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DAFTAR PUSTAKA

Abdel-Hamid, A., Dubovyk, O., El-Magd, I. A., & Menz, G. (2018). Mapping Mangroves Extents on the Red Sea Coastline in Egypt using Polarimetric SAR and High Resolution Optical Remote Sensing Data. *Sustainability 2018, Vol. 10, Page 646*, *10*(3), 646. https://doi.org/10.3390/SU10030646.

Ali, A., & Nayyar, Z. A. (2020). Extraction of mangrove forest through Landsat 8 Mangrove Index (L8MI). *Arabian Journal of Geosciences*, *13*(21). https://doi.org/10.1007/s12517-020-06138-4.

Alimbon, J. A., & Manseguiao, M. R. S. (2021). *Species composition, stand characteristics, aboveground biomass, and carbon stock of mangroves in Panabo Mangrove Park, Philippines. Biodiversitas*, 22(6), 3130-3137. https://doi.org/10.13057/biodiv/d220615

Arifanti, V. B., Sidik, F., Mulyanto, B., Susilowati, A., Wahyuni, T., Subarno, Yulianti, Yuniarti, N., Aminah, A., Suita, E., Karlina, E., Suharti, S., Pratiwi, Turjaman, M., Hidayat, A., Rachmat, H. H., Imanuddin, R., Yeny, I., Darwiati, W., ... Novita, N. (2022). Challenges and Strategies for Sustainable Mangrove Management in Indonesia: A Review. *Forests*, *13*(5), 695. https://doi.org/10.3390/f13050695.

Ariyani, N. A. E., & Kismartini. (2018). Implementation of Conservation Policy Through the Protection of Life Support System in the Karimunjawa National Park. *E3S Web of Conferences*, *31*. https://doi.org/10.1051/e3sconf/20183108014

Arkham, M. N., Riadi, S., Wahyudin, Y., & Krisnafi, Y. (2023). Economic value of mangrove ecosystem services in the coastal area of Bintan Island, Indonesia. *Wetlands Ecology and Management*. https://doi.org/10.1007/s11273-023-09955-y

Asad, M. H., Saleem, S., & Bais, A. (2023). *Detection and mapping of Kochia plants and patches using high-resolution ground imagery and satellite data: Application of machine learning.* IEEE Access, PP(99), 1-1. https://doi.org/10.1109/ACCESS.2023.3308909

Ayub, A. S., Anggoro, A., Lukman, A. H., Ariasari, A., Nurul Suci, A. N., Agustini, N. T., Nugroho, F., Muslih, A. M., Hanami, C. C., & Zulhendri, R. (2023). *Mapping the potential of mangrove planting in the rehabilitation of coastal ecosystems using drone technology.* Journal of Sylva Indonesiana, 6(2), 164-177. https://doi.org/10.32734/jsi.v6i02.10515

UNIVERSITAS
GADJAH MADA
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Bai, T., Li, D., Sun, K., Chen, Y., & Li, W. (2016). *Cloud detection for high-resolution satellite imagery using machine learning and multi-feature fusion. Remote Sensing, 8*(9), 715. https://doi.org/10.3390/rs8090715

Baloloy, A. B., Blanco, A. C., Raymund Rhommel, R. R. C., & Nadaoka, K. (2020). Development and application of a new mangrove vegetation index (MVI) for rapid and accurate mangrove mapping. *ISPRS Journal of Photogrammetry and Remote Sensing*, *166*, 95–117. https://doi.org/10.1016/j.isprsjprs.2020.06.001

Basheer, S., Wang, X., Farooque, A. A., Nawaz, R. A., Liu, K., Adekanmbi, T., & Liu, S. (2022). Comparison of Land Use Land Cover Classifiers Using Different Satellite Imagery and Machine Learning Techniques. *Remote Sensing*, *14*(19). https://doi.org/10.3390/rs14194978

Belgiu, M., & Drăguţ, L. (2016). *Random forest in remote sensing: A review of applications and future directions. ISPRS Journal of Photogrammetry and Remote Sensing, 114*, 24-31. https://doi.org/10.1016/j.isprsjprs.2016.01.011

Bindel, M., Hese, S., Berger, C., & Schmullius, C. (2011). *Feature selection from high resolution remote sensing data for biotope mapping.* The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XXXVIII-4/W19, 39-44. https://doi.org/10.5194/isprsarchives-XXXVIII-4-W19-39-2011.

Blaschke, T., 2010. Object based image analysis for remote sensing. ISPRS J. Photogrammetry Remote Sens. 65, 2–16. https://doi.org/10.1016/j.isprsjprs.2009.06.004.

Bunting, P., Rosenqvist, A., Hilarides, L., Lucas, R. M., Thomas, N., Tadono, T., Worthington, T.A., Spalding, M., Murray, N.J., & Rebelo, L.-M. (2022). *Global Mangrove Extent Change 1996–2020: Global Mangrove Watch Version 3.0.* Remote Sensing, 14(15), 3657. https://doi.org/10.3390/rs14153657.

Cardone, B., Di Martino, F., & Miraglia, V. (2023). *A novel fuzzy-based remote sensing image segmentation method. Sensors, 23*(24), 9641. https://doi.org/10.3390/s23249641.

Campbell, J. E., Harris, J. R., Huntley, D. H., McMartin, I., Wityk, U., Dredge, L. A., & Eagles, S. (2013). *Remote predictive mapping of surficial earth materials: Wager Bay North area, Nunavut – NTS 46-E (N), 46-K (SW), 46-L, 46-M (SW), 56-H (N), 56-I and 56-J (S)* (Geological Survey of Canada, Open File 7118). https://doi.org/10.4095/293158.

KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Chen, Z., Zhang, M., Zhang, H., & Liu, Y. (2023). Mapping Mangrove Using a Red-Edge Mangrove Index (REMI) Based on Sentinel-2 Multispectral Images. *IEEE Transactions on Geoscience and Remote Sensing*, *61*. https://doi.org/10.1109/TGRS.2023.3323741

Choudhary, B., Dhar, V., & Pawase, A. S. (2024). Blue carbon and the role of mangroves in carbon sequestration: Its mechanisms, estimation, human impacts and conservation strategies for economic incentives. *Journal of Sea Research*, *199*. https://doi.org/10.1016/j.seares.2024.102504

Congalton, R.G., Green, K., 2019. Assessing the Accuracy of remotely Sensed Data: Principles and Practices, third ed. CRC Press, Boca Raton. https://doi.org/10.1201/9780429052729.

Crase, B., Liedloff, A., Vesk, P. A., Burgman, M. A., & Wintle, B. A. (2013). Hydroperiod is the main driver of the spatial pattern of dominance in mangrove communities. *Global Ecology and Biogeography*, *22*(7), 806–817. https://doi.org/10.1111/geb.12063

Crooks, S., Herr, D., Tamelander, J., Laffoley, D., & Vandever, J. (2011). *Marine Ecosystem Series Mitigating Climate Change through Restoration and Management of Coastal Wetlands and Near-shore Marine Ecosystems Challenges and Opportunities*. The International Bank for Reconstruction and Development/The World Bank. www.worldbank.org/environment/publications

Cuenca-Ocay, G. (2019). Mangrove ecosystems' role in climate change mitigation. *Davao Research Journal*, *12*(2). https://doi.org/10.59120/drj.v12i2.168

Danoedoro, P. (2012). *Pengantar penginderaan jauh digital*. Yogyakarta, Indonesia: Andi.

Dave, C. P., Joshi, R., & S. Srivastava, S. (2015). A Survey on Geometric Correction of Satellite Imagery. *International Journal of Computer Applications*, *116*(12), 24–27. https://doi.org/10.5120/20389-2655

Drusch, M., Del Bello, U., Carlier, S., Colin, O., Fernandez, V., Gascon, F., Hoersch, B., Isola, C., Laberinti, P., Martimort, P., Meygret, A., Spoto, F., Sy, O., Marchese, F., & Bargellini, P. (2012). Sentinel-2: ESA's optical high-resolution mission for GMES operational services. Remote Sensing of Environment, 120, 25–36. https://doi.org/10.1016/j.rse.2011.11.026.

Dwiputra, M. A., & Mustofa, A. (2021). The Comparison of RGB 564 and RGB 573 Band Composite of Landsat 8 for Mangrove Vegetation Distribution Identification on Pahawang

UNIVERSITAS
GADJAH MADA
KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Island, Lampung. *IOP Conference Series: Earth and Environmental Science*, *830*(1). https://doi.org/10.1088/1755-1315/830/1/012017

Elmes, A., Alemohammad, H., Avery, R., Caylor, K., Eastman, J. R., Fishgold, L., Friedl, M. A., Jain, M., Kohli, D., Bayas, J. C. L., Lunga, D., McCarty, J. L., Pontius, R. G., Reinmann, A. B., Rogan, J., Song, L., Stoynova, H., Ye, S., Yi, Z. F., & Estes, L. (2020). Accounting for training data error in machine learning applied to earth observations. In *Remote Sensing* (Vol. 12, Issue 6). MDPI AG. https://doi.org/10.3390/rs12061034

ERDAS (1999) ERDAS Field Guide Revised and Expanded. 5th Edition, ERDAS Inc., Atlanta.

Fatoyinbo, T. E., & Simard, M. (2013). Height and biomass of mangroves in Africa from ICESat/GLAS and SRTM. International Journal of Remote Sensing, 34(2), 668–681. https://doi.org/10.1080/01431161.2012.712224

Fisher, J. R. B., Acosta, E. A., Dennedy-Frank, P. J., Kroeger, T., & Boucher, T. M. (2018). Impact of satellite imagery spatial resolution on land use classification accuracy and modeled water quality. *Remote Sensing in Ecology and Conservation, 4(2),* 137–149. https://doi.org/10.1002/rse2.61

Foody, G. M. (2002). Status of land cover classification accuracy assessment. *Remote Sensing of Environment*, *80*, 185–201. www.elsevier.com/locate/rse

Foody, G. M., Campbell, N. A., & Trodd, N. M. (1992). Derivation and Applications of Probabilistic Measures of Class Membership from the Maximum-Likelihood Classification. *Photogrammetric Engineering and Remote Sensing*, *58*(9), 1335–1341. https://doi.org/10.1109/TGRS.2004.827257.

Foody, G. M., & Mathur, A. (2004). A relative evaluation of multiclass image classification by support vector machines. *IEEE Transactions on Geoscience and Remote Sensing, 42*(6), 1335–1343.

Gao, H., Guo, J., Guo, P., & Chen, X. (2021). Classification of very-high-spatial-resolution aerial images based on multiscale features with limited semantic information. *Remote Sensing, 13*(3), 364. https://doi.org/10.3390/rs13030364.

Gong, C., Tao, D., Maybank, S. J., Liu, W., Kang, G., & Yang, J. (2016). Multi-Modal Curriculum Learning for Semi-Supervised Image Classification. *IEEE Transactions on Image Processing*, *25*(7), 3249–3260. https://doi.org/10.1109/TIP.2016.2563981

KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Harefa, M. S., Pratama, A., Sihombing, E. T., Ilvaldo, I., Putri, N. A., Sembiring, Y. P., & Ramadani, Y. F. (2024). The Role of Local Communities in Development Mangrove Ecotourism at Paluh Getah Beach. *Journal of Social, Policy, and Development Studies*, *1*, 29–40.

Hay, G. J., & Castilla, G. (2006). Object-based image analysis: Strengths, weaknesses, opportunities and threats (SWOT). In *Proceedings of the 2006 ASPRS Annual Conference*. American Society for Photogrammetry and Remote Sensing.

Heenkenda, M. K., Joyce, K. E., Maier, S. W., & Bartolo, R. (2014). Mangrove species identification: Comparing WorldView-2 with aerial photographs. *Remote Sensing, 6*(7), 6064-6088. https://doi.org/10.3390/rs6076064.

Heumann, B. W. (2011). An object-based classification of mangroves using a hybrid decision tree-support vector machine approach. *Remote Sensing*, *3*(11), 2440–2460. https://doi.org/10.3390/rs3112440.

Hidayatullah, M. F., Kamal, M., & Wicaksono, P. (2023). Species-based aboveground mangrove carbon stock estimation using WorldView-2 image data. *Remote Sensing Applications: Society and Environment*, *30*. https://doi.org/10.1016/j.rsase.2023.100959.

Honkavaara, E., & Khoramshahi, E. (2018). Radiometric correction of close-range spectral image blocks captured using an unmanned aerial vehicle with a radiometric block adjustment. *Remote Sensing*, *10*(2). https://doi.org/10.3390/rs10020256.

Immitzer, M., Vuolo, F., & Atzberger, C. (2016). First Experience with Sentinel-2 Data for Crop and Tree Species Classifications in Central Europe. *Remote Sensing*, *8*(3), 166. https://doi.org/10.3390/rs8030166.

Jensen, J. R. (2015). *Introductory Digital Image Processing: A Remote Sensing Perspective* (4th ed.). Pearson.

Jiang, Y., Liu, Q., Ma, L., Lu, X., & Zhang, J. (2021). High-resolution mangrove forests classification with UAV hyperspectral image and WorldView-2 multispectral image. *Remote Sensing*, 13(8), 1529. https://doi.org/10.3390/rs13081529.

Johnson, B. A. (2015). Scale Issues Related to the Accuracy Assessment of Land Use/Land Cover Maps Produced Using Multi-Resolution Data: Comments on “The Improvement of

KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Land Cover Classification by Thermal Remote Sensing". Remote Sens. 2015, 7(7), 8368–8390. *Remote Sensing*, *7*(10), 13436-13439. https://doi.org/10.3390/rs71013436.

Kamal, M., Hidayatullah, M. F., Mahyatar, P., & Ridha, S. M. (2022). Estimation of aboveground mangrove carbon stocks from WorldView-2 imagery based on generic and species-specific allometric equations. *Remote Sensing Applications: Society and Environment*, *26*. https://doi.org/10.1016/j.rsase.2022.100748.

Kamal, M., Phinn, S., & Johansen, K. (2015). Object-Based Approach for Multi-Scale Mangrove Composition Mapping Using Multi-Resolution Image Datasets. *Remote Sensing 2015, Vol. 7, Pages 4753-4783*, *7*(4), 4753–4783. https://doi.org/10.3390/RS70404753.

Kauffman, J. B., Adame, M. F., Arifanti, V. B., Schile-Beers, L. M., Bernardino, A. F., Bhomia, R. K., Donato, D. C., Feller, I. C., Ferreira, T. O., Garcia, M. C., MacKenzie, R. A., Megonigal, J. P., Murdiyarso, D., Simpson, L. T., & Alongi, D. M. (2020). *Total ecosystem carbon stocks of mangroves across broad global environmental and physical gradients. Ecological Monographs, 90*(2), e01405. https://doi.org/10.1002/ecm.1405.

Kaufman, Y. J., Wald, A. E., Remer, L. A., Bo-Cai Gao, Rong-Rong Li, & Flynn, L. (1997). The MODIS 2.1-μm channel-correlation with visible reflectance for use in remote sensing of aerosol. *IEEE Transactions on Geoscience and Remote Sensing*, *35*(5), 1286–1298. https://doi.org/10.1109/36.628795

Kruse, F. A., & Perry, S. L. (2013). *Mineral mapping using simulated WorldView-3 short-wave infrared imagery.* Remote Sensing, 5(6), 2688-2703. https://doi.org/10.3390/rs5062688

Kucuk Matci, D., & Avdan, U. (2020). Optimization-based automated unsupervised classification method: A novel approach. *Expert Systems with Applications*, *160*. https://doi.org/10.1016/j.eswa.2020.113735

Kuenzer, C., Bluemel, A., Gebhardt, S., Quoc, T. V., & Dech, S. (2011). Remote sensing of mangrove ecosystems: A review. In *Remote Sensing* (Vol. 3, Issue 5, pp. 878–928). https://doi.org/10.3390/rs3050878

Kuester, M. A. (2017). *Absolute Radiometric Calibration: 2016v0 GE01 and CAVIS*.

Kulkarni, A., Chong, D., & Batarseh, F. A. (2020). Foundations of data imbalance and solutions for a data democracy. In *Data Democracy: At the Nexus of Artificial Intelligence, Software*

UNIVERSITAS GADJAH MADA
KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON OBJEK VEGETASI MANGROVE
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Development, and Knowledge Engineering (pp. 83–106). Elsevier. https://doi.org/10.1016/B978-0-12-818366-3.00005-8

Kumar, A., Kumar, G., Patil, D. S., & Gupta, R. (2025). *Evaluating machine learning classifiers for IRS high-resolution satellite images using object-based and pixel-based classification techniques.* Journal of the Indian Society of Remote Sensing, 53(6), 1799-1818. https://doi.org/10.1007/s12524-024-02084-w.

Laksono, A. N., & Mussadun. (2014). Dampak Aktivitas Ekowisata di Pulau Karimunjawa Berdasarkan Persepsi Masyarakat. *Jurnal Teknik PWK*, *3*, 262–273.

Latifah, N., Febrianto, S., Endrawati, H., & Zainuri, D. M. (2018). *Pemetaan Klasifikasi Dan Analisa Perubahan Ekosistem Mangrove Menggunakan Citra Satelit Multi Temporal Di Karimunjawa, Jepara, Indonesia*. *21*(2), 97–102. https://doi.org/10.14710/jkt.v21i2

Li, C., Wang, J., Wang, L., Hu, L., & Gong, P. (2014). Comparison of Classification Algorithms and Training Sample Sizes in Urban Land Classification with Landsat Thematic Mapper Imagery. Remote Sensing, 6(2), 964-983. https://doi.org/10.3390/rs6020964

Li, Z. L., Tang, B. H., Wu, H., Ren, H., Yan, G., Wan, Z., Trigo, I. F., & Sobrino, J. A. (2013). Satellite-derived land surface temperature: Current status and perspectives. In *Remote Sensing of Environment* (Vol. 131, pp. 14–37). https://doi.org/10.1016/j.rse.2012.12.008

Li, R., Gao, X., Shi, F., & Zhang, H. (2023). Scale Effect of Land Cover Classification from Multi-Resolution Satellite Remote Sensing Data. *Sensors*, *23*(13), 6136. https://doi.org/10.3390/s23136136.

Liang, S., & Wang, J. (2020). A systematic view of remote sensing. In *Advanced Remote Sensing* (pp. 1–57). Elsevier. https://doi.org/10.1016/b978-0-12-815826-5.00001-5

Liao, Y., Liao, Y., Zhao, W., Chen, Q., Li, T., & Yang, T. (2020). Study on Mangrove of Maximum Likelihood: Reclassification Method in Xiezhou Bay. *Journal of Coastal Research*, 334–343. https://www.jstor.org/stable/48639251.

Lillesand, T. M., Kiefer, R. W., & Chipman, J. W. (2015). *Remote Sensing And Image Interpretation 7th Edition* (7th ed.). John Wiley & Sons, Inc.

Liu, K., Li, X., Shi, X., & Wang, S. (2008). Monitoring mangrove forest changes using remote sensing and GIS data with decision-tree learning. Wetlands, 28(2), 336–346. https://doi.org/10.1672/06-91.1.

UNIVERSITAS
GADJAH MADA
KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Liu, X., Forkuor, G., Asare, S., Aboagye, D., & Gumma, M. K. (2020). Large-scale high-resolution coastal mangrove forests mapping across West Africa with machine learning ensemble and satellite big data. Frontiers in Earth Science, 8, 560933. https://doi.org/10.3389/feart.2020.560933.

Liu, M., Yu, T., Gu, X., Sun, Z., Yang, J., Zhang, Z., Mi, X., Cao, W., & Li, J. (2020). The Impact of Spatial Resolution on the Classification of Vegetation Types in Highly Fragmented Planting Areas Based on Unmanned Aerial Vehicle Hyperspectral Images. *Remote Sensing*, *12*(1), 146. https://doi.org/10.3390/rs12010146

Lu, D., & Weng, Q. (2007). A survey of image classification methods and techniques for improving classification performance. In *International Journal of Remote Sensing* (Vol. 28, Issue 5, pp. 823–870). Taylor and Francis Ltd. https://doi.org/10.1080/01431160600746456

Lundmark, T., Bergh, J., Nordin, A., Fahlvik, N., & Poudel, B. C. (2016). Comparison of carbon balances between continuous-cover and clear-cut forestry in Sweden. *Ambio*, *45*, 203–213. https://doi.org/10.1007/s13280-015-0756-3

Macnae, W. (1968). A General Account of The Fauna and Flora of Mangrove Swamps and Forests in The Indo-West-Pacific Region. In *mar. Biol* (Vol. 6).

Matthew, M. W., Adler-Golden, S. M., Berk, A., Richtsmeier, S. C., Levine, R. Y., Bernstein, L. S., Acharya, P. K., Anderson, G. P., Felde, G. W., Hoke, M. L., Ratkowski, A. J., Burke, H. K., Kaiser, R. D., & Miller, D. P. (2000). Status of atmospheric correction using a MODTRAN4-based algorithm. *Algorithms for Multispectral, Hyperspectral, and Ultraspectral Imagery VI*, *4049*, 199. https://doi.org/10.1117/12.410341

Maxwell, A. E., Warner, T. A., & Fang, F. (2018). *Implementation of machine-learning classification in remote sensing: An applied review. International Journal of Remote Sensing, 39*(9), 2784–2817. https://doi.org/10.1080/01431161.2018.1433343

Maxwell, A. E., Warner, T. A., & Guillén, L. A. (2021). Accuracy assessment in convolutional neural network-based deep learning remote sensing studies—part 1: Literature review. In *Remote Sensing* (Vol. 13, Issue 13). MDPI AG. https://doi.org/10.3390/rs13132450

UNIVERSITAS
GADJAH MADA
KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Mondal, P., Trzaska, S., & De Sherbinin, A. (2018). Landsat-Derived Estimates of Mangrove Extents in the Sierra Leone Coastal Landscape Complex during 1990–2016. *Sensors*, *18*(1), 12. https://doi.org/10.3390/s18010012

Nagarajan, P., Rajendran, L., Pillai, N. D., & Lakshmanan, G. (2022). *Comparison of machine learning algorithms for mangrove species identification in Malad Creek, Mumbai using WorldView-2 and Google Earth images. Journal of Coastal Conservation, 26*, 44. https://doi.org/10.1007/s11852-022-00891-2

Neri, M. P., Baloloy, A. B., & Blanco, A. C. (2021). *Limitation assessment and workflow refinement of the mangrove vegetation index (MVI)-based mapping methodology using Sentinel-2 imagery.* In *Proceedings of the Philippine Geomatics Symposium 2021* (Vol. XLVI-4/W6, pp. 235-242). The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences. https://doi.org/10.5194/isprs-archives-XLVI-4-W6-2021-235-2021.

Ning, J., Wang, H., Yang, Q., He, T., & Fu, T. (2023). *Dynamic response of carbon storage to ecological restoration measures in Liupanshui City, Mountain, Water, Forest, Field, Lake and Grassland*. https://doi.org/10.21203/rs.3.rs-2862194/v1.

Noor, R. Y., Khazali, M., & Suryadiputra, N. N. (2006). *Panduan Pengenalan Mangrove di Indonesia*.

Peng, Y., Chen, J., Xu, X., & Pu, F. (2013). SAR Images Statistical Modeling and Classification Based on the Mixture of Alpha-Stable Distributions. Remote Sensing, 5(5), 2145-2163. https://doi.org/10.3390/rs5052145

Pham, T. D., Yokoya, N., Bui, D. T., Yoshino, K., & Friess, D. A. (2019). Remote sensing approaches for monitoring mangrove species, structure, and biomass: Opportunities and challenges. In *Remote Sensing* (Vol. 11, Issue 3). MDPI AG. https://doi.org/10.3390/rs11030230

Polidoro, B. A., Carpenter, K. E., Collins, L., Duke, N. C., Ellison, A. M., Ellison, J. C., Farnsworth, E. J., Fernando, E. S., Kathiresan, K., Koedam, N. E., Livingstone, S. R., Miyagi, T., Moore, G. E., Nam, V. N., Ong, J. E., Primavera, J. H., Salmo, S. G., Sanciangco, J. C., Sukardjo, S., … Yong, J. W. H. (2010). The loss of species: Mangrove extinction risk and geographic areas of global concern. *PLoS ONE*, *5*(4). https://doi.org/10.1371/journal.pone.0010095

UNIVERSITAS
GADJAH MADA
KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Prasad, P., Loveson, V. J., Chandra, P., & Kotha, M. (2022). Evaluation and comparison of the earth observing sensors in land cover/land use studies using machine learning algorithms. *Ecological Informatics*, *68*. https://doi.org/10.1016/j.ecoinf.2021.101522

Purwanto, A. D., & Asriningrum, W. (2019). IDENTIFICATION OF MANGROVE FORESTS USING MULTISPECTRAL SATELLITE IMAGERIES. *International Journal of Remote Sensing and Earth Sciences*, *16*(1), 63–86. https://doi.org/10.30536/j.ijereses.2019.v16.a3097

Qiu, P., Wang, D., Zou, X., Yang, X., Xie, G., Xu, S., & Zhong, Z. (2019). Finer resolution estimation and mapping of mangrove biomass using UAV LiDAR and worldview-2 data. *Forests*, *10*(10). https://doi.org/10.3390/f10100871

Richards, J. A., & Jia, X. (2006). *Remote Sensing Digital Image Analysis: An Introduction* (4th ed.). Springer.

Rogers, K., Lymburner, L., Salum, R., Brooke, B. P., & Woodroffe, C. D. (2017). Mapping of mangrove extent and zonation using high and low tide composites of Landsat data. *Hydrobiologia*, *803*(1), 49–68. https://doi.org/10.1007/s10750-017-3257-5

Roy, D. P., Wulder, M. A., Loveland, T. R., Woodcock, C. E., Allen, R. G., Anderson, M. C., Helder, D., Irons, J. R., Johnson, D. M., Kennedy, R., Scambos, T. A., Schaaf, C. B., Schott, J. R., Sheng, Y., Vermote, E. F., Belward, A. S., Bindschadler, R., & Zhu, Z. (2014). Landsat-8: Science and product vision for terrestrial global change research. *Remote Sensing of Environment, 145*, 154–172. https://doi.org/10.1016/j.rse.2014.02.001

Sagala, P. M., Bhomia, R. K., & Murdiyarso, D. (2024). Assessment of coastal vulnerability to support mangrove restoration in the northern coast of Java, Indonesia. *Regional Studies in Marine Science*, *70*. https://doi.org/10.1016/j.rsma.2024.103383

Sayler, K. (2024, May). *Landsat 8–9 Collection 2 (C2) Level 2 Science Product Guide (Version 6.0) [LSDS-1619]*. U.S. Department of the Interior. https://d9-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/s3fs-public/media/files/LSDS-1619_Landsat8-9-Collection2-Level2-Science-Product-Guide-v6.pdf

Selgrath, J. C., Roelfsema, C., Gergel, S. E., & Vincent, A. C. J. (2016). Mapping for coral reef conservation: Comparing the value of participatory and remote sensing approaches. *Ecosphere*, *7*(5). https://doi.org/10.1002/ecs2.1325

KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Shetty, S., Gupta, P. K., Belgiu, M., & Srivastav, S. K. (2021). Assessing the Effect of Training Sampling Design on the Performance of Machine Learning Classifiers for Land Cover Mapping Using Multi-Temporal Remote Sensing Data and Google Earth Engine. Remote Sensing, 13(8), 1433. https://doi.org/10.3390/rs13081433

Singh, A., Bhattacharya, P., Vyas, P., & Roy, S. (2010). Contribution of NTFPs in the Livelihood of Mangrove Forest Dwellers of Sundarban. *Journal of Human Ecology*, *29*(3), 191–200. https://doi.org/10.1080/09709274.2010.11906263

SUHET. (2015). *SENTINEL-2 User Handbook*. European Space Agency.

Suryanti, Hendarto, I. B., & Anggoro, D. (2011). Perubahan Luas Hutan Mangrove di Pulau Kemujan Taman Nasional Karimunjawa. *Jurnal Ilmu Pengetahuan Dan Teknologi*, *20*, 1–9.

Suwanprasit, C., & Srichai, N. (2012). Impacts of spatial resolution on land cover classification. *Proceedings of the Asia-Pacific Advanced Network*, *33*(0), 39. https://doi.org/10.7125/apan.33.4

Tian, J., Wang, L., Li, X., Gong, H., & Zhong, R. (2017). *Comparison of UAV and WorldView-2 imagery for mapping leaf area index of mangrove forest. International Journal of Applied Earth Observation and Geoinformation,* 61, 22-31. https://doi.org/10.1016/j.jag.2017.05.002

Updike, T., & Comp, C. (2010). *Radiometric Use of WorldView-2 Imagery Technical Note*.

Villamayor, B. M. R., Rollon, R. N., Samson, M. S., Albano, G. M. G., & Primavera, J. H. (2016). Impact of Haiyan on Philippine mangroves: Implications to the fate of the widespread monospecific Rhizophora plantations against strong typhoons. *Ocean and Coastal Management*, *132*, 1–14. https://doi.org/10.1016/j.ocecoaman.2016.07.011

Vu, T. T. P., Pham, T. D., Saintilan, N., Skidmore, A., Luu, H. V., Vu, Q. H., Le, N. N., Nguyen, H. Q., & Matsushita, B. (2022). *Mapping multi-decadal mangrove extent in the northern coast of Vietnam using Landsat time-series data on Google Earth Engine platform. Remote Sensing, 14*(18), 4664. https://doi.org/10.3390/rs14184664.

Wang, D., Wan, B., Qiu, P., Su, Y., Guo, Q., Wang, R., Sun, F., & Wu, X. (2018). Evaluating the performance of Sentinel-2, Landsat 8 and Pléiades-1 in mapping mangrove extent and species. *Remote Sensing*, *10*(9). https://doi.org/10.3390/rs10091468

UNIVERSITAS
GADJAH MADA
KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Wang, L., Lu, Y., & Miao, J. (2024). Remote Sensing of Mangrove Forests. *Reference Module in Earth Systems and Environmental Sciences*. https://doi.org/10.1016/B978-0-443-13220-9.00005-6

Weng, Q. (2012). Remote sensing of impervious surfaces in urban areas: Requirements, methods, and trends. *Remote Sensing of Environment, 117*, 34–49. https://doi.org/10.1016/j.rse.2011.02.030

Wicaksono, P., & Aryaguna, P. A. (2020). Analyses of inter-class spectral separability and classification accuracy of benthic habitat mapping using multispectral image. *Remote Sensing Applications: Society and Environment*, *19*. https://doi.org/10.1016/j.rsase.2020.100335

Wickham, J., & Riitters, K. H. (2019). Influence of high-resolution data on the assessment of forest fragmentation. *Landscape Ecology, 34*, 2169-2182. https://doi.org/10.1007/s10980-019-00820-z.

Winarso, G., Purwanto, A. D., Yuwono, D., & Yuwono, D. M. (2014). *New Mangrove Index as Degradation/Health Indicator Using Remote Sensing Data: Segara Anakan and Alas Purwo Case Study*. https://www.researchgate.net/publication/277137915.

Wolfe, J. D., & Black, S. R. (2023, November 1). *Hyperspectral analytics in ENVI®: Target detection and spectral mapping methods* (NV5 Geospatial Solutions White Paper). NV5 Geospatial Solutions, Inc. https://www.nv5geospatialsoftware.com/Portals/0/pdfs/Confirmation/Hyperspectral-Whitepaper.pdf.

Woodcock, C. E., & Strahler, A. H. (1987). The factor of scale in remote sensing. *Remote Sensing of Environment, 21*(3), 311–332. https://doi.org/10.1016/0034-4257(87)90015-0

Woodroffe, C. D. (1995). *Earth Surface Processes and Landforms Response of Tide-Dominated Mangrove Shorelines in Northern Australia to Anticipated Sea-Level Rise* (Vol. 20).

Zhang, C., Gao, S., Yang, X., Li, F., Yue, M., Han, Y., Zhao, H., Zhang, Y., & Fan, K. (2018). Convolutional neural network-based remote sensing images segmentation method for extracting winter wheat spatial distribution. *Applied Sciences (Switzerland)*, *8*(10). https://doi.org/10.3390/app8101981

KAJIAN PENGARUH RESOLUSI SPASIAL CITRA TERHADAP HASIL PENGUKURAN LUASAN DAN PERHITUNGAN STOK KARBON
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Zhang, H., He, J., Chen, S., Zhan, Y., Bai, Y., & Qin, Y. (2023). Comparing Three Methods of Selecting Training Samples in Supervised Classification of Multispectral Remote Sensing Images. *Sensors (Basel, Switzerland)*, *23*(20), 8530. https://doi.org/10.3390/S23208530/S1

Zhang, H., Xia, Q., Dai, S., Zheng, Q., Zhang, Y., & Deng, X. (2023). Mangrove forest mapping from object-oriented multi-feature ensemble classification using Sentinel-2 images. *Frontiers in Marine Science*, *10*. https://doi.org/10.3389/fmars.2023.1243116

Zhao, C., Jia, M., Zhang, R., Wang, Z., Ren, C., Mao, D., & Wang, Y. (2024). Mangrove species mapping in coastal China using synthesized Sentinel-2 high-separability images. *Remote Sensing of Environment*, *307*. https://doi.org/10.1016/j.rse.2024.114151

Zhu, Y., Liu, K., Liu, L., Wang, S., & Liu, H. (2015). Retrieval of mangrove aboveground biomass at the individual species level with worldview-2 images. *Remote Sensing*, *7*(9), 12192–12214. https://doi.org/10.3390/rs70912192

Zhu, Y., Liu, K., Liu, L., Myint, S. W., Wang, S., Cao, J., & Wu, Z. (2020). Estimating and Mapping Mangrove Biomass Dynamic Change Using WorldView-2 Images and Digital Surface Models. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, *13*, 2123–2134. https://doi.org/10.1109/JSTARS.2020.2989500

Zhu, Y., Myint, S. W., Liu, K., Liu, L., & Cao, J. (2024). Integration of UAV LiDAR and WorldView-2 images for modeling mangrove aboveground biomass with GA-ANN wrapper. *Ecological Processes*, 13, Article 85. https://doi.org/10.1186/s13717-024-00566-w.