



DAFTAR PUSTAKA

- Adan, M. S., Hussin, Y. A., & Kloosterman, D. E. H. (2017). *Integrating Sentinel-2 Derived Vegetation Indices and Terrestrial Laser Scanner To Estimate Above-Ground Biomass/Carbon in Ayer Hitam Tropical Forest Malaysia*. 78. https://webapps.itc.utwente.nl/librarywww/papers_2017/msc/nrm/adan.pdf
- Ahmed, N., & Glaser, M. (2016). Coastal aquaculture, mangrove deforestation and blue carbon emissions: Is REDD+ a solution? *Marine Policy*, 66, 58–66. <https://doi.org/10.1016/j.marpol.2016.01.011>
- Alan, J., Castillo, A., Apan, A. A., Maraseni, T. N., & Salmo, S. G. (2017). ISPRS Journal of Photogrammetry and Remote Sensing Estimation and mapping of above-ground biomass of mangrove forests and their replacement land uses in the Philippines using Sentinel imagery. *ISPRS Journal of Photogrammetry and Remote Sensing*, 134, 70–85. <https://doi.org/10.1016/j.isprsjprs.2017.10.016>
- Alongi, D. M. (2002). *Present state and future of the world's mangrove forests*. 29(3), 331–349. <https://doi.org/10.1017/S0376892902000231>
- Alongi, D. M. (2014). Carbon cycling and storage in mangrove forests. *Annual Review of Marine Science*, 6, 195–219. <https://doi.org/10.1146/annurev-marine-010213-135020>
- Arjasakusuma, S., Kusuma, S., Rafif, R., Saringatin, S., & Mada, U. G. (2020). *Combination of Landsat 8 OLI and Sentinel-1 SAR Time-Series Data for Mapping Paddy Fields in Parts of West and Central Java Provinces , Indonesia. November*. <https://doi.org/10.3390/ijgi9110663>
- Aslan, A., Rahman, A. F., Warren, M. W., & Robeson, S. M. (2016). Mapping spatial distribution and biomass of coastal wetland vegetation in Indonesian Papua by combining active and passive remotely sensed data. *Remote Sensing of Environment*, 183, 65–81. <https://doi.org/10.1016/j.rse.2016.04.026>
- Badan Standar Nasional. (2011). *Pengukuran dan Penghitungan Cadangan Karbon – Pengukuran Lapangan untuk Penaksiran Cadangan Karbon Hutan* (



Ground Based Forest Carbon Accounting). 1–24.

- Belgiu, M., & Dra, L. (2016). *ISPRS Journal of Photogrammetry and Remote Sensing Random forest in remote sensing : A review of applications and future directions* gut. 114, 24–31. <https://doi.org/10.1016/j.isprsjprs.2016.01.011>
- Belgiu, M., & Drăgu, 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>
- Breiman, L. (2001). Random forests. *Random Forests*, 1–32. <https://doi.org/10.1201/9780429469275-8>
- Byrd, K. B., Connell, J. L. O., Di, S., & Kelly, M. (2014). Remote Sensing of Environment Evaluation of sensor types and environmental controls on mapping biomass of coastal marsh emergent vegetation. *Remote Sensing of Environment*, 149, 166–180. <https://doi.org/10.1016/j.rse.2014.04.003>
- Cahyaningrum, S. T., Hartoko, A., & Suryanti. (2014). *Biomassa Karbon Mangrove Pada Kawasan Pulau Kemujan Taman Nasional Karimunjawa*. 3, 34–42.
- Cahyawati, A. (2017). Analisis Citra Alos Palsar untuk Estimasi Stok Karbon di Atas Permukaan pada Tegakan Tiap Ekosistem Hutan di SPTN 1 Sukadana Taman Nasional Gunung Palung, Provinsi Kalimantan Barat. Yogyakarta: Fakultas Geografi UGM.
- Cahyono, W. E. (2015). Pengaruh Pemanasan Global Terhadap Lingkungan Bumi. *Berita Dirgantara LAPAN*, 16, 28–31. http://jurnal.lapan.go.id/index.php/berita_dirgantara/article/download/732/649
- Chen, C., Son, N., Chang, N., Chen, C., Chang, L., Valdez, M., Centeno, G., Thompson, C. A., & Aceituno, J. L. (2013). *Multi-Decadal Mangrove Forest Change Detection and Prediction in Honduras, Central America, with Landsat Imagery and a Markov Chain Model*. 6408–6426. <https://doi.org/10.3390/rs5126408>
- Chen, L., Wang, Y., Ren, C., Zhang, B., & Wang, Z. (2019). Optimal combination



- of predictors and algorithms for forest above-ground biomass mapping from Sentinel and SRTM data. *Remote Sensing*, 11(4), 1–20. <https://doi.org/10.3390/rs11040414>
- Cougo, M. F., Souza-Filho, P. W. M., Silva, A. Q., Fernandes, M. E. B., Dos Santos, J. R., Abreu, M. R. S., Nascimento, W. R., & Simard, M. (2015). Radarsat-2 backscattering for the modeling of biophysical parameters of regenerating mangrove forests. *Remote Sensing*, 7(12), 17097–17112. <https://doi.org/10.3390/rs71215873>
- Coy, M., & Roger. (2005). Field Methods in Remote Sensing. In *Journal of Chemical Information and Modeling*.
- Cutler, M. E. J., Boyd, D. S., Foody, G. M., & Vettrivel, A. (2012). Estimating tropical forest biomass with a combination of SAR image texture and Landsat TM data: An assessment of predictions between regions. *ISPRS Journal of Photogrammetry and Remote Sensing*, 70, 66–77. <https://doi.org/10.1016/j.isprsjprs.2012.03.011>
- Danoedoro, P. (1996). Pengolahan Citra Digital Teori dan Aplikasinya dalam Bidang Penginderaan Jauh. Fakultas Geografi UGM
- Danoedoro, P. (2012). *Pengantar Penginderaan Jauh Digital*. Yogyakarta: Pen-erbit ANDI.
- Darmawan, S., Takeuchi, W., Vetrata, Y., Wikantika, K., & Sari, D. K. (2015). Impact of topography and tidal height on ALOS palsar polarimetric measurements to estimate aboveground biomass of mangrove forest in Indonesia. *Journal of Sensors*, 2015. <https://doi.org/10.1155/2015/641798>
- Dat Pham, T., Xia, J., Thang Ha, N., Tien Bui, D., Nhu Le, N., & Tekeuchi, W. (2019). A review of remote sensing approaches for monitoring blue carbon ecosystems: Mangroves, sea grasses and salt marshes during 2010–2018. *Sensors (Switzerland)*, 19(8). <https://doi.org/10.3390/s19081933>
- Delegido, J., Verrelst, J., Alonso, L., & Moreno, J. (2011). Evaluation of sentinel-2 red-edge bands for empirical estimation of green LAI and chlorophyll content. *Sensors*, 11(7), 7063–7081. <https://doi.org/10.3390/s110707063>



- Devara Prawira A., R. H. J. (2011). Analisis Koefisien Nilai Hamburan Balik Obyek Penutup Lahan Pada Data Digital Alos Palsar Berpolarisasi Ganda (HH dan HV) di Sebagian Jakarta dan Tanggerang. *Fakultas Geografi UGM, Yogyakarta.*
- Dharmawan, I. W. S., & Siregar, C. A. (2008). Karbon Tanah Dan Pendugaan KarbonTegakan Avicennia marina (Forsk.) Vierh. di Ciasem, Purwakarta. *Jurnal Penelitian Hutan Dan Konservasi Alam*, 5(4), 317–328. <https://doi.org/10.20886/jphka.2008.5.4.317-328>
- Donato, D. C., Kauffman, J. B., Murdiyarso, D., Kurnianto, S., & Stidham, M. (2011). Mangroves among the most carbon-rich forests in the tropics. *Nature Geoscience*, 4(4), 1–5. <https://doi.org/10.1038/ngeo1123>
- Donato, D. C., Kauffman, J. B., Murdiyarso, D., Kurnianto, S., Stidham, M., & Kanninen, M. (2012). Mangrove adalah salah satu hutan terkaya karbon di kawasan tropis. *CIFOR Brief*, 13(12), 12.
- Duarte, C. M., Losada, I. J., Hendriks, I. E., Mazarrasa, I., & Marbà, N. (2013). The role of coastal plant communities for climate change mitigation and adaptation. *Nature Climate Change*, 3(11), 961–968. <https://doi.org/10.1038/nclimate1970>
- ESA. (2014) Sentinels Scientific Data Hub, European Space Agency, viewed November, 2020
- Field, C. D. (2007). *Rehabilitation of Mangrove Ecosystems : An Overview*. 37(1997), 383–392.
- Filipponi, F. (2019). Sentinel-1 GRD Preprocessing Workflow. *Proceedings*, 18(1), 11. <https://doi.org/10.3390/ecrs-3-06201>
- Frampton, W. J., Dash, J., Watmough, G., & Milton, E. J. (2013). Evaluating the capabilities of Sentinel-2 for quantitative estimation of biophysical variables in vegetation. *ISPRS Journal of Photogrammetry and Remote Sensing*, 82, 83–92. <https://doi.org/10.1016/j.isprsjprs.2013.04.007>
- Frampton, W. J., Dash, J., Watmough, G., & Milton, E. J. (2013). ISPRS Journal of Photogrammetry and Remote Sensing Evaluating the capabilities of Sentinel-



- 2 for quantitative estimation of biophysical variables in vegetation. *ISPRS Journal of Photogrammetry and Remote Sensing*, 82, 83–92. <https://doi.org/10.1016/j.isprsjprs.2013.04.007>
- FWI. (2006). Lembar Informasi. Catatan Singkat : Potret Kondisi Hutan Indonesia dan Kinerja Pelaku di Sektor kehutanan. Bogor
- FWI. (2009). Penghitungan potensi karbon di kawasan hutan. *Forest Watch Indonesia*, 11.
- Ghosh, S. M., & Behera, M. D. (2018). Aboveground biomass estimation using multi-sensor data synergy and machine learning algorithms in a dense tropical forest. *Applied Geography*, 96(March), 29–40. <https://doi.org/10.1016/j.apgeog.2018.05.011>
- Giri Ananto, W. H., Hadi, H. A., Sandhini Putri, A. F., Hanum, D. N., Puji Wiryawan, B. K., Prabaswara, R. R., & Arjasakusuma, S. (2019). Assessment of dual polarization in Sentinel-1 data for estimating forest aboveground biomass: case study of Barru Regency, South Sulawesi. 1137214(December 2019), 47. <https://doi.org/10.1111/12.2540845>
- Giri, C., Ochieng, E., Tieszen, L. L., Zhu, Z., Singh, A., Loveland, T., Masek, J., & Duke, N. (2011). Status and distribution of mangrove forests of the world using earth observation satellite data. *Global Ecology and Biogeography*, 20(1), 154–159. <https://doi.org/10.1111/j.1466-8238.2010.00584.x>
- Goetz, S. J., Baccini, A., Laporte, N. T., Johns, T., Walker, W., Kellndorfer, J., Houghton, R. A., & Sun, M. (2009). Mapping and monitoring carbon stocks with satellite observations: A comparison of methods. *Carbon Balance and Management*, 4, 1–7. <https://doi.org/10.1186/1750-0680-4-2>
- Grimsditch, G., Alder, J., & Nakamura, T. (2013). The blue carbon special edition – Introduction and overview. *Ocean & Coastal Management*, 83, 1–4. <https://doi.org/10.1016/j.ocecoaman.2012.04.020>
- Hamdan, O., Khali Aziz, H., & Mohd Hasmadi, I. (2014). L-band ALOS PALSAR for biomass estimation of Matang Mangroves, Malaysia. *Remote Sensing of Environment*, 155, 69–78. <https://doi.org/10.1016/j.rse.2014.04.029>



- Heumann, B. W. (2011). Satellite remote sensing of mangrove forests: Recent advances and future opportunities. *Progress in Physical Geography*, 35(1), 87–108. <https://doi.org/10.1177/0309133310385371>
- Hermayani, R. (2018). Analisis Citra Sentinel-1A Untuk Estimasi Stok Karbon Di Atas Permukaan (*Above Ground Carbon*) Hutan Mangrove Pulau Kemujan, Taman Nasional Karimunjawa. *Skripsi*. Fakultas Geografi Universitas Gadjah Mada
- Hidayatullah, M. F. Estimasi Karbon Atas Permukaan Hutan Mangrove Berdasarkan Spesies Menggunakan Citra Wolrdview 2 Di Kawasan Clungup Mangrove Conservation,Kabupaten Malang. *Tesis*. Fakultas Geografi Universitas Gadjah Mada.
- Hidayati, N. I. (2013). Ekstraksi Data Indeks Vegetasi Untuk Evauasi Ruang Terbuka Hijau Berdasarkan Citra Alos di Kecamatan Ngaglik Kabupaten Sleman Yogyakarta. *Agroteknologi*, 3, 27–34. <http://dx.doi.org/10.1016/j.encep.2012.03.001>
- Hilmi, E dan C. Kusmana.(1999). Ekosistem Mangrove: Antara Karakteristik, Teknik Sampling, dan Analisis Sistem. Program Pascasarjana IPB. Bogor
- Hornong, N, 2004. *Global Land Vegetation; An Electronic Textbook*. NASA Godard Space Flihgt Center Earth Sciences.
- Huete, A. R. (1988). A Soil Adjusted Vegetation Index (SAVI). *Remote Sensing of Environment*, 295–309.
- Ilman, M., Dargusch, P., Dart, P., & Onrizal. (2016). A historical analysis of the drivers of loss and degradation of Indonesia's mangroves. *Land Use Policy*, 54, 448–459. <https://doi.org/10.1016/j.landusepol.2016.03.010>
- Jachowski, N. R. A., Quak, M. S. Y., Friess, D. A., Duangnamon, D., Webb, E. L., & Ziegler, A. D. (2013). Mangrove biomass estimation in Southwest Thailand using machine learning. *Applied Geography*, 45, 311–321. <https://doi.org/10.1016/j.apgeog.2013.09.024>
- Jaya, I Nengah Surati. (2009). Analisis Citra Dijital: Perspektif Penginderaan Jauh Untuk Pengelolaan Dumberdaya Alam. Fakultas Kehutanan IPB. Bogor



- Joshi, N., Baumann, M., Ehammer, A., Fensholt, R., Grogan, K., Hostert, P., Jepsen, M. R., Kuemmerle, T., Meyfroidt, P., Mitchard, E. T. A., Reiche, J., Ryan, C. M., & Waske, B. (2016). A review of the application of optical and radar remote sensing data fusion to land use mapping and monitoring. *Remote Sensing*, 8(1), 1–23. <https://doi.org/10.3390/rs8010070>
- Kamal, M., Faqih, M., Mahyatar, P., & Muhammad, S. (2022). Remote Sensing Applications : Society and Environment 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(March), 100748. <https://doi.org/10.1016/j.rsase.2022.100748>
- Kamal, M., Hartono, H., Wicaksono, P., Adi, N. S., & Arjasakusuma, S. (2016). Assessment of Mangrove Forest Degradation Through Canopy Fractional Cover in Karimunjawa Island, Central Java, Indonesia. *Geoplanning: Journal of Geomatics and Planning*, 3(2), 107. <https://doi.org/10.14710/geoplanning.3.2.107-116>
- Kamal, M., Phinn, S., Johansen, K., & Adi, N. S. (2016). Estimation of mangrove leaf area index from ALOS AVNIR-2 data (A comparison of tropical and subtropical mangroves). *AIP Conference Proceedings*, 1755(July). <https://doi.org/10.1063/1.4958480>
- Kathiresan, K., & Bingham, B. L. (2001). Biology of mangroves and mangrove ecosystems. *Advances in Marine Biology*, 40, 81–251. [https://doi.org/10.1016/S0065-2881\(01\)40003-4](https://doi.org/10.1016/S0065-2881(01)40003-4)
- Kauffman, J. B. O., Eider, C. H. H., & Orfolk, J. E. N. (2014). *Carbon stocks of intact mangroves and carbon emissions arising from their conversion in the Dominican Republic*. 24(3), 518–527.
- Kemenhut. 2007. Pedoman Inventarisasi Hutan Menyeluruh Berkala (IHMB) pada Usaha Pemanfaatan Hasil Hutan pada Hutan Produksi. Permenhut 34/2007
- Kemenhut. 2017. Pejabat Pengelola Informasi dan Dokumentasi. http://ppid.menlhk.go.id/siaran_pers.



- Komiyama, A., Ong, J. E., & Poungparn, S. (2008). Allometry, biomass, and productivity of mangrove forests: A review. *Aquatic Botany*, 89(2), 128–137. <https://doi.org/10.1016/j.aquabot.2007.12.006>
- Komiyama, A., Poungparn, S., & Kato, S. (2005). Common allometric equations for estimating the tree weight of mangroves. *Journal of Tropical Ecology*, 21(4), 471–477. <https://doi.org/10.1017/S0266467405002476>
- Krisnawati, H., Adinugroho, W. C., & Imanuddin, R. (2012). *Monograf Model Model Alometrik Untuk Pendugaan Biomassa Pohon pada Berbagai Tipe Ekosistem Hutan di Indonesia*. Kementerian Kehutanan Badan Penelitian Dan Pengembangan Kehutanan Pusat Penelitian Dan Pengembangan Konservasi Dan Rehabilitasi.
- 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). <https://doi.org/10.3390/rs3050878>
- Kumar, L., Sinha, P., Taylor, S., & Alqurashi, A. F. (2015). Review of the use of remote sensing for biomass estimation to support renewable energy generation. *Journal of Applied Remote Sensing*, 9(1), 097696. <https://doi.org/10.1117/1.jrs.9.097696>
- Laffoley, D., & Grimsditch, G. (2009). *The Management of Natural Coastal Carbon Sinks* (Issue November).
- Lantzanakis, G., Mitraka, Z., & Chrysoulakis, N. (2016). Comparison of physically and image based atmospheric correction methods for Sentinel-2 satellite imagery. *Fourth International Conference on Remote Sensing and Geoinformation of the Environment (RSCy2016)*, 9688, 96880A. <https://doi.org/10.1117/12.2242889>
- Laurin, G. V., Balling, J., Corona, P., Mattioli, W., Papale, D., Puletti, N., Rizzo, M., Truckenbrodt, J., & Urban, M. (2018). Above-ground biomass prediction by Sentinel-1 multitemporal data in central Italy with integration of ALOS2 and Sentinel-2 data. *Journal of Applied Remote Sensing*, 12(01), 1. <https://doi.org/10.1117/1.jrs.12.016008>



- Liu, M., Zhang, H., Lin, G., Lin, H., & Tang, D. (2018). Zonation and directional dynamics of mangrove forests derived from time-series satellite imagery in Mai Po, Hong Kong. *Sustainability (Switzerland)*, 10(6), 3–5. <https://doi.org/10.3390/su10061913>
- Lu, D. (2006). The potential and challenge of remote sensing-based biomass estimation. *International Journal of Remote Sensing*, 27(7), 1297–1328. <https://doi.org/10.1080/01431160500486732>
- Lu, D., Chen, Q., Wang, G., Liu, L., Li, G., & Moran, E. (2016). A survey of remote sensing-based aboveground biomass estimation methods in forest ecosystems. *International Journal of Digital Earth*, 9(1), 63–105. <https://doi.org/10.1080/17538947.2014.990526>
- Lucas, M. R., Lee, C. A., Armston, J., Carreiras, J. M. B., Viergever, K. M., Bunting, P., Clewley, D., Mahta, M., Siqueira, P., & Woodhouse, I. (2010). Ecosystem Function in Savannas. In *Ecosystem Function in Savannas*. <https://doi.org/10.1201/b10275>
- Mahyatar, P. Pemetaan Cadangan Karbon Atas Permukaan Di kawasan Mangrove Clungup, Kabupaten Malang Menggunakan Citra Wolrdview 2. *Skripsi*. Fakultas Geografi Universitas Gadjah Mada.
- McCoy, R. M. (2005). *Field Methods in Remote Sensing*. New York: The Guilford Press A Division of Guilford Publications. New York
- Mohd Zaki, N. A., & Abd Latif, Z. (2017). Carbon sinks and tropical forest biomass estimation: a review on role of remote sensing in aboveground-biomass modelling. *Geocarto International*, 32(7), 701–716. <https://doi.org/10.1080/10106049.2016.1178814>
- Muhd-Ekhzarizal, M. E., Mohd-Hasmadi, I., Hamdan, O., Mohamad-Roslan, M. K., & Noor-Shaila, S. (2018). Estimation of aboveground biomass in mangrove forests using vegetation indices from SPOT-5 image. *Journal of Tropical Forest Science*, 30(2), 224–233. <https://doi.org/10.26525/jtfs2018.30.2.224233>
- Mumby, P. J. (2000). Mapping Mangroves. In *Remote Sensing Handbook for*

*Tropical Coastal Management.*

- Murdiyarno, D., Donato, D., Kauffman, J. B., Kurnianto, S., Stidham, M., & Kanninen, M. (2009). *Carbon storage in mangrove and peatland ecosystems A preliminary account from plots in Indonesia Carbon storage in mangrove and peatland ecosystems.*
- Mutanga, O., Adam, E., & Azong, M. (2012). International Journal of Applied Earth Observation and Geoinformation High density biomass estimation for wetland vegetation using WorldView-2 imagery and random forest regression algorithm. *International Journal of Applied Earth Observations and Geoinformation*, 18, 399–406. <https://doi.org/10.1016/j.jag.2012.03.012>
- Nasution, F. R., & Ghifari, A. (2017). *Parameter Tuning in Random Forest Based on Grid Search Method for Gender Classification Based on Voice Frequency.* Cece, 625–629.
- Noor, Y. R., Khazali, M., & Suryadiputra, I. N. N. (2006). *Panduan Pengenalan Mangrove di Indonesia* (PHKA/WI-IP (Wetlands International-Indonesia Programme). (ed.); 2nd ed., Issue May)
- Nuthammachot, N., Askar, A., & Stratoulias, D. (2020). Combined use of Sentinel-1 and Sentinel-2 data for improving above-ground biomass estimation. *Geocarto International*, 0(0), 1–11. <https://doi.org/10.1080/10106049.2020.1726507>
- Of, S., Backscatter, M. S. A. R., Changes, T. O., Forest, O. F., & Biomass, A. (2013). *Sensitivity of multi-source sar backscatter to changes of forest aboveground biomass.* 2457–2460.
- Omar, H., Misman, M. A., & Kassim, A. R. (2017). Synergetic of PALSAR-2 and sentinel-1A SAR polarimetry for retrieving aboveground biomass in dipterocarp forest of Malaysia. *Applied Sciences (Switzerland)*, 7(7). <https://doi.org/10.3390/app7070675>
- Patil, V., Singh, A., & Naik, N. (2014). *Estimation of Carbon Stocks in Avicennia marina Stand Using Allometry , CHN Analysis , and GIS Methods.* 379–391. <https://doi.org/10.1007/s13157-013-0505-y>



- Pflug, B., Makarau, A., & Richter, R. (2016). Processing Sentinel-2 data with ATCOR. *EGU General Assembly*, 66(April), 2–3. [https://doi.org/10.5194/isprsarchives-XL-7-W3-677-2015.\(3\)](https://doi.org/10.5194/isprsarchives-XL-7-W3-677-2015.(3))
- Pham, L. T. H., & Brabyn, L. (2017). Monitoring mangrove biomass change in Vietnam using SPOT images and an object-based approach combined with machine learning algorithms. *ISPRS Journal of Photogrammetry and Remote Sensing*, 128, 86–97. <https://doi.org/10.1016/j.isprsjprs.2017.03.013>
- Pham, T. D., Le, N. N., Ha, N. T., Nguyen, L. V., & Xia, J. (2020). Estimating Mangrove Above-Ground Biomass Using Extreme Gradient Boosting Decision Trees Algorithm with Fused Sentinel-2 and ALOS-2 PALSAR-2 Data in. *Remote Sensing*. doi:10.3390/rs12050777
- 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. *Remote Sensing*, 11(3), 1–25. <https://doi.org/10.3390/rs11030230>
- Pham, T. D., Yoshino, K., & Bui, D. T. (2017). Biomass estimation of Sonneratia caseolaris (l.) Engler at a coastal area of Hai Phong city (Vietnam) using ALOS-2 PALSAR imagery and GIS-based multi-layer perceptron neural networks. *GIScience and Remote Sensing*, 54(3), 329–353. <https://doi.org/10.1080/15481603.2016.1269869>
- Pham, T. D., Yoshino, K., Le, N. N., & Bui, D. T. (2018). Estimating aboveground biomass of a mangrove plantation on the Northern coast of Vietnam using machine learning techniques with an integration of ALOS-2 PALSAR-2 and Sentinel-2A data. *International Journal of Remote Sensing*, 39(22), 7761–7788. <https://doi.org/10.1080/01431161.2018.1471544>
- Phiri, D., Simwanda, M., Salekin, S., Nyirenda, R, V., Murayama, Y., & Ranagalage, M. (2020). remote sensing Sentinel-2 Data for Land Cover / Use Mapping : A Review. *Remote Sensing*, 2291(12), 14.
- Pons, Diego Hernán. (2010). Remote Sensing Technologies for Forest Monitoring and Carbon Stocks Estimations. Univercidad Nacional de Cordoba.CONAE.



- Purnobasuki, H. (2012). Pemanfaatan hutan mangrove sebagai penyimpan karbon. *Buletin PSL Universitas Surabaya*, 28(June), 3–5.
- Rahmandika, M. R. A. (2017). Studi Zonasi Ekosistem Mangrove Di Clungup Mangrove Conservation (CMC) Sendang Biru Desa Tambakrejo Kecamatan Sumbermanjing Wetan Kabupaten Malang Jawa Timur. Skripsi. Universitas Brawijaya
- Reddy, M. A., 2001, *Textbook of Remote Sensing and Geographical Information Systems*. BSP BS Publication, Hyderabad, India. ISBN: 8178001357
- Rhyma, P. P., Norizah, K., Hamdan, O., Faridah-Hanum, I., & Zulfa, A. W. (2020). Integration of normalised different vegetation index and Soil-Adjusted Vegetation Index for mangrove vegetation delineation. *Remote Sensing Applications: Society and Environment*, 17(December 2019), 100280. <https://doi.org/10.1016/j.rsase.2019.100280>
- 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>
- Romeijn H.E. (2001) Random Search Methods. In: Floudas C.A., Pardalos P.M. (eds) Encyclopedia of Optimization. Springer, Boston, MA. https://doi.org/10.1007/0-306-48332-7_424
- S, Quegan (2008). Radar Remote Sensing. Sheffield Centre for Earth Observation Science, University of Sheffield, U.K. Geoinformatics. Vol 1.
- Septiana, B., Wijaya, A. P., & Suprayogi, A. (2017). *Jurnal Geodesi Undip Januari 2017 Metode SAR Simulation Terrain Correction Menggunakan Data SAR Sentinel – 1*. 6, 148–157.
- Shimada, M. (2011). Model-based polarimetric SAR calibration method using forest and surface-scattering targets. *IEEE Transactions on Geoscience and Remote Sensing*, 49(5), 1712–1733. <https://doi.org/10.1109/TGRS.2010.2090046>



- Sinaga, S. H., S. Andri dan Haniah. 2018. Analisis Ketersediaan Ruang Terbuka Hijau Dengan Metode *Normalized Difference Vegetation Index* Dan *Soil Adjusted Vegetation Index* Menggunakan Citra Satelit Sentinel-2a. *Jurnal Geodesi Undip*. 7: 1-10
- Standar Nasional Indonesia, S. (2011). *Penyusunan persamaan alometrik untuk penaksiran cadangan karbon hutan berdasar pengukuran lapangan (ground based forest carbon accounting)*. 1–6. www.bsn.go.id
- Sugiyono. (2011). *Memahami Penelitian Kualitatif*. Bandung: Alfabeta.
- Su, Y., Guo, Q., Xue, B., Hu, T., Alvarez, O., Tao, S., & Fang, J. (2016). Spatial distribution of forest aboveground biomass in China: Estimation through combination of spaceborne lidar, optical imagery, and forest inventory data. *Remote Sensing of Environment*, 173, 187–199. <https://doi.org/10.1016/j.rse.2015.12.002>
- Taunk, K. (2019). *Ulasan Singkat Tetangga Terdekat Algoritma untuk Pembelajaran dan Klasifikasi*. Iciccs, 1255–1260.
- Taylor, P., & Lu, D. (2007). *International Journal of Remote The potential and challenge of remote sensing - based biomass estimation*. May 2013, 37–41. <https://doi.org/10.1080/01431160500486732>
- Toosi, N. B., Soffianian, A. R., Fakheran, S., Pourmanafi, S., Ginzler, C., & Waser, L. T. (2020). Land cover classification in Mangrove ecosystems based on VHR satellite data and machine learning-An upscaling approach. *Remote Sensing*, 12(17). <https://doi.org/10.3390/RS12172684>
- Tucker, C. J. (1979). Red and photographic infrared linear combinations for monitoring vegetation. *Remote Sensing of Environment*, 8(2), 127–150. [https://doi.org/10.1016/0034-4257\(79\)90013-0](https://doi.org/10.1016/0034-4257(79)90013-0)
- Utari, D., Kamal, M., & Sidik, F. (2020). Above-ground biomass estimation of mangrove forest using WorldView-2 imagery in Perancak Estuary, Bali. *IOP Conference Series: Earth and Environmental Science*, 500(1). <https://doi.org/10.1088/1755-1315/500/1/012011>
- Vafaei, S., Soosani, J., Adeli, K., Fadaei, H., Naghavi, H., Pham, T. D., & Bui, D.



- T. (2018). Improving accuracy estimation of Forest Aboveground Biomass based on incorporation of ALOS-2 PALSAR-2 and Sentinel-2A imagery and machine learning: A case study of the Hyrcanian forest area (Iran). *Remote Sensing*, 10(2). <https://doi.org/10.3390/rs10020172>
- Valderrama-Landeros, L., Flores-de-Santiago, F., Kovacs, J. M., & Flores-Verdugo, F. (2018). An assessment of commonly employed satellite-based remote sensors for mapping mangrove species in Mexico using an NDVI-based classification scheme. *Environmental Monitoring and Assessment*, 190(1). <https://doi.org/10.1007/s10661-017-6399-z>
- 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*. <https://doi.org/10.3390/rs10091468>
- Wang, D., Wan, B., Qiu, P., Su, Y., Guo, Q., & Wu, X. (2018). Artificial mangrove species mapping using Pléiades-1: An evaluation of pixel-based and object-based classifications with selected machine learning algorithms. *Remote Sensing*, 10(2). <https://doi.org/10.3390/rs10020294>
- Wang, L., Silván-cárdenas, J. L., & Sousa, W. P. (2008). *Neural Network Classification of Mangrove Species from Multi-seasonal Ikonos Imagery*. 74(7), 921–927.
- Wicaksono, P. (2015). Remote Sensing Model Development For Seagrass And Mangroves Carbon Stock Mapping. PhD. Thesis. Universitas Gadjah Mada
- Wicaksono, P., Danoedoro, P., & Nehren, U. (2016). Mangrove biomass carbon stock mapping of the Karimunjawa Islands using multispectral remote sensing. *Mangrove biomass carbon stock mapping of the. International Journal of Remote Sensing*, 37(1), 26–52. <https://doi.org/10.1080/01431161.2015.1117679>
- Wiley, J. & S. (2013). Satellite Synthetic Aperture Radar in Archaeology and Cultural Landscape: An Overview. *Wiley Online Library*, 78, 71–78. <https://doi.org/10.1002/arp>



- Worthington, T., Spalding, M., Worthington, T., & Spalding, M. (2018). *Mangrove Restoration Potential A global map highlighting a critical opportunity critical opportunity.*
- Wu, C., Shen, H., Shen, A., Deng, J., Gan, M., Zhu, J., Xu, H., & Wang, K. (2016). Comparison of machine-learning methods for above-ground biomass estimation based on Landsat imagery. *Journal of Applied Remote Sensing*, 10(3), 035010. <https://doi.org/10.1117/1.jrs.10.035010>
- Ying, X. (2019). An Overview of Overfitting and its Solutions. *Journal of Physics: Conference Series*, 1168(2). <https://doi.org/10.1088/1742-6596/1168/2/022022>
- Zheng, D., Rademacher, J., Chen, J., Crow, T., Bresee, M., Le, J., & Ryu, S. (2004). *Estimating aboveground biomass using Landsat 7 ETM + data across a managed landscape in northern Wisconsin , USA.* 93, 402–411. <https://doi.org/10.1016/j.rse.2004.08.008>