

## DAFTAR PUSTAKA

- Abao, J. B., Bronson, K. F., Wassmann, R., & Singh, U. (2000). Simultaneous records of methane and nitrous oxide emissions in rice-based cropping systems under rainfed conditions. *Nutrient Cycling in Agroecosystems*, 58(1–3), 131–139. <https://doi.org/10.1023/A:1009842502608>
- Abduh, A. M., & Annisa, W. (2017). Interaction of paddy varieties and compost with flux of methane in Tidal Swampland. *Jurnal Tanah Tropika (Journal of Tropical Soils)*, 21(3), 179. <https://doi.org/10.5400/jts.v21i3.2206>
- Abdullah, B. (2009). *Perakitan dan pengembangan varietas padi tipe baru*.
- Adugna, G. (2016). A review on impact of compost on soil properties, water use and crop productivity. *Agricultural Science Research Journal*, 4(3), 93–104. <https://doi.org/10.14662/ARJASR2016.010>
- Al-Kaisi, M. M., & Yin, X. (2005). Tillage and crop residue effects on soil carbon and carbon dioxide emission in corn-soybean rotations. *Journal of Environmental Quality*, 34(2), 437–445. <https://doi.org/10.2134/jeq2005.0437>
- Alavan, A., Hayati, R., & Hayati, E. (2015). Pengaruh pemupukan terhadap pertumbuhan beberapa varietas padi gogo (*Oryza sativa* L.). *Jurnal Floratek*, 10(61), 61–68.
- Alberto, M. C. R., Wassmann, R., Hirano, T., Miyata, A., Kumar, A., Padre, A., & Amante, M. (2009). CO<sub>2</sub>/heat fluxes in rice fields: Comparative assessment of flooded and non-flooded fields in the Philippines. *Agricultural and Forest Meteorology*, 149(10), 1737–1750. <https://doi.org/10.1016/j.agrformet.2009.06.003>
- Aldrian, E., Karmini, M., & Budiman. (2011). Adaptasi dan mitigasi perubahan iklim di Indonesia. In *Badan Meteorologi, Klimatologi, dan Geofisika* (Issue November 2011).
- Alemaw, B. F., & Simalenga, T. (2015). Climate change impacts and adaptation in rainfed farming systems: A modeling framework for scaling-out Climate Smart Agriculture in Sub-Saharan Africa. *American Journal of Climate Change*, 04(04), 313–329. <https://doi.org/10.4236/ajcc.2015.44025>
- Ananyeva, N. D., Rogovaya, S. V., Ivashchenko, K. V., Vasenev, V. I., Sarzhanov, D. A., Ryzhkov, O. V., & Kudayarov, V. N. (2016). Carbon dioxide emission and soil microbial respiration activity of Chernozems under anthropogenic transformation of terrestrial ecosystems. *Eurasian Journal of Soil Science (Ejss)*, 5(2), 146. <https://doi.org/10.18393/ejss.2016.2.146-154>
- Annisa, W., & Nursyamsi, D. (2016). Pengaruh amelioran, pupuk dan sistem pengelolaan tanah sulfat masam terhadap hasil padi dan emisi metana. *Indonesian Soil and Climate Journal*, 40(2), 135–145. <https://doi.org/10.2017/jti.v40i2.5726>

- Aulakh, M. S., Wassmann, R., & Rennenberg, H. (2002). Methane transport capacity of twenty-two rice cultivars from five major Asian rice-growing countries. *Agriculture, Ecosystems and Environment*, 91(1–3), 59–71. [https://doi.org/10.1016/S0167-8809\(01\)00260-2](https://doi.org/10.1016/S0167-8809(01)00260-2)
- Aulakh, M. S., Wassmann, R., Rennenberg, H., & Fink, S. (2000). Pattern and amount of aerenchyma relate to variable methane transport capacity of different rice cultivars. *Plant Biology*, 2(2), 182–194. <https://doi.org/10.1055/s-2000-9161>
- Baig, M. ., Shahid, S. ., & Straquadine, G. S. (2013). Making rainfed agriculture sustainable through environmental friendly technologies in Pakistan: A review. *International Soil and Water Conservation Research*, 1(2), 36–52.
- Balingtan. (2007). *Juknis pengambilan dan analisis sampel gas CO<sub>2</sub>*. Balai Penelitian Lingkungan Pertanian.
- Balittanah. (2009). *Petunjuk teknis analisis kimia tanah, tanaman, air, dan pupuk*. Balai Penelitian Tanah.
- Baruah, K. K., Gogoi, B., & Gogoi, P. (2010). Plant physiological and soil characteristics associated with methane and nitrous oxide emission from rice paddy. *Physiology and Molecular Biology of Plants*, 16(1), 79–91. <https://doi.org/10.1007/s12298-010-0010-1>
- Beding, P. A., & Tiro, B. M. W. (2019a). Pengelolaan tanaman terpadu padi varietas unggul baru di lahan sawah tadah hujan di Kabupen Jayapura, Papua. *Al Ulum Jurnal Sains Dan Teknologi*, 5(1), 18–25. <https://doi.org/10.31602/ajst.v5i1.2471>
- Beding, P. A., & Tiro, B. M. W. (2019b). Uji adaptasi varietas unggul padi tadah hujan Kabupaten Jayapura, Papua. *Jurnal Pengkajian Dan Pengembangan Teknologi Pertanian*, 22(2), 151–160. <https://doi.org/10.21082/jpntp.v22n2.2019.p165-174>
- Bhattacharyya, P., Roy, K. S., Neogi, S., Chakravorti, S. P., Behera, K. S., Das, K. M., Bardhan, S., & Rao, K. S. (2012). Effect of long-term application of organic amendment on C storage in relation to global warming potential and biological activities in tropical flooded soil planted to rice. *Nutrient Cycling in Agroecosystems*, 94(2–3), 273–285. <https://doi.org/10.1007/s10705-012-9540-y>
- Biederbeck, V. O., Janzen, H. H., Campbell, C. A., & Zentner, R. P. (1994). Labile soil organic matter as influenced by cropping practices in an arid environment. *Soil Biology and Biochemistry*, 26(12), 1647–1656. [https://doi.org/10.1016/0038-0717\(94\)90317-4](https://doi.org/10.1016/0038-0717(94)90317-4)
- Bongiovanni, M. D., & Lobartini, J. C. (2006). Particulate organic matter, carbohydrate, humic acid contents in soil macro- and microaggregates as affected by cultivation. *Geoderma*, 136, 660–665.
- BPS Pati. (2020). *Kecamatan Pucakwangi dalam angka 2020*.

- BPS Pati. (2021). *Luas panen dan produksi padi Kabupaten Pati 2020*. Badan Pusat Statistik Kabupaten Pati.
- Butterbach-Bahl, K., Papen, H., & Rennenberg, H. (1997). Impact of gas transport through rice cultivars on methane emission from rice paddy fields. *Plant, Cell and Environment*, 20(9), 1175–1183. <https://doi.org/10.1046/j.1365-3040.1997.d01-142.x>
- Dariah, A. (2013). Sistem pertanian efisien karbon sebagai bentuk adaptasi dan mitigasi sektor pertanian terhadap perubahan iklim. In *Politik Pembangunan Pertanian Menghadapi Perubahan Iklim* (pp. 195–213).
- Dariah, A. (2015). Pembangunan pertanian berbasis ekoregion dari perspektif lingkungan hidup. In *Pembangunan Pertanian Berbasis Ekoregion. Badan Litbang Pertanian*.
- Dhaliwal, S. S., Naresh, R. K., Mandal, A., Singh, R., & Dhaliwal, M. K. (2019). Dynamics and transformations of micronutrients in agricultural soils as influenced by organic matter build-up: A review. *Environmental and Sustainability Indicators*, 1–2(May), 100007. <https://doi.org/10.1016/j.indic.2019.100007>
- Dubey, S. K. (2005). Microbial ecology of methane emission in rice agroecosystem: A review. *Applied Ecology and Environmental Research*, 3(2), 1–27. [https://doi.org/10.15666/aeer/0302\\_001027](https://doi.org/10.15666/aeer/0302_001027)
- Emmett, B. D., Buckley, D. H., & Drinkwater, L. E. (2020). Plant growth rate and nitrogen uptake shape rhizosphere bacterial community composition and activity in an agricultural field. *New Phytologist*, 225(2), 960–973. <https://doi.org/10.1111/nph.16171>
- Epule, E. T., Peng, C., & Mafany, N. . (2011). Methane emissions from paddy rice fields: Strategies towards achieving a win-win sustainability scenario between rice production and methane emission reduction. *Journal of Sustainable Development*, 4(6), 188–196. <https://doi.org/10.5539/jsd.v4n6p188>
- Estiningtyas, W., & Syakir, M. (2017). Pengaruh perubahan iklim terhadap produksi padi di lahan tadah hujan. *Jurnal Meteorologi Dan Geofisika*, 18(2), 83–93. <https://doi.org/10.31172/jmg.v18i2.406>
- Firmansyah, I, Liferdi, Khaririyatun N, Yufdy, M. (2015). Pupuk Organik & Pupuk Hayati. *Pertumbuhan Dan Hasil Bawang Merah Dengan Aplikasi Pupuk Organik Dan Pupuk Hayati Pada Tanah Alluvial*, 25(2), 133–141.
- Fortuna, A., Harwood, R. R., & Paul, E. A. (2003). The effects of compost and crop rotations on carbon turnover and the particulate organic matter fraction. *Soil Science*, 168(6), 434–444. <https://doi.org/10.1097/01.ss.0000075288.53382.91>
- Gogoi, B., & Baruah, K. K. (2012). Nitrous oxide emissions from fields with different wheat and rice varieties. *Pedosphere*, 22(1), 112–121.

[https://doi.org/10.1016/S1002-0160\(11\)60197-5](https://doi.org/10.1016/S1002-0160(11)60197-5)

- Haines, A. (2009). Sharon Friel, Alan D Dangour, Tara Garnett, Karen Lock, Zaid Chalabi, Ian Roberts, Ainslie Butler, Colin D Butler, Jeff Waage, Anthony J McMichael, Andy Haines. *The Lancet*, 374(9706), 2016–2025.
- Hardy, A. G. (2013). Greenhouse gas emissions from rice cropping systems. In *ACS Symposium Series* (Vol. 3, pp. 1–30). <https://doi.org/10.1021/bk-2011-1072.ch005>
- Hartati, S., Syamsiyah, J., Widijanto, H., & Bonis, M. A. (2009). Pengaruh pupuk kandang sapi dengan biodekomposer dan pupuk anorganik terhadap efisiensi serapan K dan hasil tanaman padi (*Oriza sativa* L.) di lahan sawah Palur Sukoharjo. *Jurnal Ilmiah Ilmu Tanah Dan Agroklimatologi*, 6(1), 53–60.
- Hartatik, W., & Sarmah. (2013). Pengaruh pemberian pupuk organik terhadap kadar asam humat dan asam fulvat tanah. *Jurnal Tanah Dan Iklim*, 37(12), 79–86.
- Hidayat, Y., Saleh, Y., & Waraiya, M. (2015). Kelayakan usahatani padi varietas unggul baru melalui PTT di Kabupaten Halmahera Tengah. *Jurnal Penelitian Pertanian Tanaman Pangan*, 31(3), 166–172. <https://doi.org/10.21082/jpntp.v31n3.2012.p>
- Hossain, M. (2016). Effect of alternate wetting and drying versus continuous flooding on carbon rates in rice and soil. *International Journal of Agricultural Research, Innovation and Technology*, 6(1), 26–33. <https://doi.org/10.3329/ijarit.v6i1.29209>
- Hou, H., Peng, S., Xu, J., Yang, S., & Mao, Z. (2012). Seasonal variations of CH<sub>4</sub> and N<sub>2</sub>O emissions in response to water management of paddy fields located in Southeast China. *Chemosphere*, 89(7), 884–892. <https://doi.org/10.1016/j.chemosphere.2012.04.066>
- Hu, Y., Zheng, Q., Noll, L., Zhang, S., & Wanek, W. (2020). Direct measurement of the in situ decomposition of microbial-derived soil organic matter. *Soil Biology and Biochemistry*, 141, 107660. <https://doi.org/10.1016/j.soilbio.2019.107660>
- Hulyatussyamsiah, S. N., Hartono, R., & Anwarudin, O. (2019). Adopsi pemupukan berimbang padi sawah melalui penggunaan Urea Berlapis Arang Aktif di Majalengka. *Jurnal Penyuluhan Pertanian*, 14(2), 1–17.
- Hussain, M., Farooq, M., Nawaz, A., Al-Sadi, A. M., Solaiman, Z. M., Alghamdi, S. S., Ammara, U., Ok, Y. S., & Siddique, K. H. M. (2017). Biochar for crop production: potential benefits and risks. In *Journal of Soils and Sediments* (Vol. 17, Issue 3). *Journal of Soils and Sediments*. <https://doi.org/10.1007/s11368-016-1360-2>
- IAEA. (1992). Manual on measurement of methane and nitrous oxide emission from agriculture. In *Manual on Measurement of Methane and Nitrous Oxide Emission from Agricultural*. International Atomic Energy Agency.

- Johnston, A. E., Poulton, P. R., & Coleman, K. (2009). Soil organic matter : Its importance in sustainable agriculture and carbon dioxide fluxes. In *Advances in Agronomy* (1st ed., Vol. 101, Issue 08, pp. 1–57). Elsevier Inc. [https://doi.org/10.1016/S0065-2113\(08\)00801-8](https://doi.org/10.1016/S0065-2113(08)00801-8)
- Kartikawati, R., & Nursyamsi, D. (2013). Pengaruh pengairan, pemupukan, dan penghambat nitrifikasi terhadap emisi gas rumah kaca di lahan sawah tanah mineral. *Jurnal Ecolab*, 7(2), 93–107. <https://doi.org/10.20886/jklh.2013.7.2.93-107>
- Kasno, A. (2009). Respon tanaman jagung terhadap pemupukan fosfor pada Typic Dystrudepts. *Journal of Tropical Soils*, 14(2), 111–118. <https://doi.org/10.5400/jts.2009.v14i2.111-118>
- Kasno, A., Rostaman, T., & Setyorini, D. (2016). Peningkatan produktivitas lahan sawah tadah hujan dengan pemupukan hara N, P, K dan penggunaan padi varietas unggul. *Jurnal Tanah Dan Iklim*, 40(2), 147–157. <https://doi.org/10.2017/jti.v40i2.5727>
- Kasno, A., Setyorini, D., & Suastika, I. . W. (2020). Pengelolaan hara terpadu pada lahan sawah tadah hujan sebagai upaya peningkatan produksi beras nasional. *Jurnal Sumberdaya Lahan*, 14(1), 15. <https://doi.org/10.21082/jsdl.v14n1.2020.15-24>
- Khanal, R. C. (2009). Climate change and organic agriculture. *Journal of Agriculture and Environment*, 10, 116–127. <https://doi.org/10.3126/aej.v10i0.2136>
- Khosa, M. K., Sidhu, B. S., & Benbi, D. K. (2010). Effect of organic materials and rice cultivars on methane emission from rice field. *Journal of Environmental Biology*, 31(3), 281–285.
- Kimura, M., Murase, J., & Lu, Y. (2004). Carbon cycling in rice field ecosystems in the context of input, decomposition and translocation of organic materials and the fates of their end products (CO<sub>2</sub> and CH<sub>4</sub>). *Soil Biology and Biochemistry*, 36(9), 1399–1416. <https://doi.org/10.1016/j.soilbio.2004.03.006>
- Las, I., Suprihatno, B., Daradjat, A. A., Suwarno, Abdullah, B., & Satoto. (2004). Inovasi teknologi varietas unggul padi: perkembangan, arah, dan strategi ke depan. In *Ekonomi Padi dan Beras di Indonesia* (pp. 375–395).
- Lehmann, J., & Kleber, M. (2015). The contentious nature of soil organic matter. *Nature*, 528(7580), 60–68. <https://doi.org/10.1038/nature16069>
- Li, H., Dong, X., da Silva, E. B., de Oliveira, L. M., Chen, Y., & Ma, L. Q. (2017). Mechanisms of metal sorption by biochars: Biochar characteristics and modifications. *Chemosphere*, 178, 466–478. <https://doi.org/10.1016/j.chemosphere.2017.03.072>
- Li, J., Wu, X., Gebremikael, M. T., Wu, H., Cai, D., Wang, B., Li, B., Zhang, J., Li, Y., & Xi, J. (2018). Response of soil organic carbon fractions, microbial



- community composition and carbon mineralization to high-input fertilizer practices under an intensive agricultural system. *PLoS ONE*, 13(4), 1–16. <https://doi.org/10.1371/journal.pone.0195144>
- Li, Z., Wang, D., Sui, P., Long, P., Yan, L., Wang, X., Yan, P., Shen, Y., Dai, H., Yang, X., Cui, J., & Chen, Y. (2018). Effects of different agricultural organic wastes on soil GHG emissions: During a 4-year field measurement in the North China Plain. *Waste Management*, 81, 202–210. <https://doi.org/10.1016/j.wasman.2018.10.008>
- Liao, B., Wu, X., Yu, Y., Luo, S., Hu, R., & Lu, G. (2020). Effects of mild alternate wetting and drying irrigation and mid-season drainage on CH<sub>4</sub> and N<sub>2</sub>O emissions in rice cultivation. *Science of the Total Environment*, 698, 1–11.
- Lou, Y., Li, Z., & Zhang, T. (2003). Carbon dioxide flux in a subtropical agricultural soil of China. *Water, Air, and Soil Pollution*, 149(1–4), 281–293. <https://doi.org/10.1023/A:1025727504841>
- Makino, A. (2011). Photosynthesis, grain yield, and nitrogen utilization in rice and wheat. *Plant Physiology*, 155(1), 125–129. <https://doi.org/10.1104/pp.110.165076>
- Malik, A., & Jamil, A. (2008). Kajian kelayakan teknologi usahatani padi sawah tadah hujan di Merauke Papua. *Caraka Tani: Journal of Sustainable Agriculture*, 23(1), 47. <https://doi.org/10.20961/carakatani.v23i1.13886>
- Mardiyati, S., Natsir, M., & Nailah. (2019). Analisis risiko usahatani sawah tadah hujan berbasis perubahan iklim di Kabupaten Takalar. *Agrokompleks*, 19(1), 38–44.
- Marriot, E. E., & Wander, M. (2006). Qualitative and quantitative differences in particulate organic matter fractions in organic and conventional farming systems. *Soil Biology and Biochemistry*, 38(7), 1527–1536.
- Maryati, Nelvia, & Anom, E. (2014). Perubahan sifat kumia tanah sawah saat serapan hara maksimum oleh padi (*Oryza sativa* L setelah aplikasi campuran kompos tandan kosong kelapa sawit (TKKS) dengan Abu Boiler. *Jom Faperta*, 1(1), 148–162.
- Minamikawa, K., & Sakai, N. (2006). The practical use of water management based on soil redox potential for decreasing methane emission from a paddy field in Japan. *Agriculture, Ecosystems and Environment*, 116(3–4), 181–188. <https://doi.org/10.1016/j.agee.2006.02.006>
- Minamikawa, K., Tokida, T., Sudo, S., Padre, A., & Yagi, K. (2015). Guidelines for measuring CH<sub>4</sub> and N<sub>2</sub>O emissions from rice paddies by a manually operated closed chamber method. In *Scientific reports* (Vol. 235). National Institute for Agro-Environmental Sciences, Tsukuba, Japan. <https://doi.org/10.1016/j.agee.2016.10.011>
- Mitra, S., Jain, M. C., Kumar, S., Bandyopadhyay, S. K., & Kalra, N. (1999).

- Effect of rice cultivars on methane emission. *Agriculture, Ecosystems and Environment*, 73, 177–183.
- Moe, K., Moh, S. M., Htwe, A. Z., Kajihara, Y., & Yamakawa, T. (2019). Effects of integrated organic and inorganic fertilizers on yield and growth parameters of rice varieties. *Rice Science*, 26(5), 309–318. <https://doi.org/10.1016/j.rsci.2019.08.005>
- Mulyadi, & Wihardjaka, A. (2014). Emisi gas rumah kaca dan hasil gabah dari tiga varietas padi pada lahan sawah tadah hujan bersurjan. *Jurnal Penelitian Pertanian Tanaman Pangan*, 33(2), 116. <https://doi.org/10.21082/jpntp.v33n2.2014.p116-121>
- Muñoz, C., Paulino, L., Monreal, C., & Zagal, E. (2010). Greenhouse gas (CO<sub>2</sub> and N<sub>2</sub>O) emissions from soils: A Review. *Chilean Journal of Agricultural Research*, 70(3), 485–497. <https://doi.org/10.1145/1120212.1120272>
- Mustaha, M. A., Nugroho, C., Ma'suf, A., & Asaad, M. (2020). Perbaikan pola tanam pada lahan sawah tadah hujan melalui introduksi VUB Balitbangtan (Kasus Desa Andoolo Utama, Kab. Konawe Selatan). In *Bukti Nyata Peningkatan Indeks Pertanaman: Fondasi Lumbung Pangan Masa Depan* (Issue November, pp. 143–151).
- Neue, H. U. (1997). Fluxes of methane from rice fields and potential for mitigation. *Soil Use and Management*, 13(4 SUPPL.), 258–267. <https://doi.org/10.1111/j.1475-2743.1997.tb00597.x>
- Neue, H. U., Wassmann, R., Lantin, R. S., Alberto, M. C. R., Aduna, J. B., & Javellana, A. M. (1996). Factors affecting methane emission from rice fields. *Atmospheric Environment*, 30(10–11), 1751–1754. [https://doi.org/10.1016/1352-2310\(95\)00375-4](https://doi.org/10.1016/1352-2310(95)00375-4)
- Novia, R. A., & Satriani, R. (2020). Analisis efisiensi teknis usahatani padi sawah tadah hujan di Kabupaten Banyumas. *Jurnal Ilmu-Ilmu Pertanian*, 16(1), 48–59.
- Noviani, P. I., & Slamet, S. (2018). Kontribusi kompos jerami-biochar dalam peningkatan P-Tersedia, jumlah populasi BPF dan hasil padi sawah. *Jurnal Ilmiah Aplikasi Isotop Dan Radiasi*, 14(1), 47–58.
- Nurazizah, A., Hairmansis, A., & Damanhuri. (2019). Daya hasil dan pendugaan parameter genetik karakter agronomi genotipe padi gogo uji ( *Oryza sativa* L.). *Jurnal Produksi Tanaman*, 7(12), 2223–2229.
- Nursyamsi, D. (2011). Mekanisme pelepasan K terfiksasi menjadi tersedia bagi pertumbuhan tanaman pada tanah-tanah yang didominasi Smektit. *Jurnal Sumberdaya Lahan Vol.*, 5, 61–74.
- Nursyamsi, D., Idris, K., Sabiham, S., Rachim, D. A., & Sofyan, A. (2007). Sifat-sifat tanah dominan yang berpengaruh terhadap K tersedia pada tanah-tanah yang didominasi Smektit. *Jurnal Tanah Dan Iklim*, 26, 13–28.
- Okalebo, J. ., Gathua, K. ., & Woomer, P. . (2002). Laboratory methods of soil

- and plant analysis: A working manual the second edition. In *SACRED Africa, Kenya Any: Vol. SECOND EDI*.
- Omirou, M., Anastopoulos, I., Fasoula, D. A., & Ioannides, I. M. (2020). The effect of chemical and organic N inputs on N<sub>2</sub>O emission from rain-fed crops in Eastern Mediterranean. *Journal of Environmental Management*, 270(April), 110755. <https://doi.org/10.1016/j.jenvman.2020.110755>
- Pan, S. G., Huang, S. Q., Zhai, J., Wang, J. P., Cao, C. G., Cai, M. L., Zhan, M., & Tang, X. R. (2012). Effects of N management on yield and N uptake of rice in Central China. *Journal of Integrative Agriculture*, 11(12), 1993–2000. [https://doi.org/10.1016/S2095-3119\(12\)60456-0](https://doi.org/10.1016/S2095-3119(12)60456-0)
- Pane, H., Wirahardjaka, A., & Fagi, A. . (2009). Menggali potensi produksi sawah tadah hujan. In *Balai Besar Penelitian Tanaman Padi* (pp. 201–221).
- Pirngadi, K., & Makarim, A. K. (2006). Peningkatan produktivitas padi pada lahan sawah tadah hujan melalui pengelolaan tanaman terpadu. *Penelitian Pertanian Tanaman Pangan*, 25(2), 116–123.
- Pirngadi, Kasdi. (2009). Peran Bahan Organik Dalam Peningkatan Produksi Padi Berkelanjutan Mendukung Ketahanan Pangan Nasional. *Pengembangan Inovasi Pertanian*, 2(1), 48–64. <http://203.176.181.70/publikasi/ip021094.pdf>
- Polyakov, V. O., & Lal, R. (2008). Soil organic matter and CO<sub>2</sub> emission as affected by water erosion on field runoff plots. *Geoderma*, 143(1–2), 216–222. <https://doi.org/10.1016/j.geoderma.2007.11.005>
- Pramono, A., Adrian, T. A., Yulianingsih, E., Sopiawati, T., & Hervani, A. (2021). Combined compost with biochar application to mitigate greenhouse gas emission in paddy field. *IOP Conference Series: Earth and Environmental Science*, 653(1). <https://doi.org/10.1088/1755-1315/653/1/012109>
- Pratibha, G., Srinivas, I., Rao, K. V., Shanker, A. K., Raju, B. M. K., Choudhary, D. K., Srinivas Rao, K., Srinivasarao, C., & Maheswari, M. (2016). Net global warming potential and greenhouse gas intensity of conventional and conservation agriculture system in rainfed semi arid tropics of India. *Atmospheric Environment*, 145, 239–250. <https://doi.org/10.1016/j.atmosenv.2016.09.039>
- Ramesh, T., & Selvaraj, R. (2020). Evaluation of rice cultivation systems for greenhouse gases emission and productivity International Journal of Ecology and Environmental Sciences. *International Journal of Ecology and Environmental Sciences*, 2(2), 49–54.
- Ramnarine, R., Wagner-Riddle, C., Dunfield, K. E., & Voroney, R. P. (2012). Contributions of carbonates to soil CO<sub>2</sub> emissions. *Canadian Journal of Soil Science*, 92(4), 599–607. <https://doi.org/10.4141/CJSS2011-025>
- Ratri, W. S., Widiatmi, S., & Kusuma, N. (2020). Analisis perilaku petani padi



- dalam menghadapi risiko di lahan sawah tadah hujan Desa Banyumeneng, Girikerto, Gunungkidul. *Jurnal Pertanian Agros*, 22(2), 235–241.
- Russenens, A. L., Korsæth, A., Bakken, L. R., & Dörsch, P. (2016). Spatial variation in soil pH controls off-season N<sub>2</sub>O emission in an agricultural soil. *Soil Biology and Biochemistry*, 99, 36–46. <https://doi.org/10.1016/j.soilbio.2016.04.019>
- Safitri, L. (2020). Ketersediaan hara makro pada beberapa sistem manajemen lahan sawah serta produksi tanaman padi (*Oryza sativa* L.). *AgriHumanis: Journal of Agriculture and Human Resource Development Studies*, 1(1), 43–54. <https://doi.org/10.46575/agrihumanis.v1i1.53>
- Sainepo, B. M., Gachene, C. K., & Karuma, A. (2018). Assessment of soil organic carbon fractions and carbon management index under different land use types in Olesharo Catchment, Narok County, Kenya. *Carbon Balance and Management*, 13(4), 1–9. <https://doi.org/10.1186/s13021-018-0091-7>
- Salawati, Basir, M., Kadekoh, I., & Thaha, A. R. (2016). Potensi biochar sekam padi terhadap perubahan pH, KTK, C organik dan P tersedia pada tanah sawah Inceptisol. *Agroland*, 23(2), 101–109.
- Salbilah, C., Muyassir, & Sufardi. (2013). Pemupukan KCl dan kompos jerami, pengaruhnya terhadap sifat kimia tanah, pertumbuhan dan hasil padi sawah (*Oryza sativa* L.). *Jurnal Manajemen Sumberdaya Lahan*, 2(3), 213–222.
- Santos, C., Fonseca, J., Coutinho, J., Trindade, H., & Jensen, L. S. (2021). Chemical properties of agro-waste compost affect greenhouse gas emission from soils through changed C and N mineralisation. *Biology and Fertility of Soils*, 57(6), 781–792. <https://doi.org/10.1007/s00374-021-01560-6>
- Saraswati, R., Santosa, E., & Yuniarti, E. (2006). Organisme perombak bahan organik. In *Pupuk Organik dan Pupuk Hayati* (pp. 211–230). Balai Besar Litbang Sumberdaya Lahan Pertanian.
- Satishkumar, N., Tevari, P., & Singh, A. (2013). A study on constraints faced by farmers in adapting to climate change in rainfed agriculture. *Journal of Human Ecology*, 44(1), 23–28. <https://doi.org/10.1080/09709274.2013.11906639>
- Setyanto, P. (2002). Mitigasi gas metan dari lahan sawah. In *Lahan Sawah dan Pengelolaannya*. Badan Litbang Pertanian (pp. 289–305).
- Setyanto, P. (2006). Varietas padi rendah emisi gas rumah kaca. *Warta Penelitian Dan Pengembangan Pertanian*, 28(4), 12–13.
- Setyanto, P. (2008). Teknologi mengurangi emisi gas rumah kaca dari lahan sawah. *Iptek Tanaman Pangan*, 3(2), 205–214.
- Setyorini, D. (2015). Pupuk organik untuk budidaya pertanian organik. In *Sistem Pertanian Organik Mendukung Produktivitas Lahan Berkelanjutan* (pp. 215–230). Badan Penelitian dan Pengembangan Pertanian.

- Sitorus, L. E., & Sembiring, E. (2014). Pengaruh aplikasi kompos terhadap emisi CO<sub>2</sub> dan karbon organik tanah. *Jurnal Teknik Lingkungan*, 18(2), 124–134. <https://doi.org/10.5614/jtl.2012.8.2.3>
- Smit, H. P. J., Reinsch, T., Swanepoel, P. A., Kluß, C., & Taube, F. (2020). Grazing under irrigation affects N<sub>2</sub>O-emissions substantially in South Africa. *Atmosphere*, 11(9), 1–19. <https://doi.org/10.3390/atmos11090925>
- Sousa-Souto, L., Santos, D. C. de J., Ambrogi, B. G., Santos, M. J. C. dos, Guerra, M. B. B., & Pereira-Filho, E. R. (2012). Increased CO<sub>2</sub> emission and organic matter decomposition by leaf-cutting ant nests in a coastal environment. *Soil Biology and Biochemistry*, 44(1), 21–25. <https://doi.org/10.1016/j.soilbio.2011.09.008>
- Suharyon, Busyra, & Minsyah, N. (2017). Upaya percepatan adopsi Varietas Unggul Baru ( VUB ) di lahan tadah hujan : Studi kasus di Kabupaten Sarolangun Jambi. *Prosiding Seminar Nasional: Membangun Pertanian Modern Dan Inovatif Berkelanjutan Dalam Rangka Mendukung MEA*, 2015(2005), 1024–1033.
- Sujinah, S., Hairmansis, A., Sasmita, P., & Nugraha, Y. (2020). Relationship between rice growth phenology with biomass, maturity, grain yield, and the effect of fertilization. *Jurnal Penelitian Pertanian Tanaman Pangan*, 4(2), 63–71.
- Sulakhudin, Suswati, D., & Gafur, S. (2016). Kajian status kesuburan tanah pada lahan sawah di Kecamatan Sungai Kunyit Kabupaten Menpawah. *Jurnal Pedon Tropika*, 3, 106–114.
- Sumarno, Kartasasmita, Unang G, Pasaribu, D. (2009). Pengayaan Kandungan Bahan Organik Tanah Mendukung Keberlanjutan Sistem Produksi Padi Sawah. *Iptek Tanaman Pangan*, 4(1), 18–32.
- Sumarno. (2007). Teknologi revolusi hijau lestari untuk ketahanan pangan nasional di masa depan. *Iptek Tanaman Pangan*, 2(2), 131–153.
- Sunarto. (1999). Sistem pengelolaan wilayah pantai berdasarkan tingkat kerawanan bencana maritim di Pantai Utara Jawa Tengah. *Majalah Geografi Indonesia*, 13(23), 69–86.
- Suntoro, Syamsiah, J., & Tiyanto, F. A. A. (2013). Potensi emisi N<sub>2</sub>O dari berbagai jenis tanah yang diberi bahan organik. *Jurnal Ilmu Tanah Dan Agroklimatologi*, 10(1), 46–54. <http://onlinelibrary.wiley.com/doi/10.1111/imre.12028/abstract>
- Suprihati. (2005). Mitigasi emisi gas rumah kaca dari lahan sawah dengan pengelolaan air. *Makalah Pribadi Falsafa Sains. Sekolah Pascasarjana S3. Institut Pertanian Bogor, PPS 702*, 1–17.
- Surmaini, E., Runtunuwu, E., & Las, I. (2011). Upaya sektor Pertanian dalam Menghadapi Perubahan Iklim. *Upaya Sektor Pertanian Dalam Menghadapi Perubahan Iklim*, 30(1), 1–7. <https://doi.org/10.21082/jp3.v30n1.2011.p1-7>

- Surmaini, E., & Syahbuddin, H. (2016). Kriteria awal musim tanam: Tinjauan prediksi waktu tanam padi Di Indonesia. *Jurnal Penelitian Dan Pengembangan Pertanian*, 35(2), 47. <https://doi.org/10.21082/jp3.v35n2.2016.p47-56>
- Sutriadi, M. T., Harsanti, E. S., & Wahyuni, S. (2019). Pestisida nabati: Prospek pengendali hama ramah lingkungan. *Jurnal Su*, 13(2), 89–101.
- Sutrisna, N., Surdianto, Y., & Marbun, O. (2016). Pengaruh pemberian jerami dan varietas padi inbrida terhadap emisi gas rumah kaca di lahan sawah irigasi. *Jurnal Tanah Dan Iklim*, 40(2), 79–85. <https://doi.org/10.2017/jti.v40i2.5517>
- Tambunan, S., Handayanto, E., & Siswanto, B. (2014). Pengaruh aplikasi bahan organik segar dan biochar terhadap ketersediaan P dalam tanah Di Lahan Kering Malang Selatan. *Jurnal Tanah Dan Sumberdaya Lahan*, 1(1), 89–98.
- Tambunan, Sonia, Siswanto, B., & Handayanto, E. (2014). Biochar Terhadap Ketersediaan P Dalam Tanah Di Lahan Kering Malang Selatan. *Tanah Dan Sumberdaya Lahan*, 1(1), 85–92.
- Taylaran, R. D., Ozawa, S., Miyamoto, N., Ookawa, T., Motobayashi, T., & Hirasawa, T. (2009). Performance of a high-yielding modern rice cultivar Takanari and several old and new cultivars grown with and without chemical fertilizer in a submerged paddy field. *Plant Production Science*, 12(3), 365–380. <https://doi.org/10.1626/pps.12.365>
- Timilsina, A., Bizimana, F., Pandey, B., Yadav, R. K. P., Dong, W., & Hu, C. (2020). Nitrous oxide emissions from paddies: Understanding the role of rice plants. *Plants*, 9(2), 1–9. <https://doi.org/10.3390/plants9020180>
- Tiwari, S., Singh, C., & Singh, J. S. (2020). Wetlands: A mayor natural source responsible for methane emission. In *Restoration of Wetland Ecosystem: A Trajectory Towards a Sustainable Environment* (pp. 59–74). <https://doi.org/10.1007/978-981-13-7665-8>
- Venkateswarlu, B., & Singh, A. K. (2015). Climate change adaptation and mitigation strategies in rainfed agriculture. In *Climate Change Modelling, Planning and Policy for Agriculture* (pp. 1–11). <https://doi.org/10.1007/978-81-322-2157-9>
- Wahyunto. (2009). Lahan sawah di Indonesia sebagai pendukung pangan nasional. *Informatika Pertanian Volume 18 No.2*, 18(2), 133–152.
- Wander, M. M., Bidart, M. G., & Aref, S. (1998). Tillage impacts on depth distribution of total and particulate organic matter in Three Illinois Soils. *Soil Science Society of America Journal*, 62(6), 1704–1711. <https://doi.org/10.2136/sssaj1998.03615995006200060031x>
- Wang, B., Xu, Y., Wang, Z., Li, Z., Guo, Y., Shao, K., & Chen, Z. (1999). Methane emissions from ricefields as affected by organic amandment, water regime, crop establishment, and rice cultivar. *Environmental Monitoring and Assessment*, 57, 213–228.

- Wang, X., Cai, D., Wu, H., Hoogmoed, W. B., & Oenema, O. (2016). Effects of variation in rainfall on rainfed crop yields and water use in dryland farming areas in China. *Arid Land Research and Management*, 30(1), 1–24. <https://doi.org/10.1080/15324982.2015.1012686>
- Wassmann, R., & Dobermann, A. (2006). Greenhouse gas emissions from rice fields: What do we know and where should we head for? *Sustainable Energy and Environment (SEE 2006) 21-23 Nov 2006. Bangkok, Thailand*, 030(November), 1–5.
- Wassmann, R., Papen, H., & Rennenberg, H. (1993). Methane emission from rice paddies and possible mitigation strategies. *Chemosphere*, 26(1–4), 201–217. [https://doi.org/10.1016/0045-6535\(93\)90422-2](https://doi.org/10.1016/0045-6535(93)90422-2)
- Wassmann, R., Villanueva, J., Khounthavong, M., Okumu, B. O., Vo, T. B. T., & Sander, B. O. (2019). Adaptation, mitigation and food security: Multi-criteria ranking system for climate-smart agriculture technologies illustrated for rainfed rice in Laos. *Global Food Security*, 23(December 2018), 33–40. <https://doi.org/10.1016/j.gfs.2019.02.003>
- Widarti, B. N., Wardhini, W. K., & Sarwono, E. (2015). Pengaruh Rasio C/N Bahan Baku Pada Pembuatan Kompos Dari Kubis dan Kulit Pisang. *Jurnal Integrasi Proses*, 5(2), 75–80.
- Widyaswari, E., Santosa, M., & Maghfoer, M. D. (2017). Analisis pertumbuhan dua varietas tanaman padi (*Oryza sativa* L.) pada berbagai perlakuan pemupukan. *Biotropika - Journal of Tropical Biology*, 5(3), 73–77. <https://doi.org/10.21776/ub.biotropika.2017.005.03.2>
- Wihardjaka, A. (2002). Pola perubahan ketersediaan Kalium dalam tanah selama pertumbuhan padi di lahan sawah tadah hujan. *Penelitian Pertanian Tanaman Pangan*, 21(3), 15–23.
- Wihardjaka, A. (2010). Emisi gas dinitrogen oksida dari tanah sawah tadah hujan yang diberi jerami padi dan bahan penghambat nitrifikasi. *Biologi Indonesia*, 6(2), 211–224.
- Wihardjaka, A., Pramono, A., & Sutriadi, M. T. (2020). Peningkatan produktivitas padi sawah tadah hujan melalui penerapan teknologi adaptif dampak perubahan iklim. *Jurnal Sumberdaya Lahan*, 14(1), 25–36.
- Wihardjaka, A., Tandjung, S. D., Sunarminto, B. H., & Sugiharto, E. (2010a). Emisi gas dinitrogen oksida pada padi gogorancan oleh pemberian jerami padi dan bahan penghambat nitrifikasi. *Penelitian Pertanian Tanaman Pangan*, 29(3), 144–151.
- Wihardjaka, A., Tandjung, S. D., Sunarminto, B. H., & Sugiharto, E. (2010b). Emisi gas dinitrogen oksida pada padi gogorancan oleh pemberian jerami padi dan bahan penghambat nitrifikasi. *Jurnal Penelitian Pertanian Tanaman Pangan*, 29(3), 144–151.
- Wissuwa, M., Ae, N., & Jones, S. S. (2001). Genotypic variation for tolerance to

phosphorus deficiency in rice and the potential for its exploitation in rice improvement. *Plant Breeding*, 120(1), 43–48. <https://doi.org/10.1046/j.1439-0523.2001.00561.x>

- Yamin, M., Suprihatno, B., Rustiati, T., & Sitaresmi, T. (2012). Toleransi beberapa genotipe padi umur pendek terhadap pasokan air terbatas. *Jurnal Penelitian Pertanian Tanaman Pangan*, 31(2), 139059. <https://doi.org/10.21082/jpntp.v31n2.2012.p>
- Yang, S., Chen, X., Jiang, Z., Ding, J., Sun, X., & Xu, J. (2020). Effects of biochar application on soil organic carbon composition and enzyme activity in paddy soil under water-saving irrigation. *International Journal of Environmental Research and Public Health*, 17(1). <https://doi.org/10.3390/ijerph17010333>
- Yang, S., Peng, S., Xu, J., Luo, Y., & Li, D. (2012). Methane and nitrous oxide emissions from paddy field as affected by water-saving irrigation. *Physics and Chemistry of the Earth*, 53–54, 30–37. <https://doi.org/10.1016/j.pce.2011.08.020>
- Yang, S. S., & Chang, H. L. (1998). Effect of environmental conditions on methane production and emission from paddy soil. *Agriculture, Ecosystems and Environment*, 69(1), 69–80. [https://doi.org/10.1016/S0167-8809\(98\)00098-X](https://doi.org/10.1016/S0167-8809(98)00098-X)
- Yang, S., Sun, X., Ding, J., Jiang, Z., Liu, X., & Xu, J. (2020). Effect of biochar addition on CO<sub>2</sub> exchange in paddy fields under water-saving irrigation in Southeast China. *Journal of Environmental Management*, 271(July), 111029. <https://doi.org/10.1016/j.jenvman.2020.111029>
- Yartiwi, Romeida, A., & Utama, S. P. (2018). Adaptasi varietas unggul baru padi sawah untuk optimasi lahan tadah hujan berwawasan lingkungan di Kabupaten Seluma Provinsi Bengkulu. *Jurnal Penelitian Pengelolaan Sumberdaya Alam Dan Lingkungan*, 7(2), 91–97.
- Yu, K. W., Wang, Z. P., Vermoesen, A., Patrick, W. H., & Van Cleemput, O. (2001). Nitrous oxide and methane emissions from different soil suspensions: Effect of soil redox status. *Biology and Fertility of Soils*, 34(1), 25–30. <https://doi.org/10.1007/s003740100350>
- Zhang, Y., Jiang, Y., Li, Z., Zhu, X., Wang, X., Chen, J., Hang, X., Deng, A., Zhang, J., & Zhang, W. (2015). Aboveground morphological traits do not predict rice variety effects on CH<sub>4</sub> emissions. *Agriculture, Ecosystems & Environment*, 208, 86–93. <https://doi.org/10.1016/j.agee.2015.04.030>