

REFERENCES

- Abalo, J., J. Varela & V. Manzano, V. 2007. Importance values for importance-performance analysis: a formula for spreading out values derived from preference rankings. *J. Bus. Res.* 60 (1): 115-121.
- Aristya, V.E. & Taryono. 2016. Factor wise contribution on sesame seed yield. *AIP Conference Proceedings* 1755: 040007.
- Aristya, V.E. & Taryono. 2019. Pemuliaan tanaman partisipatif untuk meningkatkan peran varietas padi unggul dalam mendukung swasembada pangan nasional. *Agrinova: Journal of Agriculture Innovation* 2 (1): 026-035.
- Aristya, V.E. & Taryono. 2021. Participatory rice breeding based on the concept of sustainable agriculture region. *Jurnal Penelitian dan Pengembangan Pertanian* 40 (2): 125-137.
- Aristya, V.E. 2017. Menuju mandiri benih padi lokal melalui pemuliaan partisipatif. *Warta Inovasi* 10 (1): 35-38.
- Aristya, V.E. 2021. Peran pemuliaan desentralisasi mendukung pengembangan benih pangan unggul. *Warta Inovasi* 14 (2): 7-11.
- Aristya, V.E., Taryono, Y.A. Trisyono & J.H. Mulyo. 2021a. Morphological fingerprint of new rice genotypes. *IOP Conf. Ser.: Earth Environ. Sci.* 662: 012022.
- Aristya, V.E., Taryono, Y.A. Trisyono & J.H. Mulyo. 2021b. Stakeholder preferences on major characteristics of promising rice lines. *IOP Conf. Ser. Earth Environ. Sci.* 686: 012056.
- Aristya, V.E., Taryono, Y.A. Trisyono & J.H. Mulyo. 2021c. The variability of qualitative traits in promising rice lines. *IOP Conf. Ser.: Earth Environ. Sci.* 686: 012057.
- Aristya, V.E., Y.A. Trisyono, J.H. Mulyo & Taryono. 2021d. Participatory varietal selection for promising rice lines. *Sustainability* 13: 6856.
- Asante, M.D., B.O. Asante, G.K. Acheampong, S.K. Offei, V. Gracen, H. Adu-Dapaah & E.Y. Danquah. 2013. Farmer and consumer preferences for rice in the Ashanti region of Ghana: Implications for rice breeding in West Africa. *JPBCS* 5: 229–238.
- Asrat, S., M. Yesuf, F. Carlsson & E. Wale. 2010. Farmers' preferences for crop variety traits: Lessons for on-farm conservation and technology adoption. *Ecol. Econ.* 69: 2394–2401.
- Asuming-Brempong, S. K.O. Gyasi, K.A. Marfo, A. Diagne, A.N. Wiredu, B.A Asuming, J. Haleegoah & B.N. Frimpong. 2011. The exposure and adoption of New Rice for Africa (NERICAs) among Ghanaian rice farmers: What is the evidence? *Afr. J. Agric. Res.* 6: 5911–5917.
- Atlin, G.N., T. Paris & B. Courtois. 2002. Sources of variation in rainfed rice PVS trials: implications for the design of “mother-baby” trial networks. *In: M.R. Bellon & J. Reeves (Eds.). Quantitative Analysis of Data from Participatory Methods in Plant Breeding. CIMMYT. Mexico.* pp 36-43.
- Avakyan, E.R. & R.R. Dzhamirze. 2018. Rice lodging resistance. *RUDN Journal of Agronomy and Animal Industries* 13 (4): 366-372.
- Azzopardi, E. & R.A. Nash. 2013. Critical evaluation of importance–performance analysis. *Tour. Manag.* 35: 222–233.
- Babajanpour A., S.H. Hashemi-Petroudi & M. Haghpanah. 2018. Study of genetic variation of some Iranian rice genotypes based on morphological traits, physicochemical properties and molecular markers. *J. Plant Mol.Breed.* 6(2):1-9.
- Babu, V.R., K. Shreya, K.S. Dangi, G. Usharani & P. Nagesh. 2013. Evaluation of popular rice (*Oryza sativa* L.) hybrids for quantitative, qualitative and nutritional aspects. *IJSRP* 3 (1): 1-8.

- Bailey-Serres, J., J.E. Parker, E.A. Ainsworth, G.E.D. Oldroyd & J.I. Schroeder. 2019. Genetic strategies for improving crop yields. *Nature* 575: 109–188.
- Bellon, M.R., M. Smale, A. Aguirre, S. Taba, F. Aragón, J. Díaz & H. Castro. 2000. Identifying Appropriate Germplasm for Participatory Breeding: An Example from the Central Valleys of Oaxaca, Mexico. CIMMYT Economics Working Paper 00-03. International Maize and Wheat Improvement Center. Mexico. 15 p.
- Bhatta, M., P. Sandro, M.R. Smith, O. Delaney, K.P. Voss-Fels, L. Gutierrez & L.T. Hickey. 2021. Need for speed: manipulating plant growth to accelerate breeding cycles. *Curr. Opin. Plant Biol.* 60 (1): 101986.
- Bian, J., G. Zhu, C. Zhu, X. Peng, C. Li, X. He, X. Chen, J. Fu, L. Hu, L. Ouyang, X. Shen, H. He & S. Yan. 2015. Molecular dissection of developmental behavior of tiller number and the relationship with effective panicle using indica–japonica introgression lines in rice. *Molecular Breeding* 35 (91): 1-30.
- Bioversity International, IRRI & WARDA. 2007. Descriptors for wild and cultivated rice (*Oryza spp.*). Bioversity International, Rome; IRRI, Los Baños; WARDA, Africa Rice Center, Cotonou. 64 p.
- Bottrell, D.G. & K.G. Schoenly. 2012. Resurrecting the ghost of green revolution past: The brown planthopper as a recurring threat to high-yielding rice production in tropical Asia. *J. Asia-Pacific Entomol.* 15: 122–140.
- BPS (The Central Bureau of Statistics) of Central Java. 2020. Harvested Area, Productivity, and Production of Paddy by Regency/Municipality in Central Java Province, 2018 and 2019. Available online: <https://jateng.bps.go.id/statictable/2020/06/19/1817/luaspanen-produktivitas-dan-produksi-padi1-menurut-kabupaten-kota-di-provinsi-jawa-tengah-2018-dan-2019.html> (accessed on 22 June 2020).
- BPS (The Central Bureau of Statistics). 2020. Harvested Area, Production, and Rice Productivity by Province, 2018–2019. Available online: <https://www.bps.go.id/dynamictable/2019/04/15/1608/luas-panen-produksi-dan-produktivitas-padi-menurutprovinsi-2018.html> (accessed on 23 September 2020).
- Burman, D., B. Maji, S. Singh, S. Mandal, S.K. Sarangi, B.K. Bandyopadhyay, A.R. Bal, D.K. Sharma, S.L. Krishnamurthy & H.N. Singh. 2018. Participatory evaluation guides the development and selection of farmers' preferred rice varieties for salt- and flood-affected coastal deltas of South and Southeast Asia. *Field Crops Res.* 220: 67–77.
- Busanello C., E. Venske, C.F. Stafen, A.M. Pedrolo, V.K. da Luz, T. Pedron, F.P. Paniz, B.L. Batista, A.M. de Magalhães Júnior, A.C. Antonio Costa de Oliveira & C. Pegoraro. 2020. Is the genetic variability of elite rice in southern Brazil really disappearing? *Crop Breed. Appl. Biotechnol.* 20 (2): e262620214.
- Campanelli, G., N. Acciarri, B. Campion, S. Delvecchio, F. Leteo, F. Fusari, P. Angelini & S. Ceccarelli. 2015. Participatory tomato breeding for organic conditions in Italy. *Euphytica* 204: 179–197.
- Castilla, N.P., A.M. Stuart, O. Makara, K. Sathya, S. Somany, V. Kumar & B.A.R. Hadi. 2020. Characterization of cropping practices, pest constraints, and yield variation in irrigated lowland rice of Cambodia. *Crop Prot.* 135: 104906.
- Ceccarelli, S. & S. Grando. 2020. Participatory plant breeding: Who did it, who does it and where? *Exp. Agric.* 56: 1–11.
- Ceccarelli, S. 2012. Plant breeding with farmers – a technical manual. International Center for Agricultural Research in the Dry Areas. Aleppo. 126 p.
- Ceccarelli, S., S. Grando, R. Tutwiler, J. Baha, A.M. Martini, H. Salahieh, A. Goodchild & M. Michael. 2000. A methodological study on participatory barley breeding I. Selection phase. *Euphytica* 111: 91–104.



- Chaves, M.M., J.S. Pereira, J. Maroco, M.L. Rodrigues, C.P.P. Ricardo, M.L. Osorio, I. Carvalho, T. Faria & C. Pinheiro. 2002. How plants cope with water stress in the field. Photosynthesis and growth. *Ann. Bot.* 89: 907–916.
- Cheng, X., L. Zhu & G. He. 2013. Toward understanding of molecular interaction between rice and brown planthopper. *Mol. Plant.* 6: 621–634.
- Chiffolleau, Y. & D. Desclaux. 2006. Participatory plant breeding: the best way to breed for sustainable agriculture? *Int. J. Agr. Sustain.* 4 (2): 119-130.
- Chowdhury, S., J.V. Meenakshi, K.I. Tomlins & C. Otori. 2011. Are consumers in developing countries willing to pay more for micronutrient-dense biofortified foods? Evidence from a field experiment in Uganda. *Am.J.Agric. Econ.* 93: 83-97.
- Cruz, C.V., N. Castilla, S. Suwarno, E. Hondrade, R. Hondrade, T. Paris & F. Elazegui. 2009. Rice disease management in the uplands of Indonesia and the Philippines. *In* Natural Resource Management for Poverty Reduction and Environmental Sustainability in Fragile Rice-Based Systems; Haefele, S.M., Ismail, A.M. (Eds.) Limited Proceedings 15. IRRI. Manila. pp 10-18.
- Darsani, Y.R. & Koesrini. 2018. Preferensi petani terhadap karakter beberapa varietas unggul padi lahan rawa pasang surut. *Penelitian Pertanian Tanaman Pangan* 2 (2): 85-94.
- Darwis, V. 2018. Sinergi kegiatan desa mandiri benih dan kawasan mandiri benih untuk mewujudkan swasembada benih. *Analisis Kebijakan Pertanian* 16 (1): 59-72.
- De Groot, R.S., R. Alkemade, L. Braat, L. Hein & L. Willemsen. 2010. Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making. *Ecol. Complex.* 7 (3): 260-272.
- Desclaux, D., J.M. Nolot, Y. Chiffolleau, E. Goze & C. Leclerc. 2008. Changes in the concept of genotype x environment interactions to fit agriculture diversification and decentralized participatory plant breeding: pluridisciplinary point of view. *Euphytica* 163: 533–546.
- Director-General of Food Crops. 2018. Prosedur Operasional Standar Penilaian Varietas dalam Rangka Pelepasan Varietas Tanaman Pangan. Kementerian Pertanian. Jakarta. 118 p.
- Divya, B., A. Biswas, S. Robin, R. Rabindran & A.J. Joel. 2014. Gene interactions and genetics of blast resistance and yield attributes in rice (*Oryza sativa* L.). *J. Genet.* 93 (2): 415-424.
- Do-Nascimento, W.F., E.F. da-Silva & E.A. Veasey. 2011. Agro-morphological characterization of upland rice accessions. *Sci. Agric.* 68: 652–660.
- Draper, N.R. & H. Smith. 1981. *Applied Regression Analysis* 2nd ed. John Wiley and Sons. New York. pp. 736.
- Ebojei, C.O., T.B. Ayinde & G.O. Akogwu. 2012. Socio-economic factors influencing the adoption of hybrid maize in giwa local government area of Kaduna State, Nigeria. *J. Agr. Sci.* 7 (1): 23–32.
- Efissue, A., P. Tongona, J. Derera, A. Langyintuo, M. Laing & B. Ubi. 2008. Farmers' perceptions on rice varieties in Sikasso region of Mali and their implications for rice breeding. *J. Agron. Crop. Sci.* 194: 393–400.
- FAO (Food and Agriculture Organization of the United Nations). 2018. Rice Market Monitor. Available online: <http://www.fao.org/3/I9243EN/i9243en.pdf> (accessed on 31 January 2020).
- Fatondji, B.Y., H. Adoukonou-Sagbadja, N. Sognigbe, C. Gandonou & R.S. Vodouhè. 2020. Farmers' preferences for varietal traits, their knowledge and perceptions in traditional management of drought constraints in rice cropping in Benin: Implications for rice breeding. *J. Agric. Sci.* 12: 56–77.
- Fukuoka, S., T.D. Suu, K. Ebanna & L.N. Trinh. 2006. Diversity in phenotypic profiles in landraces populations of Vietnamese rice: a case study of agronomic

- characteristics for conserving crop genetic diversity on farm. *Genet. Resour. Crop Evol.* 53: 753-761.
- Galawat F. & M. Yabe. 2010. Assessing consumer's preference for local rice in Brunei: An application of choice model. *J. Int. Soc. Southeast Asian Agri. Sci.* 16 (2): 104 -115.
- Gallet, R. F. Bonnot, J. Milazzo, C. Tertois, H. Adreit, V. Ravigné, D. Tharreau & E. Fournier. 2014. The variety mixture strategy assessed in a GXG experiment with rice and the blast fungus *Magnaporthe oryzae*. *Front Genet.* 4: 1–11.
- Gaupp, F., J. Hall & S. Hochrainer-Stigler. 2020. Changing risks of simultaneous global breadbasket failure. *Nat. Clim. Chang.* 10: 54–57.
- Gautam, R.K., P.K. Singh, K. Sakthivel, K. Venkatesan, A. Sharma, S.S. Rao, M.N. Das, S. Pal & S.K.Z. Ahmed. 2018. Agro-morphological fingerprinting of rice varieties of Andaman and Nicobar Islands. ICAR-Central Island Agricultural Research Institute. Port Blair.
- Ghazanfar, M.U., A. Habib & S.T. Sahi. 2009. Screening of rice germplasm against *Pyricularia oryzae* the cause of rice blast disease. *Pak.J. Phytopathol.* 21:41–44.
- Ghimire, R., H. Wen-Chi & R.B. Shrestha. 2015. Factors affecting adoption of improved rice varieties among rural farm households in Central Nepal. *Rice Sci.* 22: 35–43.
- Graham, S. 2014. A new perspective on the trust power nexus from rural Australia. *J. Rural Stud.* 36: 87-98.
- GRiSP (Global Rice Science Partnership). 2013. Rice almanac 4th ed. IRRI. Los Baños. 283 p.
- Gyawali, S., B.R. Sthapit, B. Bhandari, J. Bajracharya, P.K. Shrestha, M.P. Upadhyay & D.I. Jarvis. 2010. Participatory crop improvement and formal release of Jethobudho rice landrace in Nepal. *Euphytica* 176: 59–78.
- Hairmansis, A., B. Kustianto, E. Lubis & Suwarno. 2008. Increasing genetic diversity through participatory varietal selection of upland rice in Lampung. *Penelitian Pertanian Tanaman Pangan* 27 (1): 9-12.
- Hairmansis, A., Supartopo & Suwarno. 2015. Seleksi varietas partisipatif terhadap galur-galur elit padi gogo di lahan petani. *Ilmu Pertanian* 18 (2): 61-68.
- Halewood, M., P. Deupmann, B. Sthapit, R. Vernooy & S. Ceccarelli. 2007. Participatory plant breeding to promote Farmers' Rights. *Bioversity International*. Rome. 7 p.
- Harrell, D.L., J.A. Bond & S. Blanche. 2009. Evaluation of main-crop stubble height on ratoon rice growth and development. *J. Field Crops Res.* 114 (1): 396-403.
- Heong, K.L. 2009. Situation of Planthoppers in Asia. IRRI. Los Baños. pp 191–220.
- IRRI (International Rice Research Institute). 1996. Standard Evaluation System for Rice, 4nd ed. International Rice Research Institute. Los Baños. 52p.
- IRRI (International Rice Research Institute). 2004. Available online: www.knowledgebank.irri.org/wildRiceTaxonomy/default.htm (accessed on 31 January 2020).
- IRRI (International Rice Research Institute). 2007. Rice: A Practical Guide to Nutrient Management 2nd Edition. Edited by Fairhurst TH, Witt C, Buresh RJ, and Dobermann A. International Rice Research Institute. Los Baños. 89 p.
- IRRI (International Rice Research Institute). 2015. Step to Successful Rice Production. International Rice Research Institute. Los Baños. 27 p.
- IRRI (International Rice Research Institute). 2019. Step-by-Step Production. Available online: <http://www.knowledgebank.irri.org/step-by-step-production> (accessed on 11 January 2019).
- Islam, M.R., M.S. Alam, A.I. Khan, I. Hossain, L.R. Adam & F. Daayf. 2016. Analyses of genetic diversity of bacterial blight pathogen, *Xanthomonas oryzae* pv. *oryzae* using IS1112 in Bangladesh. *Comptes Rendus Biol.* 339; 399–407.

- Jackson, M.B. 2008. Ethylene-promoted Elongation: An adaptation to submergence stress. *Ann. Bot.* 101 (2): 229-248.
- Jaruchai, W., T. Monkham, S. Chankaew, B. Suriharn & J. Sanitchon. 2018. Evaluation of stability and yield potential of upland rice genotypes in North and Northeast Thailand. *J. Integr. Agric.* 17: 28–36.
- Jiang, P., F. Xu, L. Zhang, M. Liu, H. Xiong, X. Guo, Y. Zhu & X. Zhou. 2021. Impact of tillage and crop establishment methods on rice yields in a rice-ratoon rice cropping system in Southwest China. *Sci. Rep.* 11 (1): 18421.
- Joshi, A. & J.R. Witcombe. 1998. Farmer participatory approaches for varietal improvement. *In: J.R. Witcombe, D.S. Virk & J. Farrington (Eds.). Seeds of choice: making the most of new varieties for small farmers.* Oxford and IBH Publishing Co. London. Intermediate Technology Pubs. New Delhi. pp 172-190.
- Joshi, A.M., N.K. Sarao, R.C. Sharma, P. Singh & T.S. Bharaj. 2007. Varietal characterization of rice (*Oryza sativa* L.) based on morphological descriptors. *Seed Res.* 35: 188-193.
- Kalyan, B., K.V.R. Krishna & S.L.V. Rao, 2017. DUS characterization for germplasm of rice. *Int. J. Curr. Microbiol. Appl. Sci.* 6: 3480-3487
- Karimizadeh, R., M. Mohammadi, N. Sabaghni, A.A. Mahmoodi, B. Roustami, F. Seyyedi & F. Akbari. 2013. GGE biplot analysis of yield stability in multi-environment trials of lentil genotypes under rainfed condition. *Not. Sci. Biol.* 5: 256-262.
- Kato, Y. & M. Okami. 2011. Root morphology, hydraulic conductivity and plant water relations of high-yielding rice grown under aerobic conditions. *Ann. Bot.* 108 (3): 575–583.
- Keith, S.J. & B.B. Boley. 2019. Importance-performance analysis of local resident greenway users: findings from three Atlanta BeltLine Neighborhoods. *Urban for. Urban Green* 44: 126426.
- Khan, S.A., A.H. Shah, F.M. Abbasi, A. Javed, I. ur Rahman & H. Ahmad. 2015. Quantitative and qualitative traits analyses in the advance breeding lines of rice. *Int. J. Biosci.* 6 (8): 50-61.
- Kogo, B.K., L. Kumar & R. Koech. 2021. Climate change and variability in kenya: a review of impacts on agriculture and food security. *Environ. Dev. Sustain.* 23: 23-43.
- Kondhia, A., R.E. Tabien & A. Ibrahim. 2015. Evaluation and selection of high biomass rice (*Oryza sativa* L.) for drought tolerance. *Am. J. Plant Sci.* 6 (1): 1962-1972.
- Kumar, S., S.S. Singh, A.K. Singh, R. Elanchezhian, U.R. Sangale & P.K. Sundaram. 2012. Evaluation of rice genotypes for resistance to blast disease under rainfed lowland ecosystem. *J. Plant Dis. Sci.* 7: 175–178.
- Kuruma, R.W., P. Sheunda & C.M. Kahwaga. 2019. Yield stability and farmer preference of cowpea (*Vigna unguiculata*) lines in semi-arid Eastern Kenya. *Afrika Focus* 32: 65–82.
- Lacoste, M., R. Williams, W. Erskine, H. Nesbitt, L. Pereira & A. Marçal. 2012. Varietal diffusion in marginal seed systems: Participatory trials initiate change in East Timor. *J. Crop. Improv.* 26: 468–488.
- Liu, S.H., B.J. Yang, S. Liu, Z.P. Ding, Z.W. Liu & J. Tang. 2012. Effects of sublethal dose of imidacloprid and pymetrozine on relative biological fitness of brown planthopper, *Nilaparvata lugens*. *J. Rice Sci.* 26: 361–364.
- Londingkene, J.A., Y.A. Trisyono, Witjaksono & E. Martono. 2016. Resistance to imidacloprid and effect of three synergists on the resistance level of brown planthopper. *AIP Conf. Proc.* 1755: 140008.
- Lu, C., K. Yao & N. Hu. 2011. Performance and analysis of a model for describing layered leaf area index of rice. *Agricultural Sciences in China* 10 (3): 351-362.



- Lu, J., T. Ookawa & T. Hirasawa. 2000. The effects of irrigation regimes on the water use, dry matter production and physiological responses of paddy rice. *Plant and Soil* 223: 207–216.
- Luo, Y., L. Lao, B. Ai, M. Zhang, J. Xie & F. Zhang. 2019. Development of a drought stress-resistant rice restorer line through *Oryza sativa*–*rufipogon* hybridization. *J. Genet.* 98 (55): 1-20.
- Mackill, D.J. & G.S. Khush. 2018. IR64: a high-quality and high-yielding mega variety. *Rice (N Y)* 11 (1): 18.
- Makarim, A.K., S. Abdurachman, Ikhwan, N. Agustiani, S. Margaret, M.I. Wahab, R. Rachmat & A. Guswara. 2017. Teknik Ubinan Pendugaan Produktivitas Padi Menurut Sistem Tanam. BB Padi, Kementerian Pertanian. Sukamandi. 52 p.
- Manzanilla, D.O., T.R. Paris, G.T. Tatlonghari, A.M. Tobias, T.T.N. Chi, N.T. Phuong, I. Siliphouthone, V. Chamarerk, P. Bhekasut & R. Gandasoemita. 2014. Social and gender perspectives in rice breeding for submergence tolerance in Southeast asia. *Expl Agric.* 50 (2): 191–215.
- Manzanilla, D.O., T.R. Paris, G.V. Vergara, A.M. Ismail, S. Pandey, R.V. Labios, G.T. Tatlonghari, R.D. Acda, T.T.N. Chi, K. Duoangasila, I. Siliphouthone, M.O.A. Manikmas & D.J. Mackill. 2011. Submergence risks and farmers' preferences: Implications for breeding Sub1 rice in Southeast Asia. *Agr. Syst.* 104: 335–347.
- Maredia, M.K. & D.A. Raitzer. 2010. Estimating overall returns to international agricultural research in Africa through benefit–cost analysis: A “best-evidence” approach. *Agric. Econ.* 41: 81–100.
- Mbulwe, L., M. Lwaile & M. Chisi. 2015. Effectiveness of participatory breeding and variety selection for sorghum technology adoption in Zambia. *Net. J. Agric. Sci.* 3 (2): 41-48.
- Ministry of Agriculture. 2018b. Technical Guidelines for Observing and Reporting on Plant Pests and the Impacts of Climate Change. Ministry of Agriculture. Jakarta. 139 p.
- Ministry of Agriculture. 2019. Data Five Last Year. Available online: <https://www.pertanian.go.id/home/?show=page&act=view&id=61> (accessed on 3 June 2020).
- Ministry of Agriculture. 2021. Laporan tahunan tahun 2020. Direktorat Jenderal Tanaman Pangan, Kementerian Pertanian. Jakarta. 120 p.
- Mocanda, M.P., D. Gabriels & W.M. Cornelis. 2014. Data-Driven Analysis of Soil Quality Parameters using Limited Data. *Geoderma* 235–236: 271–278.
- Moonsap, P., N. Laksanavilat, P. Tasanasuwan, S. Kate-Ngam & C. Jantasuriyarat. 2019. Assessment of genetic variation of 15 Thai elite rice cultivars using InDel markers. *Crop Breed. Appl. Biot.* 19 (1): 15-21.
- Morris, M.A. & P.W. Heisey. 2003. Estimating the benefits of plant breeding research: Methodological issues and practical challenges. *Agric. Econ.* 29: 241-252.
- Morris, M.L. & M.R. Bellon. 2004. Participatory plant breeding research: Opportunities and challenges for the international crop improvement system. *Euphytica* 136: 21–35.
- Najeeb, S., F.A. Sheikh, G.A. Parray, A.B. Shikari, Gul zaffar, S.C. Kashyp, M.A. Ganie & A.B. Shah. 2017. Farmers participatory selection of new rice varieties to boost production under temperate agroecosystems. *J. Integr. Agric.* 16: 60345-7.
- Naruoka, Y., L.E. Talbert, S.P. Lanning, N.K. Blake, J.M. Martin & J.D. Sherman. 2011. Identification of quantitative trait loci for productive tiller number and its relationship to agronomic traits in spring wheat. *Theor. Appl. Genet.* 123 (6): 1043-1053.
- Nguyen, H.T., K.S. Fischer & S. Fukai. 2009. Physiological responses to various water saving systems in rice. *Field Crops Res.* 112 (2-3): 189-198.



- Oladosu, Y., M.Y. Rafii, F. Arolu, S.C. Chukwu, I. Muhammad, I. Kareem, M.A. Salisu & I.W. Arolu. 2020. Submergence tolerance in rice: review of mechanism, breeding and, future prospects. *Sustainability* 12 (4): 1632.
- Oladosu, Y., M.Y. Rafii, N. Abdullah, M.A. Malek, H.A. Rahim, G. Hussin, M.A. Latif & I. Kareem. 2014. Genetic variability and selection criteria in rice mutant lines as revealed by quantitative traits. *The Scientific World Journal*: 190531.
- Osundare, O.T., B.O. Akinyele, L.S. Fayeun & O.S. Osekita. 2017. Evaluation of qualitative and quantitative traits and correlation coefficient analysis of six upland rice varieties. *J. Biosci. Bioeng.* 1 (1): 17-27.
- Pagliarino, E., F. Orlando, V. Vaglia, S. Rolfo & S. Bocchi. 2020. Participatory research for sustainable agriculture: the case of the Italian agroecological rice network. *Eur. J. Futures Res.* 8 (7): 1-16.
- Pak, R.J. 2016. Combination of importance-performance analysis and response surface methodology for enhancing satisfaction. *Int. J. Qual. Reliab. Manag.* 33: 780–792.
- Pandey, S., D. Gauchan, M. Malabayabas, M. Bool-Emerick & B. Hardy. 2012. Patterns of adoption of improved rice varieties and farm-level impacts in stress-prone rainfed areas in South Asia. IRRI. Los Baños. 318 p.
- Pandey, S.K., A. Das, P. Rai & T. Dasgupta. 2015. Morphological and genetic diversity assessment of sesame (*Sesamum indicum* L.) accessions differing in origin. *Physiol Mol Biol Plants*.
- Paris, T, D. Manzanilla, G. Tatlonghari, R. Labios, A. Cueno & D. Villanueva. 2011. Guide to participatory varietal selection for submergence-tolerant rice. IRRI. Los Baños. 111 p.
- Perumalsamy, S., M. Bharani, M. Sudha, P. Nagarajan, L. Arul, R. Sarawathi, P. Balasubramanian & J. Ramalingam. 2010. Functional marker-assisted selection for bacterial leaf blight resistance genes in rice (*Oryza sativa* L.). *Plant Breed.* 129: 400–406.
- Phule, A.S., K.M. Barbadikar, M.S. Madhav, D. Subrahmanyam, P. Senguttuvel, M.B.B.P. Babu & P.A. Kumar. 2019. Studies on root anatomy, morphology and physiology of rice grown under aerobic and anaerobic conditions. *Physiol. Mol. Biol. Plants* 25 (1): 197-205.
- Piepho, H.P., M.F. Nazir, M. Qamar, A.U.R. Rattu, R.U. Din, M. Hussain, G. Ahmad, F.E. Subhan, J. Ahmad & Abdullah. 2016. Stability Analysis for a Countrywide Series of Wheat Trials in Pakistan. *Crop Sci.* 56: 2465–2475.
- Pierpaoli, E., G. Carli, E. Pignatti & M. Canavari 2013. Drivers of precision agriculture technologies adoption: a literature review. *Proc. Technol.* 8: 61–69.
- Qiu, Y., J. Guo, S. Jing, M. Tang, L. Zhu & G. He. 2011. Identification of antibiosis and tolerance in rice varieties carrying brown planthopper resistance genes. *Entomol. Exp. Appl.* 141: 224–231.
- Rahman, M.A., A.A. Thant, M. Win, M.S. Tun, P. Moet Moet, A.M. Thu, K.T. Win, T. Myint, O. Myint, Y. Tuntun, R.V. Labios, M.C. Casimero, G.B. Gregorio, D.E. Johnson, G.R. Singleton & R.K. Singh. 2015. Participatory varietal selection (pvs): a “bottom-up” breeding approach helps rice farmers in the Ayeyarwady Delta, Myanmar. *SABRAO J. Breed. Genet.* 47 (3): 299-314.
- Rawte, S. & R.R. Saxena. 2018. Morphological characterization of selected rice (*Oryza sativa* L.) from core germplasm group of chhattisgarh using DUS Descriptors. *Int. J. Curr. Microbiol. App. Sci.* 7 (10): 350-357.
- Rengel, Z. 2000. Mineral Nutrition of Crops, Fundamental Mechanisms and Implications. Food Production Press. Binghamton.
- Rohaeni, W.R., A. Sinaga & M.I. Ishaq. 2012. Preferensi responden terhadap keragaan tanaman dan kualitas produk beberapa varietas unggul baru padi. *Informatika Pertanian* 21 (2): 97-103.

- Roussy, C., A. Ridier, K. Chaib & A. 2020. Carpentier. Farmers' preferences for diversification crop attributes. 6. EAAE PhD Workshop: Economic research in food agriculture, environment and development. Rome. pp 02739354.
- Rueff, C. & A. Gibon. 2010. Using a view of livestock farms as social-ecological systems to study the local variety in their trajectories of change. 9th European IFSA Symposium - 2010, July 2010. Vienne. pp 1169–1179.
- Samonte, S.O.P.B., R.E. Tabien & L.T. Wilson. 2013. Parental selection in rice cultivar improvement. *Rice Sci.* 20: 45–51.
- Saptutyningsih, E., D. Diswandi & W. Jaung. 2020. Does social capital matter in climate change adaptation? A lesson from agricultural sector in Yogyakarta, Indonesia. *Land Use Policy* 95: 104189.
- Sarif, H.M., M.Y. Rafii, A. Ramli, Y. Oladosu, H.M. Musa, H.A. Rahim, Z.M. Zuki & S.C. Chukwu. 2020. Genetic diversity and variability among pigmented rice germplasm using molecular marker and morphological traits. *Biotechnol. Biotechnol Equip* 34 (1): 747-762.
- SAS Institute Inc. Base SAS® 9.4. Procedures Guide: Statistical Procedures, 2nd ed.; SAS Institute Inc.: Cary, NC, USA, 2013.
- Sasaki, T. 2005. The complete rice genome sequence and its application to breeding and genetics. *In*: K. Toriyama, K.L. Heong & B. Hardy (Eds.). *Rice is Life: Scientific Perspectives for the 21st Century*. Proceedings of the World Rice Research Conference. IRRI, Los Baños and Japan International Research Center for Agricultural Sciences, Tsukuba. 590 p.
- Satoto, M.J. Mejaya, Y. Widyastuti & I.A. Rumanti. 2013. Stabilitas dan potensi hasil varietas unggul baru padi hibrida. *Penelitian Pertanian Tanaman Pangan* 32 (2): 67-73.
- Shamim, M.Z. & V.K. Sharma. 2014. Assessment of variability and genetic diversity among different rice varieties for qualitative traits. *Indian J. Agric. Res.* 48 (3): 237-240.
- Sharma, R.C. & E. Duveiller. 2006. Farmer participatory evaluation confirms higher grain yields in spring wheat using a selection index for spot blotch resistance, maturity and kernel weight. *Euphytica* 150: 307–317.
- Singh, D.P., A.K. Singh & A. Singh. 2021. Chapter 24—Participatory plant breeding. *In* Singh, D.P., Singh, A.K., Singh, A., Eds. *Plant Breeding and Cultivar Development*. Academic Press. London. pp. 483–495.
- Singh, R., S. Sunder & D.S. Dodan. 2004. Evaluation of scented rice genotypes to blast and its management with fungicides. *J. Mycol. Plant Pathol.* 34: 280–281.
- Singh, R.K. & B.D. Chaudhary. 1977. *Biometrical Methods in Quantitative Genetics Analysis*. Kalyani Publishers Indiana. New Delhi. 304 p.
- Singh, Y.P., A.K. Nayak, D.K. Sharma, R.K. Gautam, R.K. Singh, R. Singh, V.K. Mishra, T. Paris & A.M. Ismail. 2013. Farmers' participatory varietal selection: A sustainable crop improvement approach for the 21st century. *Agroecol. Sustain. Food Syst.* 38: 427–444.
- Smith, C.M. 2021. Conventional breeding of insect-resistant crop plants: Still the best way to feed the world population. *Curr. Opin. Insect. Sci.* 45: 7–13.
- Smith, S.E., A. Al Doss & M. Warburton. 1991. Morphological and agronomic variation in North African and Arabian alfalfas. *Crop Science* 31: 1159-1163.
- Sombunjitt, S., T. Sriwongchai, C. Kuleung & V. Hongtrakul. 2017. Searching for and analysis of bacterial blight resistance genes from Thailand rice germplasm. *Agric. Nat. Resour.* 51: 365–375.
- Srivastava, A.K., D.R. Saxena, P.R. Saabale, K.S. Raghuvanshi, V.P. Anandani, R.K. Singh, O.P. Sharma, A.R. Wasinikar, S. Sahni & R.K. Varshney. 2020. Delineation of Genotype-by-Environment interactions for identification and

- validation of resistant genotypes in chickpea to *Fusarium wilt* using GGE biplot. Crop Prot. 144: 105571.
- Streck, E.A., A.M. Magalhães Júnior, G.A. Aguiar, P.H.K. Facchinello, P.R.R. Fagundes, D.F. Franco, M. Nardino & A.C. de Oliveira. 2018. Genetic progress in 45 years of irrigated rice breeding in Southern Brazil. Crop Sci. 58:1094-1105.
- Suprehatin, W.J. Umberger, D. Yi, R. Stringer & N. Minot. 2015. The effect of Indonesian farmer preferences for crop attributes in the adoption of horticultural crops: a best-worst scaling approach. Presentation at the 2015 Agricultural & Applied Economics Association and Western Agricultural Economics Association Annual Meeting, San Francisco, July 26-28. pp 1-38.
- Suwarno, E. Lubis, A. Hairmansis & Santoso. 2009. Development of a package of 20 varieties for blast management on upland rice. In: G.L. Wang & B. Valent (eds). Advances in Genetics, Genomics and Control of Rice Blast Disease. Springer Netherlands. pp. 347-357.
- Tabatabaei, I., L. Pazouki, M.R. Bihanta, S. Mansoori, M. Jalali, Javaran & U. Niinemets. 2011. Genetic variation among Iranian sesame (*Sesamum indicum* L.) accessions vis-a-vis exotic genotypes on the basis of morpho-physiological traits and RAPD markers. Australian Journal of Crop Science 5 (11): 1396-1407.
- Takai, T., P. Lumanglas, E.V. Simon, Y. Arai-Sanoh, H. Asai & N. Kobayashi. 2019. Identifying key traits in high-yielding rice cultivars for adaptability to both temperate and tropical environments. Crop J. 7: 685–693.
- Tittonell, P., B. Vanlauwe, M. Misiko & K.E. Giller. 2011. Targeting resources within diverse, heterogeneous and dynamic farming systems: Towards a uniquely African green revolution. In: A. Bationo, B. Waswa, J.M. Okeyo, F. Main, & J.M. Kihara (Eds.). Innovations as key to the green revolution in Africa: Exploring the Scientific Facts. Springer. Dordrecht. 747-758.
- USDA (United States Department of Agriculture). 2019. Commodity Intelligence Report. 2019. <https://ipad.fas.usda.gov/highlights/2019/05/Indonesia/index.pdf> (accessed on 20 August 2019).
- Vaughan D.A. & H. Morishima. 2003. Biosystematics of the genus *Oryza*. In: Smith W (Eds.). Rice: Origin, History, Technology, and Production. John Wiley & Sons, Inc. New York. pp 27-65.
- Vaughan, D., K. Kadowaki, A. Kaga & N. Tomooka. 2005. Eco-genetic diversification in the genus *Oryza*: implications for sustainable rice production. In: K. Toriyama, K.L. Heong & B. Hardy (Eds.). Rice is Life: Scientific Perspectives for the 21st Century. Proceedings of the World Rice Research Conference held. IRRI, Los Baños and Japan International Research Center for Agricultural Sciences, Tsukuba. 590 p.
- Veasey, E.A., E.F. da Silva, E.A. Schammas, G.C.X. Oliveira & A. Ando. 2008. Morphoagronomic genetic diversity in American wild rice species. Braz. Arch. Biol. Technol. 51: 95–104.
- Vial, L., P.S. Inthapanya & S. Fukai. 2008. Farmer participatory varietal selection in Lao lowland rice systems. Global Issues, Paddock Action. Proceedings of 14th Agronomy Conference. Adelaide.
- Witcombe, J.R., K.D. Joshi, R.B. Rana & D.S. Virk. 2001. Increasing genetic diversity by participatory varietal selection in high-potential production systems in Nepal and India. Euphytica 122: 575–588.
- Witcombe, J.R., A. Joshi & S.N. Goyal. 2003. Participatory plant breeding in maize: A case study from Gujarat, India. Euphytica 130: 413–422.
- Witcombe, J.R., A. Joshi, J.K. Joshi & B.R. Sthapit. 1996. Farmer participatory crop improvement. I. Varietal selection and breeding methods and their impact on biodiversity. Exp. Agric. 32: 445–460.



- World Bank. 2007. World Development Report 2008: Agriculture for Development. World Bank. Washington DC. 160–161. Available online: <https://openknowledge.worldbank.org/handle/10986/5990> (20 August 2019).
- Xu, F.F., F.F. Tang, Y.F. Shao, Y.L. Chen, C. Tong & J.S. Bao. 2014. Genotype Environment Interaction for agronomic traits of rice revealed by association mapping. *Rice Sci.* 21: 133–141.
- Yan, W. & M.S. Kang. 2003. GGE Biplot Analysis: A Graphical Tool for Breeders, Geneticists, and Agronomists. CRC Press. Boca Raton; London; New York.
- Yan, W. GGEbiplot. 2021. Available online: <http://www.ggebiplot.com/biplot.htm> (accessed on 7 May 2020).
- Yusuf, H. & E. Fitria. 2017. Persepsi dan preferensi petani terhadap varietas unggul baru (VUB) padi di Provinsi Aceh. *Jurnal Triton* 8 (1): 57-66.
- Zakaria, A.K. & T. Nurasa. 2013. Strategi penggalangan petani untuk mendukung program peningkatan produksi padi berkelanjutan. *Jurnal Analisis Kebijakan* 11 (2): 5-87.
- Zarwazi, L.M., A. Junaedi, D. Sopandie, Sugiyanta, Purwono & J. Sakagami. 2022. Prospective rice varieties for high yield performance on modified ratoon salibu cultivation. *Biodiversitas* 23 (2): 1065-1071.
- Zolviski, S. 2008. Listening to the farmers: qualitative impact assessment in unfavorable rice environments. Technical Bulletin No. 12. IRRI. Manila.