rm/pubs/rmrs\\_p044/rmrs\\_p044\\_185\\_202.pdf](https://www.fs.usda.gov/rm/pubs/rmrs_p044/rmrs_p044_185_202.pdf)
- Parfitt, R. L. (2009). Allophane and imogolite: Role in soil biogeochemical processes. *Clay Minerals*, 44(1), 135–155. <https://doi.org/10.1180/claymin.2009.044.1.135>

- Pierre Delmelle, Sophie Opfergelt, Jean-Thomas Cornelis, Chien-Lu Ping. (2015). "*The Encyclopedia of Volcanoes (Second Edition)*". Academic Press, Chapter 72, 1253-1264
- Pusat Vulkanologi dan Mitigasi Bencana Geologi (PVMBG), 2024. *Aktivitas Gunung Marapi Sumatera Barat*.
- Puspita, Wira. "Analisis Data Geostatistika menggunakan Metode Ordinary Kriging". Tugas Akhir Mahasiswa University Pendidikan Indonesia. 2010.
- Prahasta, E. 2002. Konsep-konsep Dasar Sistem Informasi Geografi. Informatika Bandung. Bandung.
- Pratomo, I. 2006. Klasifikasi gunung api aktif Indonesia, studi kasus dari beberapa letusan gunung api dalam sejarah. *Indonesian Journal on Geoscience*, 1(4), 209–227. <https://doi.org/10.17014/ijog.vol1no4.20065>
- Qin, Y., Feng, Q., Holden, N. M., & Cao, J. (2016). Variation in soil organic carbon by slope aspect in the Qilian Mountains. *Catena*, 147, 308–314.
- Schmidt, F., & Ferguson, G. C. (1951). Rainfall classification by the method of Schmidt and Ferguson. United States Weather Bureau. Retrieved from [https://www.researchgate.net/figure/Climate-Classification-by-Schmidt-Ferguson-method\\_tbl1\\_378254724](https://www.researchgate.net/figure/Climate-Classification-by-Schmidt-Ferguson-method_tbl1_378254724)
- Schoenholtz, S. H., Van Miegroet, H., & Burger, J. A. (2000). A review of chemical and physical properties as indicators of forest soil quality: challenges and opportunities. *Forest Ecology and Management*, 138(1–3), 335–356.
- Seyfried, M. S., Flerchinger, G., Bryden, S., Link, T., Marks, D., & McNamara, J. (2021). Slope and aspect controls on soil climate: Field documentation and modeling. *Vadose Zone Journal*, 20(2), 1–15.
- Shen, J., Yuan, L., Zhang, J., Li, H., Bai, Z., Chen, X., Zhang, W., & Zhang, F. (2011). *Phosphorus dynamics: From soil to plant*. *Plant Physiology*, 156(3), 997–1005. <https://doi.org/10.1104/pp.111.175232>
- Shoji, S., Nanzyo, M., & Dahlgren, R. A. (1993). *Volcanic Ash Soils: Genesis, Properties, and Utilization*. Elsevier, Amsterdam. 288 hal.
- Shoji, S., & Takahashi, T. (2002). *Volcanic ash soils: Genesis, properties, and utilization*. Springer.
- Smith, J. A., & Paul, E. A. (2019). Soil microbial activity and nitrogen mineralization under environmental stress. *Soil Biology and Biochemistry*, 134, 65–72. <https://doi.org/10.1016/j.soilbio.2019.04.012>
- Soil Survey Staff. (1999). *Soil Taxonomy: A Basic System of Soil Classification for Making and Interpreting Soil Surveys*.

- Soil Survey Staff. 2010. *Soil Taxonomy a Basic System of Soil Classification for Making and Interpreting Soil Surveys Eleventh Edition*. United States Department of Agriculture. Washington DC. 754 hal.
- Sumardin, dan SN, A. 2016. Penerapan Sistem Informasi Geografis dalam Pemetaan Produksi Pertanian di Kabupaten Bone. *Jurnal Inspiraton* 6(2): 173-178.
- Sutanto, R. 2005. *Dasar-dasar Ilmu Tanah. Konsep dan Kenyataan*. Kanisius: Yogyakarta
- Takamoto, A., Hashimoto, Y., Asano, M., Noguchi, K., & Wagai, R. (2021). Distribution and chemical species of phosphorus across density fractions in Andisols of contrasting mineralogy. *Geoderma*, 395, 115080. <https://doi.org/10.1016/j.geoderma.2021.115080>
- Tan, K. H. 1998. Andosols. Program Studi Ilmu Tanah Program Pasca Sarjana Universitas Sumatera Utara. Medan. 75 halaman.
- Tan, K. H. (2011). *Principles of Soil Chemistry* (4th ed.). Boca Raton: CRC Press.
- Tiessen, H., Stewart, J. W. B., & Cole, C. V. (1984). Pathways of phosphorus transformations in soils of differing pedogenesis. *Soil Science Society of America Journal*, 48(4), 853–858. <https://doi.org/10.2136/sssaj1984.03615995004800040031x>
- Widiastuti, R., Haryadi, & Harnoto. (2015). "Effect of Organic Matter on Soil Nitrogen Availability in Volcanic Soils." *Journal of Agricultural Science*.
- Yousman, Y. 2004. *Sistem Informasi Geografis dengan MapInfo Professional*. Andi Offset: Yogyakarta.
- Yulnafatmawita. 2013. *Buku Pegangan Mahasiswa untuk Praktikum (Bpmp) Fisika Tanah (Pnt 313)*. Fakultas Pertanian Universitas Andalas: Padang. 76 hal.
- Zhang, Q., Fang, R., Deng, C., Zhao, H., Shen, M., & Wang, Q. (2022). Slope aspect effects on plant community characteristics and soil physical and chemical properties. *Ecological Indicators*, 140, 109000.
- Zhang, X., Li, Q., Gao, J., Hu, Y., Song, M., & Yue, Y. (2020). Effects of rainfall amount and frequency on soil nitrogen mineralization in Zoigé alpine wetland. *European Journal of Soil Biology*, 97, 103170. <https://doi.org/10.1016/j.ejsobi.2020.103170>
- Zhou, J., Jiang, P., & Wu, J. (2008). Effects of rainfall on phosphorus leaching from soils. *Geoderma*, 148(3–4), 402–408. <https://doi.org/10.1016/j.geoderma.2007.12.006>
- Parfitt, R. L. (2009). Allophane and imogolite: Role in soil biogeochemical processes. *Clay Minerals*, 44(1), 135–155. <https://doi.org/10.1180/claymin.2009.044.1.135>