the Malaysian Pepper Board and Universiti Kebangsaan Malaysia for their contribution to this project.

REFERENCES

[1] International Pepper Community, "County Profile: Malaysia," 2016.

[2] Malaysian Pepper Board, "Geographical Indication of Sarawak Pepper," Malaysian Pepper Board, Kuching, 2013.

[3] K. S. Krishnamurthy, V. A. Parthasarathy, K. V. Saji and B. Krishnamoorthy, "Ideotype concept in black pepper," Journal of Spices and Aromatic Crops, 2010.

[4] J. Othman and Y. Jafari, "Selected Research Issues in the Malaysian Agriculture Sector," Jurnal Ekonomi Malaysia, vol. 48, no. 2, pp. 127-136, 2014.

[5] A. H. Awang, K. Hashim, Z. Ramli, N. Lyndon, and M. N. S. Ali, "The effect of Technology Transfer, good agriculture practices on the productivity of independent palm oil smallholders," International Journal of Economic Perspectives, vol. 10, no. 4, pp. 300-3004, 2016.

[6] A. Wahyudi and E. R. Pribadi, "Inovasi untuk meningkatkan daya saing lada Indonesia," Perspektif: Review penelitian tanaman industri, vol. 15, no. 2, pp. 134-145, 2016.

[7] A. Bartlett, A. Andales, M. Arabi and T. Bauder, "A smartphone app to extend the use of a cloud-based irrigation scheduling tool," Computers in electronics and agriculture, vol. 111, pp. 127-130, 2015.

[8] W. Phonphan, "Water Demands Estimation on Agriculture Area using Geographic Information System," Int. Journal of Advances in Science, Engineering and Technology, vol. 6, no. 2, pp. 28-31, 2018.

[9] L. Eng, "Pepper production technology in Malaysia," Malaysia Pepper Board, 2011.

[10] R. J. Devraj, "Pulsexpert: an expert system for diagnosis and control of diseases in pulse crops," Expert systems with applications, 2011.

[11] L. Gonzalez-Diaz, P. Martinez-Jimenez, F. Bastida and J. Gonzalez-Andujar, "Expert system for integrated plant protection in pepper (capsicum annuum l)," Experts systems with the application, 2009.

[12] H. Ali, M. Lali, M. Nawaz, M. Sharif and B. Saleem, "Symptom-based automated detection of citrus diseases using the color histogram and textural descriptors," Computers and Electronics in agriculture, 2011.

[13] S. S. Abdullah, R. M. Yusof, N. A. Zainal, A. Abdullah, A. A. Bakar and K. Omar, "Paddy Abnormality Vision Recognition Tool Based on Multi-Layered Mamdani Fuzzy Modeling," Applied Engineering in Agriculture, vol. 30, no. 2, pp. 325-334, 2014.

[14] K. Zhang, Y. Chai and S. Yang, "Self Organising feature map for cluster analysis in multi-disease diagnosis," Expert systems with Applications, 2010.

[15] Z. Ibrahim, S. Mohd Noah and M. Noor, "Rules for Ontology Population from Text of Malaysia Medicinal Herbs Domain." in Rough Set and Knowledge Technology..

[16] N. I. Y. Saat and S. A. Mohd Noah, "Rule-based Approach for Automatic Ontology Population of Agriculture Domain", Information Technology Journal, vol. 15, no. 2, pp. 46-51, 2016.

[17] S. Choudhary and N. Bhatnagar, "Determination Of Selected Pesticide Residues In Fruits Using Quechers Approach And Reversed-Phase High-Performance Liquid Chromatography (RP-HPLC)," Int. Journal of Advances in Science, Engineering and Technology, vol. 4, no. 1, pp. 19-22, 2016.

[18] P. Sneha and V. Rakesh, "Automatic monitoring and control of shrimp aquaculture and paddy field based on embedded system and IoT," in Proceedings of the International Conference on Inventive Computing and Informatics, ICICI 2017, Coimbatore, India, 2018.

[19] P. Hetal and P. Dharmendra, "Survey of Android Apps for Agriculture," International Journal of Information Sciences and Techniques, vol. 6, no. 1/2, pp. 61-67, 2016.

[20] S. Rajeswari, K. Suthendran and K. Rajakumar, "A smart agricultural model by integrating IoT, mobile and cloud-based big data analytics," in Proceedings of 2017 International Conference on Intelligent Computing and Control, Coimbatore, India, 2018.

[21] D. P. Dahnil and R. Hassan, "Wireless sensor networks: a framework for community and educational gardens," Advanced Science Letters, vol. 24, pp. 1153-1157, 2018.

[22] M. Hopkin, "17 Agriculture Apps That Will Help You Farm Smarter In 2017," CropLife, Danvers, Massachusetts, 2016.

[23] S. Kamarudin, N. Sahari, R. Sulaiman, R. Alan and F. A. A. Zakry, "Kebolehcapaian nasihat bagi pengurusan penyakit tanaman oleh pekebun kecil lada hitam, Sarawak: Tinjauan awal," Geografia: Malaysia Journal of Society and Space, vol. 9, no. 2, pp. 17-26, 2013.

[24] S. Kamarudin, R. Alan, N. Sahari, A. N. Abdul Wahab and R. Sulaiman, "Pembangunan dan Penilaian Model Hasrat Mengguna Aplikasi Mudah Alih Penasihatan Penyakit Tanaman Lada Hitam," Jurnal pengurusan, vol. 52, 2018.

[25] A. Paulus, D. Megir and L. Eng, "Pepper technology package," Department of Agriculture Sarawak, 2006.

[26] A. Paulus, S. Sim, L. Eng, G. Megir and J. and Rosmah, "Pepper production technology in Malaysia,," Malaysian Pepper Board., Kuching, 2011.

[27] V. Lopez-Moralez, O. Lopez-Ortega, J. Ramos-Fernandez and L. Munoz, "Japiest: an integral intelligent system for diagnosis and control of tomato diseases and pests in hydroponic greenhouses," Expert systems with applications, 2008.