CURRICULUM VITAE

A. BUTIR-BUTIR PERIBADI *(Personal Details)*			
Nama Penuh *(Full Name)*	**FARRAH MELISSA MUHARAM**		Gelaran *(Title):* DR.
No. MyKad / No. Pasport *(Mykad No. / Passport No.)* 820127-01-5976	Warganegara *(Citizenship)* MALAYSIA	Bangsa *(Race)* MALAY	Jantina *(Gender)* FEMALE
Jawatan *(Designation)* ASSOCIATE PROFESSOR		Tarikh Lahir *(Date of Birth)* 27 JANUARY 1982	

Alamat Semasa *(Current Address)*	Jabatan/Fakulti *(Department/Faculty)*	E-mel dan URL *(E-mail Address and URL)*
1529, Jalan Warisan Puteri A53, Bandar Warisan Puteri, 70400 Seremban. Negeri Sembilan.	Department of Agriculture Technology Faculty of Agriculture, Universiti Putra Malaysia Serdang, Malaysia. Tel: 03-97694960	E-mail: farrahm@upm.edu.my URL: H/P: 012-2545248

B. KELAYAKAN AKADEMIK *(Academic Qualification)*			
Nama Sijil / Kelayakan *(Certificate / Qualification obtained)*	Nama Sekolah Institusi *(Name of School / Institution)*	Tahun *(Year obtained)*	Bidang pengkhususuan *(Area of Specialization)*
B. Sc (Remote Sensing)	Universiti Teknologi Malaysia, MALAYSIA	2003	Remote Sensing
M. Sc (Remote Sensing)	University College London, UNITED KINGDOM	2005	Remote Sensing
PhD. (Plant and Soil Science)	Texas Tech University, TEXAS.	2012	Plant and Soil Science

C. KEMAHIRAN BAHASA *(Language Proficiency)*					
Bahasa / *Language*	Lemah *Poor (1)*	Sederhana *Moderate (2)*	Baik *Good (3)*	Amat Baik *Very good (4)*	Cemerlang *Excellent (5)*
English					√
Bahasa Melayu					√
Chinese					
Lain-lain *(other):*					

D. PENGALAMAN SAINTIFIK DAN PENGKHUSUSAN ***(Scientific experience and Specialisation)***				
Organization	*Position*	*Start Date*	*End Date*	*Expertise*
Golden Hope Research Sdn. Bhd. (GHRSB), Banting, Malaysia	Research Officer	2006	2007	Precision Agriculture
ESRI South Asia Sdn. Bhd., Petaling Jaya, Malaysia	Software Engineer	2006		GIS software

E. PEKERJAAN ***(Employment)***				
Majikan / *Employer*	Jawatan / *Designation*	Jabatan / *Department*	Tarikh lantikan / *Start Date*	Tarikh tamat / *Date Ended*
Faculty of Agriculture, UPM, Serdang.	Associate Professor	Department of Agriculture Technology	June 2018	
Faculty of Agriculture, UPM, Serdang.	Senior Lecturer	Department of Agriculture Technology	Sept. 2012	May 2018
Faculty of Agriculture, UPM, Serdang.	Tutor	Department of Agriculture Technology	2007	2012
Golden Hope Research Sdn. Bhd. (GHRSB), Banting, Malaysia (Currently known as Sime Darby Research Sdn. Bhd.).	Research Officer	Precision Agriculture	2006	2007
ESRI South Asia Sdn. Bhd., Petaling Jaya, Malaysia.	Software Engineer		2006	
Universiti Teknologi Malaysia, Malaysia.	Research Assistant		2003	2004
Teraju Ukur Sdn. Bhd., Johor Bahru, Malaysia.	Part time employee		2003	2004
Universiti Teknologi Malaysia, Malaysia.	Research Assistant		2003	

F. ANUGERAH DAN HADIAH *(Honours and Awards)*				
Name of awards	*Title*	*Award Authority*	*Award Type*	*Year*
Academic Awards	Travel grant awards	Organizing committee, 4th International Symposium on the Nitrogen Nutrition of Plants	International	2019

	ISPA Outstanding Graduate Student	International Society of Precision Agriculture		2012
	Howard Taylor Memorial Endowed Scholarship	Department of Plant and Soil Science, Texas Tech University.		2012
	Graduate Student Oral Competition	Southern Branch American Society of Agronomy Program Annual Meeting. February 6-8, Corpus Christi, TX.	Third Prize	2010
	A.W. Young Graduate Student Support Endowment Scholarship,	Department of Plant and Soil Science, Texas Tech University.		2009 – 2012
	University Teknologi Malaysia's Chancellor's Award	University Teknologi Malaysia		2004
Non-Academic Awards	Detection of agricultural land abandonment using space technology	Invention, Research and Innovation Exhibition 21206, Universiti Putra Malaysia	Bronze medal	2016
Awards of Merit	Certificate of Service Excellency	Universiti Putra Malaysia (UPM)	Nation	2013
	Certificate of Service Excellency	Universiti Putra Malaysia (UPM)	Nation	2014
	Certificate of Service Excellency	Universiti Putra Malaysia (UPM)	Nation	2015

	Certificate of Service Excellency	Universiti Putra Malaysia (UPM)	Nation	2016
	Certificate of Service Excellency	Universiti Putra Malaysia (UPM)	Nation	2017
	Certificate of Service Excellency	Universiti Putra Malaysia (UPM)	Nation	2018
	Award of Excellent Service	Universiti Putra Malaysia (UPM)	Nation	2018
	Certificate of Service Excellency	Universiti Putra Malaysia (UPM)	Nation	2019
	Award of Best Lecturer	Agrobank-UPM Certification Programme	Nation	2019

G. SENARAI PENERBITAN (Sila masukan nama pengarang, tajuk, nama jurnal, jilid, muka surat dan tahun diterbitkan) *(List of publications – author (s), title, journal, volume, page and year published)*	
Journal	1. Darren, H.J.A, Ismail, M.H. and **Muharam, F.M.** Land Use/Land Cover changes and the relationship with land surface temperature using Landsat and MODIS imageries in Cameron Highlands, Malaysia. Land 2020, 9(10), 372; https://doi.org/10.3390/land9100372 (Q2). 2. Amirruddin, A.D., **Muharam, F.M***, Ismail, M.H., Ismail, M.F., and Tan, N.P. 2020. Hyperspectral spectroscopy and imbalance data approaches for classification of oil palm's macronutrients observed from frond 9 and 17. Computers and Electronics in Agriculture. https://doi.org/10.1016/j.compag.2020.105768 (Q1). 3. Amirruddin, A.D., **Muharam, F.M***, Ismail, M.H., Ismail, M.F.,Tan, N.P. and Karam, D.S. 2020. Hyperspectral remote sensing for assessment of chlorophyll sufficiency levels in mature oil palm (Elaeis guineensis) based on frond numbers: Analysis of decision tree and random forest. Computers and Electronics in Agriculture. doi.org/10.1016/j.compag.2020.105221 (Q1). 4. Nadiah, N.S.H., Nursyahidah, R. Jaafar, N.M., Zaharah, S.S. and Muharam, F.M. Arbuscular Mycorrhizal Fungi (AMF) and NPK Fertilisation Rate on the Growth of Soursop (Annona muricata L.) Seedlings. Malaysian Journal of Soil Science 24, 147-159. 5. Ruslan, S.A., **Muharam F.M.***, Zulkafli, Z, Omar, D, Zambri, M.P. 2019. Using satellite-measured relative humidity for prediction of *Metisa plana*'s

population in oil palm plantations: A comparative assessment of regression and artificial neural network models. PLoS ONE 14(10): e0223968. https://doi.org/10.1371/journal.pone.0223968 (Q1).

6. Hamsa, C.S., Kanniah, D.K., **Muharam, F.M.*,** Idris, N.H., Abdullah, Z., Mohamed, L. 2019. Textural measures for estimating oil palm age. International Journal of Remote Sensing, 40, 19, 7516-7537. https://doi.org/10.1080/01431161.2018.1530813 (Q2).

7. Amirruddin, A.D., and **Muharam, F.M*. 2019.** Evaluation of linear discriminant and Support Vector Machine classifiers for classification of nitrogen status in mature oil palm from SPOT-6 satellite image: analysis of raw spectral bands and spectral indices. Geocarto International, 34, 7, 735-749. doi.org/10.1080/10106049.2018.1434687 (Q2).

8. Nazri A, Mazlan N, **Muharam, F.M.**, 2018. Automated brown planthopper detection from imperfect sticky pad images using deep convolutional neural network. PLoS ONE 13(12): e0208501. https://doi.org/10.1371/journal.pone.0208501 (Q1).

9. **Muharam, F.M.**, Delahunty, T., and Maas, S.J.2018. Evaluation of nitrogen treatment effects on the reflectance of cotton at different spatial scales. International Journal of Remote Sensing, 39, 23, 84248 – 8504, https://doi.org/10.1080/01431161.2018.1488286 (Q2).

10. Mohidem, N.A., Zailina, H., Malina, O., Rafiza, S., **Muharam, F.M.**, Punitha, M. Demographic, socio-economic, and behavioural as risk factors of Tuberculosis in Malaysia: A systematic review of the literature. Reviews on Environmental Health, 33, 4, 407-421. doi: 10.1515/reveh-2018-0026

11. Nevame, A. Y. M., _Emon, R. M., _Malek, M. A., _Hasan, M. M., _Alam, M.A., **Muharam, F.M.**, Aslani, F., Rafii, M.Y., and Ismail, M. R. 2018. Relationship between High Temperature and Formation of Chalkiness and Their Effects on Quality of Rice. BioMed Research International, doi:10.1155/2018/1653721 (Q2).

12. Mohd Zad, S.N., Zed Zulkafli, **Muharam, F.M**. 2018. Satellite rainfall. TRMM 3B42-V7) performance assessment over Pahang River basin, Malaysia. Remote Sensing, 10, 388; doi:10.3390/rs10030388 (Q1).

13. Amirruddin, A. D., **Muharam, F. M.*** and Karam, D. S. 2018. Evaluation of ground-level and space-borne sensors as tools in monitoring nitrogen nutrition status in immature and mature oil palm. Journal of Plant Nutrition, 41, 371-383, doi:10.1080/01904167.2017.1385804 (Q4).

14. Bejo, S.K. Ramli, N.H., and **Muharam, F. M.** 2017. A review of wireless sensor network (WSN) applications in plantation canopy areas. Asian

Journal of Scientific Research, doi: 10.3923/ajsr.2018 (Scopus).

15. Ahmadi, P., **Muharam, F.M.***, Ahmad, K., Mansor, S., and Seman, I.A. 2017. Early detection of *Ganoderma* basal stem rot of oil palms using artificial neural network spectral analysis. Plant Disease, 101, 1009-1016 (Q1).

16. Yusoff, N. M., **Muharam, F. M.***, Takeuchi, W., Darmawan, S. and Razak, M.H.A. 2017. Phenology and classification of agricultural land abandonment based on ALOS-1 and 2 PALSAR multi-temporal measurements. International Journal of Digital Earth, 10, 155-174, doi:10.1080/17538947.2016.1216615 (Q1).

17. Yusoff, N. M., **Muharam**, **F.M.*** and Bejo, S.K. 2017. Towards the use of remote sensing data for monitoring of abandoned oil palm lands in Malaysia: A semi-automatic approach. International Journal of Remote Sensing, 38, 432-449 (Q2).

18. Lai Lai, Ismail, M.R., **Muharam, F.M.**, Martini, M. Y., Ismail, R., and Jaafar, N.M. 2017. Effects of rice straw derived biochar and different rates of nitrogen (N) fertilizer on rice growth and yield attributes. Asian Journal of Crop Sciences, 9, 159-166, doi: 10.3923/ajcs.2017.159.166 (Scopus).

19. Amirruddin, A. D., **Muharam, F. M.*** and Mazlan, N. 2017. Assessing leaf scale measurement for nitrogen content of multi-ages oil palm: Performance of discriminant analysis and support vector machine classifiers. International Journal of Remote Sensing, 38, 7260-7280 (Q2).

20. Mazlan, N., Ahmed, M., **Muharam, F. M.** and Alam, M.A. 2017. Status of persistent organic pesticide residues in water and food and their effects on environment and farmers: a comprehensive review in Nigeria. Semina Ciências Agrárias, 38, 2221-2236 (Scopus).

21. Amirruddin, A. D., **Muharam, F. M.**, Tan, N. P., Daljit, K. S and Martini, M. Y. 2017. Nitrogen effects on growth and spectral characteristics of immature and mature oil palms. Asian Journal of Plant Sciences, 16, 200-210, doi: 10.3923/ajps.2017 (Scopus).

22. **Muharam, F. M**.*, Ruslan, S. A., Zulkafli, S. L., Mazlan, N., Adam, N. A. and Husin, N. A. 2017. Remote sensing derivation of land surface temperature for insect pest monitoring. Asian Journal of Plant Sciences, 16, 160-171, doi: 10.3923/ajps.2017 (Scopus).

23. Yusoff, N.M. and **Muharam, F.M.*** 2015. The use of multi-temporal Landsat imageries in detecting seasonal crop abandonment. Remote Sensing 7, 11974-11991, doi:10.3390/rs70911974 (Q1).

24. **Muharam, F.M.**, * Maas, S.J., Bronson, K.F. and Delahunty, T. 2015.

	Estimating cotton nitrogen nutrition status using leaf greenness and ground cover information. Remote Sensing 7, 7007-7028, doi:10.3390/rs70607007 (Q1). 25. Amirruddin, A.D., **Muharam, F.M., *** and Zaharah, A.R. 2014. Evaluation of multiple proximal sensors for estimating nitrogen nutritional content of matured oil palm. Asian Journal of Plant Sciences, 13, 136-146 (Scopus). 26. **Muharam, F.M.**, Bronson, K.F., Maas, S.J., and Ritchie, G.L. 2014. Estimation of cotton plant nitrogen status using plant height, canopy width, and percent ground cover. Field Crops Research, 169: 58-69 (Q1). **Non-Citation Indexed** 27. Ali, M., Man, N. and **Muharam, F.M.**, and Omar S.Z. 2020. Factors Influencing Behavioral Intention of Farmers to Use ICTs for Agricultural Risk Management in Malaysia. Pakistan Journal of Agricultural Research 33 (2), 295-302. 28. Ali, M., Man, N. and **Muharam, F.M.** 2020. Intention Level of Farmers to Use Information Communication Technologies for Agricultural Risk Management in Malaysia. Journal of International Agricultural and Extension Education, 27 (2): 108-117. 29. Ali, M., N. Man and **Muharam, F.M.** 2019. Perceptions of farmers about their motivation to manage agricultural risk in Malaysia. Pakistan Journal of Agricultural Research, 32(2): 282-286. 30. Ali, M., Man, N, Abd Latif., I., **Muharam, F.M., and** Omar, S.Z. 2018. The use of information and communication technologies in agricultural risk management by the agricultural extension services in Malaysia. International Journal of Agriculture, Environment and Food Sciences, 2, 29-35. 31. K.S. Rajoo, A. Ismail, D.S. Karam, H. Omar, **F.M. Muharam** and D. Zulperi, 2017. Phytoremediation studies on Arsenic contaminated soils in Malaysia. Journal of Advanced Chemical Sciences, 3(3): 490-493. 32. Rajoo, K.S., Karam, D.S., Arifin, A. and **Muharam, F.M.** 2016. Phytoremediation Potential of *Dipterocarpus chataceus* planted on sewage sludge contaminated soils. Middle East Journal of Scientific Research, 24, 1169-1177. 33. Karam, D.S., Arifin, A., Rajoo, K.S., **Muharam, F.M.,** Mohamad Kasim, M.R., and Hazandy, A.R. 2016. Proposed Soil Quality Index for rehabilitated tropical forest sites in Malaysia. American Journal of Applied Sciences.
Books/Monographs	
Chapter in book	
Proceedings	**National level**

1. Abdullah, A.N.H., Che Hashim, M.F., Mohd Zad, S.N., Bahari, N. I. S., **Muharam, F. M.**, Zulkafli, Z., Nurulhuda, K., Mazlan, N., Husin, N. A., and Ismail M. R. 2019. Precision Agriculture Application in Paddy Monitoring in Malaysia. National Rice Farmer Convention, 6 – 7 August, Serdang, Malaysia.

2. Faiz, M.C.H., Liyana, N.Y., Muharam, F.M., Zulkafli, Z., Zulkarami, B., Razi Ismail, M. 2019. Preliminary Evaluation of ORYZA (v3) Crop Growth Model for MR269 Rice Variety. National Convention of Agricultural and Food Engineering 2019, 21 March, Putrajaya, Malaysia.

3. Bejo, S.K., Jaleni, M., Husin, M.E., Khosrokhani, M., **Muharam, F.M.**, Seman, I.A. and Anuar, M.I. 2016. Basal Stem Rot (BSR) detection using textural analysis of unmanned aerial vehicle (UAV) Image, NanoMITe Annual Symposium 2016, 28 September, Kuala Lumpur, Malaysia.

4. Ishak, I., Sidi, F., and Affendey, L.S., Ibrahim, H., Mamat, A., Kamarulzaman, N.H., and **Muharam, F.M.** 2014. Big data analytic application framework for Malaysian palm oil industry. Malaysian National Conference of Databases 2014 (MaNCoD 2014), 17 September, Serdang, Selangor.

International level

1. Amirruddin, A.D., **Muharam, F.M.,** Ismail, M.H., Ismail, M.F. & Tan, N.P. (2019). Monitoring Leaf Nitrogen, Phosphorus and Potassium of Mature Oil Palm via Hyperspectral Remote Sensing and Machine Learning. The 5th University Consortium (UC) Graduate Forum-SEARCA. 01-02 October 2019, IPB University, Indonesia.

2. Amirruddin, A.D., **Muharam, F.M.,** Ismail, M.H., Ismail, M.F. & Tan, N.P. 2019. Monitoring Leaf Nitrogen, Phosphorus and Potassium of Mature Oil Palm via Hyperspectral Remote Sensing and Machine Learning. The 5th University Consortium (UC) Graduate Forum-SEARCA. 01-02 October 2019, IPB University, Indonesia.

3. Abdullah, A.N.H., **Muharam, F.M.**, Zulkafli,Z.D., Nurulhuda,K., Ismail, M.R., Che Hashim, M.F., and Mohd Zad,S.N. 2019. Estimation of Leaf Area Index from Multispectral Indices and Machine Learning Models. The 40th Asian Conference on Remote Sensing, 14-18 October, Daejeon Convention Center (DCC), Korea.

4. Bahari, N. I. S., **Muharam, F. M.**, Mazlan, N., Husin, N. A., and Ismail M. R. 2019. Development of Geospatial Model for Elucidation of Brown Plant Hopper (BPH) Landscape Ecology in

Malaysian Rice Field and Prediction of Its Prevalence. In: UPM-KU Postgraduate Colloquium and Research Forum, Food Security Sustainability in South East Asia. August 14-15, Serdang, Malaysia.

5. Mohd Zad, S.N., Zulkafli, Z., Nurulhuda, K., Muharam, F.M., Razi Ismail, M. 2018. Improving Satellite-Based Estimations of Daily Rainfall for Large Scale Rice-Crop Modelling Applications. The 4th International Conference on Water Resources 2018, 27-28 November, Pulau Langkawi, Malaysia.

6. Ruslan, S.A, **Muharam, F. M.**, Omar, D., Zulkafli, Z. and Zambri, M.P. 2018. Development of Geospatial Model for Predicting Metisa Plana's Prevalence in Malaysian Oil Palm Plantation. International Conference on Green Agro-industry and Bioeconomy 2018 (ICGAB 2018), 18- 20 September, Malang; Indonesia.

7. Ruslan, S.A, **Muharam, F. M.**, Omar, D., Zulkafli, Z. and Zambri, M.P. 2018. Remotely Sensed Relative Humidity for Predicting Metisa Plana's Population. 39th Asian Conference on Remote Sensing, 15-19 October, Kuala Lumpur, Malaysia.

8. Salim, M. Z., Mohd Zahir, M. H., **Muharam, F. M.**, Azura, N. A., Omar, D., and Zambri, M.P. 2018. Weather-Based Forecasting Model for Presence of Bagworm (*Metisa Plana*) Using Artificial Neural Network under Field Condition. ISSAAS International Congress 2018, 12-14 October, Kuching, Malaysia.

9. Mohd Zahir, M. H., Salim, M. Z., **Muharam, F. M.**, Azura, N. A., Omar, D., and Zambri, M. P. 2018. Temporal Variations of Bagworm (Metisa plana) In Relation to Weather Parameters under Different Time Lags. ISSAAS International Congress 2018, 12-14 October, Kuching, Malaysia.

10. Amirruddin, A.D. and **Muharam, F. M.** 2017. Classification of oil palm nitrogen status from SPOT-6 satellite using support vector machine and spectral indices. International Conference on Big Data Applications in Agriculture (ICBAA 2017), 5-6 December, Kuala Lumpur, Malaysia.

11. Amirruddin, A.D. and **Muharam, F. M.** 2017. Evaluation of oil palm nitrogen status from leaf status: performance of support vector machine and linear discriminant analysis. Forum Pertanian IPIMA, 6-9 November, Kuala Lumpur, Malaysia.

12. Yusoff, N. M. and **Muharam, F. M.** 2016. Identification of abandoned oil palm areas from satellite images.37th Asian Conference on Remote Sensing, 17 - 21 October, Colombo, Sri Lanka.

	13. Yusoff, N. M. and **Muharam, F. M.** 2016. Detection of agricultural land abandonment using space technology. 7th International Agriculture Congress, 4 – 6 October, Bangi, Malaysia. 14. Mokhtar, S.I., Hashim, **J.H., Muharam, F. M.,** Hod, R. and Shamsudin, U.K. 2016. Developing malaria susceptibility area in Sabah, Malaysia using spatial analysis. 28th Annual Conference International Society for Environmental Epidemiology, 1 – 4 September, Rome, Italy. 15. Zulkifli, Z., Bejo, S.K. and **Muharam, F.M.** 2016. Effect of nitrogen fertilizer to growth, biomass and grain yield of paddy. 3rd International Conference on Agricultural and Food Engineering, 23 – 25 August, Kuala Lumpur, Malaysia. 16. Othman, M., Ash'aari, Z. H., **Muharam, F. M.**, Sulaiman, W. N. A., Hamisan, H., Mohamad, N. D. and Othman, N. H. 2016. Assessment of drought impacts on vegetation health: a case study in Kedah. 8th IGRSM International Conference and Exhibition on Geospatial & Remote Sensing (IGRSM 2016), 13-14 April, Kuala Lumpur, Malaysia. 17. Amirruddin, A.D., **Muharam, F.M.** 2015. Evaluation of vegetation index (VI) in estimating nitrogen nutrition status in oil palm. 3rd International Symposium on Applied Engineering and Sciences 2015 (SAES 2015), 23-24 November, Serdang, Malaysia. 18. Yusoff, N. M. and **Muharam, F. M.,** Takeuchi, W. Darmawan, S. and Abd Razak, M.H. 2015. Monitoring of agricultural land abandonment using remote sensing. SAFE Workshop, 17 June, Ho Chi Minh, Vietnam. 19. Darmawan, S., Takeuchi, W., **Muharam F.M**. and Abd Razak, M.H. 2015.Investigation of scattering mechanisms on agricultural land abandonment based on decomposition of ALOS PALSAR data. The International Symposium on Remote Sensing, 22 April, Tainan, Taiwan. 20. Ahmadi, P., **Muharam, F. M.**, Ahmad, K., Mansor, S., & Abu Seman. 2014. Determination of physiological parameters in relation to different severity levels of *Ganoderma* as a mechanism for early detection in oil palm. 6th International Agriculture Congress, 27-29 October, Putrajaya, Malaysia. 21. **Muharam, F. M.**, Takeuchi, W., Darmawan, S. and Abd Razak, M.H. 2014. Monitoring of agricultural land abandonment using remote sensing. SAFE Workshop and 21th Asia-Pacific Regional Space Agency Forum (21th APRSAF), 1-3 December, Tokyo, Japan.

	22. **Muharam F.M**., Takeuchi, W. Darmawan, S. and Abd Razak, M.H. 2014. Characterization of agricultural land abandonment based on ALOS PALSAR and LANDSAT multitemporal measurement. International Conference on Space, Aeronautical and Navigational Electronics. 22 - 24 October, Malacca, Malaysia. 23. Tengku Hassan, T. N., **Muharam, F. M.**, Darmawan, S., Takeuchi, W., Samarakoon, L., Ishak, A.R., and Abd Razak, M.H. 2014. Monitoring abandoned agricultural land in Malaysia using remote sensing. 7th IGRSM International Conference and Exhibition on Geospatial & Remote Sensing (IGRSM 2016), 21-22 April, Kuala Lumpur, Malaysia. 24. **Muharam, F. M.**, Takeuchi, W., Samarakoon, L., Ishak, A.R., and Abd Razak, M.H. Monitoring of agricultural land abandonment using remote sensing. SAFE Workshop and 20th Asia-Pacific Regional Space Agency Forum (20th APRSAF), 2-4 June, Hanoi, Vietnam. 25. **Muharam, F. M.** 2013. Monitoring of agricultural land abandonment using remote sensing. SAFE Workshop and 29th International Symposium on Space Technology, 5-6 June, Nagoya, Japan. 26. **Muharam, F. M.** and Maas, S.J. 2012. Impacts of nitrogen treatments on the reflectance of cotton plants at different spatial scales. 11th International Conference for Precision Agriculture. 15-18 July, Indianapolis, IN. 27. **Muharam, F. M.** and Maas, S.J. 2012. Reflectance of cotton plants at different spatial scales related to nitrogen (N) treatments. Southern Branch American Society of Agronomy Program Annual Meeting. February 5-7, Birmingham, AL. 28. **Muharam, F. M.** and Maas, S.J. 2011. Nitrogen nutrition estimation of cotton fields using greenness and ground cover parameters. ASA-CSSA-SSA International Annual Meetings. 16-19 October, San Antonio, TX. 29. **Muharam, F. M.** and Maas, S.J. 2011. Cotton leaf, canopy and scene reflectance spectra analysis for nitrogen estimation. Southern Branch American Society of Agronomy Program Annual Meeting. February 6-8, Corpus Christi, TX.
Other publications	A Method for Predicting Insect Population (Patent file number PI2017704520).
Computer software	

H. PROJEK PENYELIDIKAN TERDAHULU *(Past Research Project)*					
Project No.	*Project Title*	*Role*	*Year*	*Source of fund*	*Status*
01-03-06-001FR	Monitoring of abandoned agricultural land in Malaysia using remote sensing	Principal Investigator	2013-2015	Japan Aerospace Exploration Agency (JAXA) (satellite imageries, travel grant and training)	Completed
	Development of model(s) for evaluation and mapping of oil palm nitrogen nutrition status	Principal Investigator	2013-2016	United Malacca Berhad **(RM152,250)**	Completed
	Development of model(s) for early detection of *Ganoderma* infected areas	Principal Investigator	2013-2016	United Malacca Berhad **(RM152,250)**	Completed
GP-IPM/2014/9434000	Detection of abandoned agricultural lands using remote sensing	Principal Investigator	2014-2016	Universiti Putra Malaysia **(RM50,000)**	Completed
TRGS/1/2015/ UPM/01/4/3	Two-way interaction between agricultural land use change and flood event by the integration of geospatial technologies and land use modeler	Principal Investigator	2015	Ministry of Education, Malaysia **(RM82,500)**	Completed
04-01-04-SF2158	Development of geospatial model for elucidation of Metisa plana's landscape ecology in Malaysian oil palm microclimate	Principal Investigator	2015-2018	Ministry of Science, Technology and Innovation, Malaysia **(RM380,000)** Tabung Haji Plantation (in	Completed

	and prediction of its prevalence			kind contribution) **(RM85,800)**	
FRGS/2/2014/ STWN03/UPM/02/3	Quantifying spatial and time heterogeneity of *Metisa plana* in Malaysian's oil palm microclimate and hierarchical linkage of its outbreak to geospatial data	Principal Investigator	2014-2017	Ministry of Education, Malaysia **(RM102,000)**	Completed
	MOSTI innofund: Development of ground sensors for precision agriculture	Consultant	2018 - 2019	Pragbotix (Prec. Ag. Robotics) Sdn. Bhd. **(RM30,000)**	Completed
	Assessing deforestation and its effect on land surface temperature using satellite data in Cameron Highland	Co-researcher	2016-2018	Ministry of Education, Malaysia (RM78,200)	Completed
	Modelling Drinking Water Distribution System (DWDS) vulnerability to Active Pharmaceutical Ingredients (APIs) by integration of geospatial-hydraulic and water quality model	Co-researcher	2016-2019	Ministry of Education, Malaysia (RM115,119)	Completed
	PadiU Putra: Accelerating rice food security and socioeconomics for rice farming communities	Co-researcher	2017-2019	Ministry of Education, Malaysia (RM1,200,000)	Completed

	Application of the nanodelivery system and nanosensor in smart farming for actual detection and control of *Ganoderma Boninense*	Co-researcher	2015-2020	NanoMITE **(RM700,000)**	On-going
07-02-14-1539FR	Quantifying threats to food (rice) security in Malaysia under climate change and mitigation using a weather-based risk approach.	Co-researcher	2017-2020	Ministry of Education, Malaysia **(RM76,800)**	On-going
GP-IPS/2018/ 9670300	Evaluation of rice growth parameters as affected by cultivars and nitrogen treatments by using unmanned aerial vehicle platform	Principal Investigator	2018-2021	Universiti Putra Malaysia **(RM25,000)**	On-going