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DAFTAR PUSTAKA

Adi, R. N., & Setiawan, O. (2010). Penentuan Zonasi Tataguna Air Tanah Di Kabupaten Bantul, Daerah Istimewa Yogyakarta. *Jurnal Penelitian Hutan Dan Konservasi Alam*, *7*(4), 315–339. https://doi.org/10.20886/jphka.2010.7.4.315-339

Dattatreya, S., Khan, A. N., Jena, K., & Chatterjee, G. (2024). Conventional to Modern Methods of Soil NPK Sensing: A Review. *IEEE Sensors Journal*, *24*(3), 2367–2380. https://doi.org/10.1109/JSEN.2023.3334243

Eviati, Sulaeman, Herawaty, L., Anggria, L., Esman, Tantika, H. E., Prihatini, R., & Wuningrum, P. (2023). Analisis Kimia Tanah, Tanaman, Air, Dan Pupuk. In *Petunjuk Teknis Edisi*. https://tanahpupuk.bsip.pertanian.go.id

Gottemukkala, L., Jajala, S. T. R., Thalari, A., Vootkuri, S. R., Kumar, V., & Naidu, G. M. (2023). Sustainable Crop Recommendation System Using Soil NPK Sensor. *E3S Web of Conferences*, *430*. https://doi.org/10.1051/e3sconf/202343001100

Gupta, S., Goud, A., Jain, P., & Darshni, M. (2024). Predictive Modeling of Soil Fertility Grades Using Random Forest Algorithm. *2024 International Conference on Advances in Computing Research on Science Engineering and Technology, ACROSET 2024*, 1–6. https://doi.org/10.1109/ACROSET62108.2024.10743617

Islam, M. R., Oliullah, K., Kabir, M. M., Alom, M., & Mridha, M. F. (2023). Machine learning enabled IoT system for soil nutrients monitoring and crop recommendation. *Journal of Agriculture and Food Research*, *14*(June), 100880. https://doi.org/10.1016/j.jafr.2023.100880

Jain, N., Awasthi, Y., & Jain, R. K. (2023). An IoT-based soil analysis system using optical sensors and multivariate regression. *International Journal of Experimental Research and Review*, *31*(January), 23–32. https://doi.org/10.52756/10.52756/ijerr.2023.v31spl.003

Jiang, G., Chen, Z., Siripornpibul, C., Haryono, E., Nguyen, N. X., Oo, T., Manzano, L. S. J., Vongphachanh, S., Kong, S., & Guo, F. (2021). The karst water environment in Southeast Asia: characteristics, challenges, and approaches. *Hydrogeology Journal*, *29*(1), 123–135. https://doi.org/10.1007/s10040-020-02267-y

Kabupaten Gunung Kidul Yogyakarta, S. (2021). *"Hidrologi Kawasan Karst Gunung Sewu Di Kecamatan Tanjung*. *April*.

Keerthan Kumar, T. G., Shubha, C., & Sushma, S. A. (2019). Random forest algorithm for soil fertility prediction and grading using machine learning. *International Journal of Innovative Technology and Exploring Engineering*, *9*(1), 1301–1304. https://doi.org/10.35940/ijitee.L3609.119119

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Khanal, K., Ojha, G., Chataut, S., & Ghimire, U. K. (2024). IoT-Based Real-Time Soil Health Monitoring System for Precision Agriculture. *International Research Journal of Engineering and Technology*, *July*, 470–478. www.irjet.net

Khotimah, Y. K., Supardi, S., & Antriyandarti, E. (2019). Pemanfaatan Sumber Daya Pertanian Lahan Kering di Pegunungan Karst Gunungkidul. *Pemanfaatan Sumber Daya Pertanian Lahan Kering Di Pegunungan Karst Gunungkidul*, *3*(1), 50–57. https://www.researchgate.net/publication/342668723_Pemanfaatan_Sumber_Daya_Pertanian_Lahan_Kering_di_Pegunungan_Karst_Gunungkidul

Luo, D., Xiong, K., Wu, C., Gu, X., & Wang, Z. (2023). Soil Moisture and Nutrient Changes of Agroforestry in Karst Plateau Mountain: A Monitoring Example. *Agronomy*, *13*(1). https://doi.org/10.3390/agronomy13010094

Pamungkas, W., Afandi, M. A., Astiti, S., Enriko, I. K. A., Zukhrufi, A. S., Putra, R. H., & Rohmat. (2023). Research in Electronic Multi-Sensor Accuracy in the Implementation of Soil Fertility Monitoring System Using LoRA. *International Journal on Advanced Science, Engineering and Information Technology*, *13*(6), 2397–2406. https://doi.org/10.18517/ijaseit.13.6.18836

Pandey, P., Sindhuja, K., Muthukumaran, D., Kanna, C. K., Raj, T. S., & Srinivasan, S. (2024). Integrated IoT and Random Forest Algorithm Solutions for Agricultural Waste Management and Biomass Valorization. *2024 1st International Conference on Innovations in Communications, Electrical and Computer Engineering, ICICEC 2024*, 1–6. https://doi.org/10.1109/ICICEC62498.2024.10808352

Paper Karakteristik Airtanah Karst di Gunungkidul. (n.d.).

Potdar, R. P., Shirolkar, M. M., Verma, A. J., More, P. S., & Kulkarni, A. (2021). Determination of soil nutrients (NPK) using optical methods: a mini review. *Journal of Plant Nutrition*, *44*(12), 1826–1839. https://doi.org/10.1080/01904167.2021.1884702

Prihatanto, Z. H. ., Rabbani, T. ., Heriyanti, A. ., & Fariz, T. . (2022). Perbedaan Karakteristik Ekosistem Ponjong, Gunungkidul dengan Ekosistem Karst Pracimantoro, Wonogiri. *Proceeding Seminar Nasional IPA XII*, *3*, 142–149.

Pyingkodi, M., Thenmozhi, K., Karthikeyan, M., Kalpana, T., Palarimath, S., & Kumar, G. B. A. (2022). IoT based Soil Nutrients Analysis and Monitoring System for Smart Agriculture. *3rd International Conference on Electronics and Sustainable Communication Systems, ICESC 2022 - Proceedings*, *August*, 489–494. https://doi.org/10.1109/ICESC54411.2022.9885371

Reza, M., Miri, S., & Javidan, R. (2016). A Hybrid Data Mining Approach for Intrusion Detection on Imbalanced NSL-KDD Dataset. *International Journal of Advanced Computer Science and Applications*, *7*(6), 1–33. https://doi.org/10.14569/ijacsa.2016.070603

Reza, M. N., Lee, K. H., Karim, M. R., Haque, M. A., Bicamumakuba, E., Dey, P. K., Jang, Y. Y., & Chung, S. O. (2025). Trends of Soil and Solution Nutrient

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Sensing for Open Field and Hydroponic Cultivation in Facilitated Smart Agriculture. *Sensors*, *25*(2). https://doi.org/10.3390/s25020453

Rumeon, R., Sukoco, H., & Rahmawan, H. (2025). *Construction of an Autonomous Nutrient Sensor System Based on the Internet of Things (IoT) on Cassava Land*. *10*(06), 60–65. https://doi.org/10.47191/etj/v10i06.25

Senapaty, M. K., Ray, A., & Padhy, N. (2023). IoT-Enabled Soil Nutrient Analysis and Crop Recommendation Model for Precision Agriculture. *Computers*, *12*(3), 1–33. https://doi.org/10.3390/computers12030061

Talekar, B. (2020). A Detailed Review on Decision Tree and Random Forest. *Bioscience Biotechnology Research Communications*, *13*(14), 245–248. https://doi.org/10.21786/bbrc/13.14/57

Thapa, S., Bhattarai, S., Subedi, B., Paudel, B., & Tiwari, H. N. (2024). Use of Machine Learning and Deep Learning along with NPK Sensor for Intelligent Farming Solutions. *International Research Journal of Innovations in Engineering and Technology*, *08*(05), 220–226. https://doi.org/10.47001/irjiet/2024.805032

Ummah, M. S. (2019). N Title. *Sustainability (Switzerland)*, *11*(1), 1–14. http://scioteca.caf.com/bitstream/handle/123456789/1091/RED2017-Eng-8ene.pdf?sequence=12&isAllowed=y%0Ahttp://dx.doi.org/10.1016/j.regsciurbeco.2008.06.005%0Ahttps://www.researchgate.net/publication/305320484_SISTEM_PEMBETUNGAN_TERPUSAT_STRATEGI_MELESTARI

Wan, L., Yang, J., Zheng, C., Guo, J., Zhou, J., Han, Y., & Rebi, A. (2024). Effect of Agroforestry Systems on Soil NPK and C Improvements in Karst Graben Basin of Southwest China. *Agronomy*, *14*(6), 1–16. https://doi.org/10.3390/agronomy14061179

Zhang, S., Xiong, K., Min, X., & Zhu, D. (2024). Vegetation vulnerability in karst desertification areas is related to land–atmosphere feedback induced by lithology. *Catena*, *247*(September), 108542. https://doi.org/10.1016/j.catena.2024.108542

Zhang, W., Zhang, Y., Zhang, X., Wu, W., & Liu, H. (2024). The Spatiotemporal Variability of Soil Available Phosphorus and Potassium in Karst Region: The Crucial Role of Socio-Geographical Factors. *Land*, *13*(6). https://doi.org/10.3390/land13060882