Publications

Patent

Zaman, Q. U., Y. K. Chang, A. W. Schumann. 2013. "Variable rate sprayer system and method of variably applying agrochemicals". US Patent Publication No. 8488874 B2.

Zaman, Q. U., Y. K. Chang, A. W. Schumann. 2014. "Variable rate sprayer system and method of variably applying agrochemicals". Canadian Patent No. 2,740,503 C.

Book Chapter

Swain, K. C. and **Q. U. Zaman.** 2012. Rice crop monitoring with unmanned helicopter remote sensing images, remote sensing of biomass - principles and applications, Dr. Lola Fatoyinbo (Ed.), ISBN: 978-953-51-0313-4, InTech, Available from: http://www.intechopen.com/books/remote-sensing-of-biomass-principles-and-applications/rice-crop-monitoring-with-unmanned-helicopter-remote-sensing-images

Farooque, A. A., **Q. U. Zaman** and Schumann A. W. 2016. *The Lime: Botany, Production and Uses*. *Precision agriculture in lime*. Centre for Agriculture and Biosciences International. (CABI publisher).

Peer-Reviewed Journal Papers

Although I am involved in all aspects of my research program, I have been lead author on only a few peer reviewed publications over the past years. I firmly believe that my most important role is that of a mentor, teacher and leader in the research that is undertaken by my HQP (Post-docs, grad. students, research associates). I strongly believe they should have great recognition as first author, even though many of the original ideas have been developed through discussions with me and in several cases the research contributions were largely written by me.

Submitted:

1. Farooque A. A., F. Khan, Q. U. Zaman, T. Esau, A. W. Schumann. 2018. Estimation of water table depths using dualem-2 system. Computer and Electronics in Agriculture. In review
2. Farooque A. A, Q U Zaman, F. Abbas, H. M. Hammad, B. Acharya, T. Esau. 2018. How can potatoes be smartly cultivated with biochar soil amendment techniques in Atlantic Canada. Journal: Frontiers in Plant Science, section Technical Advances in Plant Science. In Review

3. Rehman, T., **Q. U. Zaman**, Y. Chang, A. W. Schumann, K., Corscadden,. 2018. Development and field evaluation of a machine vision based in-season weed detection system for wild blueberry. Computers and Electronics in Agriculture. In Review

4. Farooque A. A., Q. U. Zaman, M.W. Jameel, T. Esau, A. W. Schumann. 2018. Impact of wild blueberry fruit 21 characteristics and machine parameters on picking performance of a mechanical harvester: basis for automation. Applied Engineering in Electronics. In Review

Published:

63. Karen, E., E. Travis, **Q. U. Zaman,** A.A Farooque**,** A. W. Schumann. 2018. Effective use of a variable speed blower fan on a mechanical wild blueberry harvester. Applied Engineering in Agricultute. 34(5)

62. Rehman, T., **Q. U. Zaman**, Y. Chang, A. W. Schumann, K., Corscadden, T. Esau. 2018. A color co-occurrence matrix based algorithm: An analysis to minimize computational overheads. Bio-Systems Engineering. 170, 85-95.

61. Ishaque, W., F. Abbas, S. Ali, K. Mahmood, **Q.U. Zaman**, M. Azam, I. Khan, and M. Zain. 2017. Yield response of wheat (*Triticum aestivum* L.) to deficit and regulated deficit irrigation under arid/semi-arid conditions. *Pakistan Journal of Agricultural Science* 54(1):135-144. [IF 1.049**]**
60. Maqbool, R., D. Percival, **Q. U. Zaman**, T. Astatkie, S. Adl and D. Buszard. 2017. Leaf nutrients ranges and berry yield optimization in response to soil-applied nitrogen, phosphorus and potassium in wild blueberry (*Vaccinium angustifolium* Ait.). Eur. J. Hortic. Sci. *82*(4), 166–179.
59. Esau, T., **Q. U. Zaman**, D. Groulx, A. A Farooque, A. W. Schumann, Y. Chang. 2018. Machine vision smart sprayer for spot-application of agrochemical in wild blueberry fields. Precision Agriculture. DOI: 10.1007/s11119-017-9557-y
58. Ali, S., **Q. U., Zaman,** A. A. Farooque, A. W. Schumann, C. C Udenigwe, Y. Chang. K. (2018). Potential use of digital photographic technique to examine wild blueberry ripening in relation to time of harvest. Applied Engineering in Agriculture. Applied Engineering in Agriculture. 34(2): 299-308
57. Farooque A. A., **Q. U. Zaman**, A.W. Schumann, D. Groulx, T. Quang. 2017. Influence of wild blueberry fruit yield, plant height and ground slope on picking performance of a mechanical harvester: basis for automation. Applied Engineering in Agriculture. 33(5): 655-666.
56. Chattha, H. S., K. Corscadden, **Q. U. Zaman**. 2017. Hazard identification and risk assessment for improving farm safety on Canadian farms. Journal of Agricultural Safety and Health. 23(3): 155-174.
55. Chang, Y. K., **Q. U. Zaman**, T. Rehman, A.A. Farooque, M.W. Jameel and T. J. Esau. 2017. A real time ultrasonic system to measure wild blueberry plant height during harvesting. Biosystems Engineering. (157), 35-44.
54. Ishaque, W., F. Abbas, S. Ali, K Mahmood, **Q. U. Zaman**, M. Azam, I. Khan, and M. Zain**.** 2017. Yield response of wheat (triticum aestivum l.) to deficit and regulated deficit irrigation under arid/semi-arid conditions. Pak. J. Agri. Sci. 54(1): 135-144.
53. Maqbool, R., D. Percival, **Q. U. Zaman**, T. Astatkie, S. Adl, and D. Buszard .2016. Improved growth and harvestable yield through optimization of fertilizer rates of soil-applied nitrogen, phosphorus and potassium in wild blueberry (*Vaccinium angustifolium* Ait.). HortSci. 51(1):1092-1097.
52. Esau, T., **Q. U. Zaman**, D. Groulx, Y. Chang, A. W. Schumann and P. Havard. 2016. Supplementary light source development for camera-based smart spraying in low light conditions. Applied Engineering in Agriculture. 33(1): 5-14.
51. Abbas. A., **Q. U. Zaman,** A. A. Farooque, A. W. Schuman, G.R. Brewster, and R. Donald. 2016. Effect of split variable rate fertilization on wild blueberry plant growth and berry yield. Applied Engineering in Agriculture. 32(6): 675-683.
50. Farooque, A., **Q. Zaman**, Y. Chang, K. Corscadden, A. Schumann, H. Chattha and A. Madani. 2016. Influence of soil properties and topographic features on wild blueberry fruit yield. Applied Engineering in Agriculture. 32 (4) 379-388.
49. Farooque, A. A., **Q. U. Zaman**, D. Groulx, A. W. Schumann and T. Quang. 2016. Response of spatial variation in crop characteristics and topographic features to the fruit losses for wild blueberry cropping system. Applied Engineering in Agriculture. 32 (4) 493-504.
48. Farooque, A. A., **Q. U. Zaman**, D. Groulx, A. W. Schuman and Y. K. Chang, T. Nguyen-Quang. 2016. Development of a predictive model for wild blueberry harvester fruit losses during harvesting using artificial neural network. Applied Engineering in Agriculture. 2(6): 725-738.
47. Jameel, M. W., **Q. U. Zaman**, A. A. Farooque, A. W. Schumann, G. Brewster, T. Nguyen-Quang and H. S. Chattha. 2016. Effect of plant characteristics on the picking efficiency of wild blueberry harvester. Applied engineering in Agriculture. *32*(5), 589-598.
46. Chang, Y., **Q. Zaman**, A. Farooque, H. Chattha, S. Read and A. Schumann. 2016. Sensing and control system for spot-specific fertilization in wild blueberry cropping system. Precision Agriculture. 1–14. DOI : 10.1007/s11119-016-9457-6.

45. Esau, T., **Q. Zaman,** D. Groulx, K. Corscadden, Y. Chang, A. Schumann and P. Havard. 2016. Economic analysis for smart sprayer application in wild blueberry fields. Precision Agriculture. pp. 1-13. DOI 10.1007/s11119-016-9447-8.47.
44. Khan, F. S., **Q. U. Zaman**, Y. K. Chang, A. W. Schumann, A. Madani, and A. A. Farooque. 2016. Identification of gravel layer below soil surface within field using electromagnetic induction method. Precision Agriculture. 17 (2):155-167. *IF = 1.728*
43. Abbas. A., **Q. U. Zaman,** A. W. Schuman, G.R. Brewster, and R. Donald. 2016. Effect of variable rate split fertilization on subsurface water quality in wild blueberry fields. Appl. Engg. Agric. 32(1): 79-88. *IF = 0.571*
42. Chattha, H. S., **Q. U. Zaman**, Y. K. Chang, A. A. Farooque, A. W. Schumann and G. R. Brewster. 2015. Effect of lighting conditions and ground speed on performance of intelligent fertilizer spreader for spot-application in wild blueberry. Precision Agriculture. 16: 654-667. *IF = 1.728*
41. Abbas, A., **Q. U. Zaman**, A. W. Schuman, G. R. Brewster, R. Donald, and H. S. Chattha. 2014. Effect of split variable rate fertilization on ammonia volatilization in wild blueberry cropping system. Appl. Engg. Agric. 30(4): 619-627. *IF = 0.571*
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39. Chattha, H. S., **Q. U. Zaman**, Y. K. Chang, S. Read, A. W. Schumann, G. R. Brewster, and A. A. Farooque. 2014. Variable rate spreader for real-time spot-application of granular fertilizer in wild blueberry. Comp. and Elec. in Agri. 100: 70-78. *IF = 1.766*
38. Esau, T. J., **Q. U. Zaman**, Y. K. Chang, A. W. Schumann, D. C. Percival, and A. A. Farooque. 2014. Spot application of fungicide for wild blueberry using an automated prototype variable rate sprayer. Precision Agric. 15(2): 147-161. *IF = 1.728*
37. Esau, T. J., **Q. U. Zaman**, Y. K. Chang, A.W. Schumann, D. Groulx, and A. A. Farooque. 2014. Prototype variable rate sprayer for spot-application of agrochemicals in wild blueberry. Appl. Engg. Agric. 30(5): 717-725. *IF = 0.571*
36. Farooque, A. A., **Q. U. Zaman**, D. Groulx, A. W. Schumann, D. Yarborough, and T. Quang. 2014. Effect of ground speed and head revolutions on the picking efficiency of commercial wild blueberry harvester. Appl. Engg. Agric. 30(4): 535-546. *IF = 0.571*
35. Saleem, S. R., **Q. U. Zaman**, A. W. Schumann, A. Madani, Y. K. Chang, and A. A. Farooque. 2014. Impact of variable rate fertilization on nutrients losses in surface runoff for wild blueberry fields. Appl. Engg. Agric. 30(2): 179-185. *IF = 0.571*
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30. Maqbool, R., D. C. Percival, M. S. Adl, **Q. U. Zaman,** and D. Buszard. 2012. In situ estimation of foliar nitrogen in wild blueberry using reflectance spectra. Can. J. Plant Sci. 92(6): 1155-1161. *IF = 0.547*

29. Chang, Y. K., **Q. U. Zaman**, A. W. Schumann, D. C. Percival, T. J. Esau, and G. Aylew. 2012. Development of color co-occurrence matrix based machine vision algorithms for wild blueberry fields. Appl. Engg. Agric. 28(3): 315-323. *IF = 0.571*
28. Chang, Y. K., **Q. U. Zaman,** A. A. Farooque, A. W. Schumann, and D. C. Percival. 2012. An automated yield monitoring system II for commercial wild blueberry double-head harvester. Comp. Elec. Agric. 81: 97-103. *IF = 0.571*
27. Farooque, A. A., **Q. U. Zaman**, A. W. Schumann, A. Madani, and D. C. Percival. 2012. Response of wild blueberry yield to spatial variability of soil properties. Soil Sci. 1: 56-68. *IF = 1.051*
26. Farooque, A. A., **Q. U. Zaman,** A. W. Schumann, A. Madani, and D. C. Percival. 2012. Delineating management zones for site-specific fertilization in wild blueberry fields. Appl. Engg. Agric. 28(1): 57-70. *IF = 0.571*
25. Farooque, A. A., **Q. U. Zaman,** A. Madani, F. Abbas, D. C. Percival, and T. J. Esau. 2011. Ecological impacts of the N-Viro biosolids land-application for wild blueberry (*Vaccinium angustifolium.*Ait) production in Nova Scotia. J. Envir. Sci. Health. Part B 46: 366-379. *IF = 1.10*
24. Farooque, A. A., F. Abbas, **Q. U. Zaman,** A. Madani, D. C. Percival, and M. Arshad. 2011. Soil nutrient availability, plant nutrients uptake, and wild blueberry (*Vaccinium angustifolium.* Ait) yield in response to N-Viro biosolids and irrigation applications. J. of Appl. & Envir. Soil Sci. 1-7. *IF = 0.74*
23. **Zaman, Q. U.**, T. J. Esau, A. W. Schumann, D. C. Percival, Y. K. Chang, S. Read, and A. A. Farooque. 2011. Development of prototype automated variable rate sprayer for real-time spot-application of agrochemicals in wild blueberry fields. Comp. Elec. Agric. 76: 175-182. *IF = 1.766*
22. Zhang, F., **Q. U. Zaman,** D. C. Percival, and A. W. Schumann. 2010. Detecting bare spots in wild blueberry fields using digital color photography. Appl. Engg. Agric. 26(5): 723-728. *IF = 0.571*
21. Swain, K. C., **Q. U. Zaman**, A. W. Schumann, D. C. Percival, and D. D. Bochtis. 2010. Computer vision system for wild blueberry fruit yield mapping. Biosystem Engg. 106: 389-394. *IF = 1.725*
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18**. Zaman, Q. U.**, A. W. Schumann, D. C. Percival, and R. J. Gordon. 2008. Estimation of wild blueberry fruit yield using digital color photography. Trans. of the ASABE. 51(5): 1539-1544. *IF = 0.974*
17. **Zaman, Q. U.**, A. W. Schumann, and K. Hostler. 2007. Quantifying sources of error in ultrasonic measurements of citrus orchards. Appl. Engg. Agric. 23(4): 449-453. *IF = 0.571*
16. **Zaman, Q. U.** and A. W. Schumann. 2006. Nutrient management zones for citrus based on variation in soil properties and tree performance. Precision Agric. 7(1): 45-63. *IF = 1.728*
15. Zaman, Q. U., A. W. Schumann, and K. Hostler. 2006. Estimation of citrus fruit yield using ultrasonically-sensed tree size. Appl. Engg. Agric. 22(1): 39-44. *IF = 0.571*
14. **Zaman, Q. U.**, A. W. Schumann, and K. Hostler. 2006. Rapid estimation of citrus tree damage from hurricanes in Florida using an ultrasonic tree measurement system. Hort. Tech. 16(2): 339-344. *IF = 0.60*
    Note: *This publication was featured on the cover page of Hort. Tech.*
13. Schumann, A. W., W. M. Miller, Q. U. Zaman, K. H. Hostler, S. Buchanon, and S. Cugati. 2006. Variable rate granular fertilization of citrus groves: Spreader performance with single-tree prescription zones. Appl. Engg. Agric. 22(1): 19-24. *IF = 0.571*
12. **Zaman, Q. U.**, A. W. Schumann, and W. M. Miller. 2005. Variable rate nitrogen application in Florida citrus based on ultrasonically-sensed tree size. Appl. Engg. Agric. 21(3): 331-335. *IF = 0.571*
11. **Zaman, Q. U.** and A. W. Schumann. 2005. Performance of ultrasonic tree volume measurement system in commercial citrus groves. Precision Agric. 6(5): 467-480. *IF = 1.728*

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9. **Zaman, Q. U.** and M. Salyani. 2004. Effect of foliage density and ground speed on ultrasonic measurement of citrus tree volume. Appl. Engg. Agric. 20(2): 173-178. *IF = 0.571*
8. Schumann, A. W. and **Q. U. Zaman.** 2003. Mapping water table depth by electromagnetic induction. Appl. Engg. Agric. 19(6): 675-688. *IF = 0.571*
7. **Zaman, Q. U.**, R. S. Shiel, and A. W. Schumann. 2003. Variable lime application based on within-field variation in soil pH. Pak. J. Agri. Sci. 40(1-2): 1-6. *IF = 1.240*
6. **Zaman, Q. U.,** A. W. Schumann, and R. S. Shiel. 2003. Possibilities of precision fertilization with P and K based on varying nutrient content and yield potential. Pak. J. Agri. Sci. 40(1-2): 7-10. *IF = 1.240*
5. Bakhsh, A., **Q. U. Zaman,** M. A. Rana, M. Younis, and A. N. Awan. 1994. Performance evaluation of imported and locally manufactured alkatheline emitters. Pak. J. Agri. Sci. 31(1): 11-14. *IF = 1.240*
4. **Zaman, Q. U.**, A. D. Chaudhary, and M. A. Rana. 1992. Wheat harvesting losses in combining as affected by machine and crop parameters. Pak. J. Agri. Sci. 29(1): 1-4. *IF = 1.240*
3. Chaudhry, A. D., M. Javed, M. A. Rana, A. Sarwar, and **Q. U. Zaman.** 1992. Comparative performance of direct drilling & conventional tillage practices under rice-wheat rotation system. Pak. J. Agri. Sci. 29(1): 5-8. *IF = 1.240*
2. **Zaman, Q. U.**, A. D. Chaudhry, and M. A. Rana. 1991. Inter-relationship between crop and machine parameters responsible for wheat harvesting losses. Pak. J. Agri. Sci. 28(3): 227-229. *IF = 1.240*
1. Javed, M., M. A. Rana, A. D. Chaudhry, **Q. U. Zaman**, and M. Saleem. 1991. Effect of different levels of compaction on rice grain yield. Pak. J. Agri. Sci. 29(1): 5-8. *IF = 1.240*

Non Refereed Journal Papers

Zaman, Q. U., A. W. Schumann, D. C. Percival, and R. J. Gordon. 2009. Estimation of wild blueberry fruit yield using digital color photography. Acta. Hort. 57-66.

Zaman, Q. U. 2002. Planning variable tillage practices based on spatial variation in soil physical conditions and crop yield using DGPS/GIS. Agri. Mech. Asia, Africa and Latin America. 33 (3): 41-44.

Research Presentations/Publications in International Conferences

Presentations and Papers Published in Int. Scientific Meetings

67. Esau, T., **Q. U. Zaman**, K. Esau, T. Rehman, & A. Farooque. 2017. Effective use of a variable speed blower fan on a mechanical wild blueberry harvester. Annual Meeting ASABE, Spokane, Washington. July 16-19.
66. Farooq, M. H., S.N. White, Q. U. Zaman and N.S. Boyd. 2016. Evaluation of summer broadcast and spot herbicide applications for goldenrod management in wild blueberry. Canadian Weed Science Society Annual Meeting. Moncton, New Brunswick
65. Esau, T., **Q. Zaman,** D. Groulx, K. Corscadden, Y. Chang, A. Schumann and P. Havard. 2016. Smart sprayer economic analysis for application in wild blueberry fields. Annual International Meeting CSBE. Halifax, Canada. July 02-05, 2016.
64. **Ali, S., Q. U. Zaman,** A. W. Schumann, C. C. Udenigwe, and A. A. Farooque. 2016. Examining the fruit ripening levels using digital photographic technique to suggest proper time of harvest. Annual International Meeting CSBE, Halifax, NS, Canada. July 3-6, 2016.
63. Farooque, A. A., **Q. U. Zaman**, Y. Chang, T. J. Esau, A. W. Schumann, W. Jameel and S. Ali. 2016. Impact of Fruit Yield, Plant Height and Slope on Picking Performance of Mechanical Harvester:A Basis for Automation. Variation in harvesting losses in relation to fruit yield, plant

height and slope: a basis for automation of harvester. Annual International Meeting CSBE., Halifax, Canada. July 02-05, 2016

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60. Jameel M., **Q.U. Zaman**, A.W. Schumann; A. Farooque. 2016. Impact of plant characteristics on berry losses during mechanical harvesting of wild blueberry. Annual Int. Meeting ASABE, Orlando, Florida, USA. July 17-20, 2016.
59. Farooque, A.A., **Q.U. Zaman,** Y. K. Chang, T. J. Esau, A. W. Schuman, and M. W. Jameel. 2016. Variation in harvesting losses in relation to fruit yield, plant height and slope: a basis for automation of harvester. Annual Int. Meeting ASABE, Orlando, Florida, USA. July 17-20, 2016.
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57. Chang, Y. K., **Q. U. Zaman**, A. A. Farooque, H. S. Chattha., A.W. Schumann. 2015. Automated ultrasonic system to measure and map wild blueberry plant height in real-time during harvesting. Annual Int. Meeting ASABE, New Orleans, Louisana, USA. July 26-29, 2015. Paper Number. 2188695.
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48. Jameel, M. W., **Q. U. Zaman**, A. W. Schumann, T. Nguyen-Quang, G. Brewster, and H. S. Chattha. 2015. Effect of fruit characteristics on berry losses during harvesting. Annual Int. Meeting ASABE, New Orleans, Louisana, USA. July 26-29, 2015. Paper Number. 2189354.

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46. Farooque, A. A., **Q. U. Zaman,** D. Groulx, T. Quang, A. W. Schumann, and Y. K. Chang. 2014. Predictive model for wild blueberry fruit losses during harvesting. Annual Int. Meeting ASABE, Montreal, QC, Canada. July 13-16, 2014. Paper Number: 1898444
45. Chattha, H. S., **Q. U. Zaman**, Y. K. Chang, A. W. Schumann, G. R. Brewster, S. Read, and A. Abbas. 2014. Evaluation of intelligent fertilizer spreader for spot-application under sunny and cloudy conditions in wild blueberry fields. Annual Int. Meeting ASABE, Montreal, QC, Canada. July 13-16, 2014. Paper Number: 1910213
44. Esau, T. J., **Q. U. Zaman**, D. Groulx, Y. K. Chang, A. W. Schumann, and P. Havard. 2014. Smart sprayer for spot-application of agrochemicals in wild blueberry fields. Annual Int. Meeting ASABE, Montreal, QC, Canada. July 13-16, 2014. Paper Number: 1913227
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sandy hydromorphic soils. Abstract in "International Citrus Congress": Agadir, Morocco February 15-20, 2004.

3. Schumann A.W. and **Q. U. Zaman.** 2004. Software for real-time ultrasonic mapping of tree canopy volume. 7th Int. Precision Agric. Conf. Minnesota. July, 2004.
2. **Zaman, Q. U.** and A. W. Schumann. 2003. Spatial variability of soil properties and citrus tree performance. Abstract in "Changing Sciences for a Changing World: Building a Broader Vision" 2003 ASA-CSSA-SSSA Annual Meetings Denver, Colorado November 2-6.
1. Schumann, A.W. and **Q. U. Zaman.** 2003. Using electromagnetic induction methods to map groundwater in Florida citrus soils. Abstract in "Changing Sciences for a Changing World: Building a Broader Vision" 2003 ASA-CSSA-SSSA Annual Meetings Denver, Colorado November 2-6.

Articles in News Papers and Magazines

I have published several articles related to machinery development and precision agriculture in national/international newspapers and magazines.

- Precision application of dry fertilizer in wild blueberry fields. Vegetable and Fruit News. Florida, USA. Digital edition: 2018 http://www.mirabelsmagazinecentral.com/DigitalEdition/index.html?id=469cf32b-51aa-4c29-b547-a0a94b7ae7ac
- 2015. Dalhousie University Magazine. Field to fork
- Precision agriculture in wild blueberry fields. Agricola News, Volume 39, Number 1, 2013.
- Reducing herbicides – Saving $. Springboard. Highlights Report (Success Story) 2011-2012. .
- Precision variable-rate sprayer slays weeds – and costs. The Grower Magazine, February, 2011.
- Precision equipment being developed for wild blueberries. Fruit and Vegetables Magazine, March, 2011.
- Practical application of PA technologies for wild blueberries. Farm Focus Magazine, November, 2010.

Custom Software, Manuals, Broachers and Fact Sheets

Operational manuals for each precision agriculture system (developed by PARP research team at Faculty of Agriculture, Dalhousie University), brochures for precision agriculture systems and fact sheets were developed and supplied to producers through wild blueberry producers associations.

Operational manuals and software developed for:

1. Automated yield monitoring system
2. Cost-effective slope mapping system
3. DualEM for mapping soil properties, nutrients and water depth
4. Automated VR sprayer for spot application

Custom software (codes) and interface were developed for all precision agriculture systems.

Television Commercial/Programs and Radio Talk in Canada

Zaman, Q.U. and T. J. Esau. 2009. Commercial mainly on Teaching and Research in Precision Agriculture Technologies for Wild Blueberries at Faculty of Agriculture, Dalhousie University, TV Commercial- Forty Times Aired on CNN, Fox, PBS channels, May, 2009. Available on Google Video and YouTube. With a potential reach of approximately 96 million people each day, the video is **an invaluable tool to the university**.

The video clip is available at http://www.dal.ca/sites/precision-agriculture.html

Zaman Q, U. (2009). TV program on Precision Agriculture Research Program at Faculty of Agriculture, Dalhousie University on CTV in Live @5. October, 29, 2009.

Another, our TV program on "Precision Agriculture Research Program at Faculty of Agriculture, Dalhousie University" was broadcasted in October, 2010 at CTV in Live@5 program.

Radio Talk

Zaman, Q.U. (2014). Talk on CBC Radio "New pesticide technology sprays only weeds" http://www.cbc.ca/news/canada/prince-edward-island/new-pesticide-technology-sprays-only-weeds-1.2696146 (Jul 04, 2014)

Television Program in Pakistan, 2011 and 2016

Express Forum

Title "Importance of Research in Agriculture Development"

Participants:

Dr. Dr. Iqrar Khan Vice-Chancellor, Dr. Ashfaq, Dean, Faculty of Agriculture, Dr. Niaz, Dean Engineering, Dr. Noor-ul-Islam, Director General, Agriculture Research Institute, Chief scientist, Punjab Agricultural Research Board, Dr. Shahida Jamil, Pakistan Agricultural Research Council. **Canadian Scientist (Dr. Qamar Zaman).**

Additional Information (Web Site Development)

Precision Agriculture Web Page:

PA website was developed for PA activities at Dal-AC. It would help us to attract national and international students, post-docs and to develop further industry and academic collaborations. It will also help to transfer technology. PA activities at website would recognize Faculty of Agriculture, Dalhousie University a prestigious university and would bring the Faculty of Agriculture, Dalhousie University closer to the other international academic and industry institutions to develop collaborations.

http://dal.ca/precisionag