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Eng. Dr. Wanyama Joshua is a Senior Lecturer at Makerere University Department of Agricultural and Biosystems Engineering. He has experience of 22 years in teaching, research and project management during which he has been both a team member and a team leader on several research and development projects. To this end he has published papers in peer reviewed Journals and supervised M.Sc. and PhD graduate students to completion. Joshua has also reviewed for various reputable Journals, and been involved in curriculum development and examination for BSc, MSc and PhD degree programs. He has also been involved in policy review and development as subject matter specialist of Water for Agricultural Production. He has conducted research in developing appropriate climate smart water and irrigation technologies that has contributed to customizing irrigation and water harvesting systems design to Ugandan local conditions. He has also conducted various watershed studies in wet tropical catchments.

Key Projects

1. *Design and Development of an Autonomous Precision Seed Rover: A Robotic Planter for Precision Farming (Seed Rover).* Funded under the Makerere Research and Innovation Fund-Round 5. USD 35,000**.** January 2024 to December 2024.
2. Scaling up and commercialization of the sensor-based smart irrigation kit*.* Funded *by* under the Makerere Research and Innovation Fund-Round 4, **Scaling and Commercialization Grants**. USD 42,000**.** January to December 2024.

3. *Hilton Foundation Water Quality Testing Fellowship. Water Testing, Research, and Capacity Strengthening (WaterTRACS)*. Funded by Conrad N. Hilton Foundation. USD 500,000. May 2022 - October, 2025.
4. *Optimizing irrigation water use: integrative developing of capacity for small scale farmers and relevant local government personnel to improve knowledge and practice of irrigation water use.* Funded under Makerere Research and Innovation Fund. Multi-year Grant: Year 1 and 2.USD 100,000. September 2020 –June 2024.
5. *GIS Techniques in Quality Environmental Impact Assessment (EIA): Developing Capacity of EIA Practitioners and Stakeholders to Integrate GIS Techniques in Environmental Assessment*. Funded under MakRIF Round 4, USD 43000. October 2022 to June 2024.
6. *Developing a smart solar powered irrigation control system kit for enhancing water use efficiency in irrigated agriculture*. Makerere Research and Innovation Fund-Round 2. USD 21,000**.** September 2020 to March 2022.
7. *Proximal and remote sensing of soil quality for supporting farmers' crop agriculture*. Funded under Makerere Research and Innovation Fund Round 2. USD 44,000. September 2020 to June 2021.
8. *Development of a Green Low Cost Touchless Handwash Technology (TW-20 Kit) For Public Shared Spaces*. Funded under MAK Research and Innovation Fund-COVID -19 response: USD 17,000. May 2020 to November 2020.
9. *Application of Mobile-Phone Technology to Advance Access to Sustainable Point-Of-Use Water Purification Technologies for Household Drinking Water, Knowledge & Water Reuse for Backyard Food Production (mWaF-Project).* Funded under Makerere Research and Innovation Fund Round 2. USD 11,000. September 2020 –June 2021.
10. *Multidisciplinary research for improving economic performance and livestock sustainability in the Northeast cattle corridor of Uganda*. Funder under Makerere Research and Innovation Fund Round 2. USD 23,000. September 2020 –June 2021.
11. *Promotion of rainwater harvesting and low-head smallholder irrigation systems for sustained market responsive vegetable production in mid-western Uganda*. Funded under NARO CGS Cohort IV. USD 60,000. July 2016 – June 2019.
12. Poverty alleviation and food security in Africa through the implementation of small-scale technologies in integrated crop-livestock systems. M-BOSS Africa Brazil Mktplace. USD 200,000. July 2016 – June 2020.
13. *Rainwater Harvesting and Small Scale Irrigation Systems: Desk Review On Rainwater Harvesting Technologies and Small-Scale Irrigation Systems for Agricultural Production*" "USAID/Uganda Education and Research project to Improve Climate Change Adaptation (ERICCA)" through Makerere University Centre for Climate Change Research and Innovations (MUCCRI). USD 5000.January 2017 - June 2017.
14. *Livestock Production & Management Study.* Funded under GCP/UGA/041/EC "Global Climate Change Alliance-Uganda (GCCA): Agriculture Adaptation to Climate Change, Uganda". FAO Uganda. "Conducting applied multidisciplinary research for improving economic performance and livestock sustainability in the cattle corridor of Uganda": USD 135,000. May 2016 - December 2016.

15. *Livestock Production & Management Study.* Funded under GCP/UGA/041/EC "Global Climate Change Alliance-Uganda (GCCA): Agriculture Adaptation to Climate Change, Uganda". FAO Uganda. " Desk Review Data Collection & Study Design for Livestock Production & Management Study: USD 15,000. May 2015 - August 2015.

Key Publications

1. Bwambale E., **Wanyama J.,** Umukiza E., Ntole R., Chikavumbwa R. S., Sibale D., Jeremaih Z. (2024). A Review of Model Predictive Control in Precision Agriculture. *Smart Agricultural Technology.* 100716. https://doi.org/10.1016/j.atech.2024.100716.
2. Nsoh, B.; Katimbo, A.; Guo, H.; Heeren, D.M.; Nakabuye, H.N.; Qiao, X.; Ge, Y.; Rudnick, D.R.; **Wanyama, J**.; Bwambale, E., Kirag, S. (2024). Internet of Things-Based Automated Solutions Utilizing Machine Learning for Smart and Real-Time Irrigation Management: A Review. Sensors **2024**, 24, 7480. https://doi.org/10.3390/s24237480
3. *Zziwa A., **Wanyama J.**, Matsapwe D., Kizito S.S., Mibulo T., Emmanuel B. (2024).* Automation and control system implementation in a smallholder crop production in Uganda: A review. *Advances in Modern Agriculture.* 5(2), 2406. https://doi.org/10.54517/ama.v5i2.2406.
4. Kimbowa G., **Wanyama J.**, Mukaya M., Otim D., Awio T., Mugisha M. (2024). Learning from Farmers Knowledge on Participatory Irrigation Management using Q-Methodology. *Irrigation and Drainage Journal*. 2024;1–20. https://doi.org/10.1002/ird.2991.
5. **Wanyama J.,** Nakawuka P., Bwambale E. (2024). Comparative performance assessment of pilot irrigation schemes in Uganda. *Heliyon Journal,* 10 (10), E31600. https://doi.org/10.1016/j.heliyon.2024.e31600
6. **Wanyama J.**, Nakawuka P., Bwambale E., Kiraga, S., Kiggundu N., Barasa B., A. Katimbo (2024). Evaluation of land suitability for surface irrigation under changing climate in a tropical setting of Uganda, East Africa. *Agricultural systems Journal,* 217, 103937. https://doi.org/10.1016/j.agsy.2024.103937
7. **Wanyama J.,** Bwambale E., Kiraga S., Katimbo A., Nakawuka, P., Kabenge I., Oluk Isaac (2024). Leveraging the fourth industrial revolution technologies for smart irrigation in the context of Sub Saharan Africa: Constraints, opportunities and future prospects. *Smart Agricultural Technology Journal*, 7 (2024), 100412. https://doi.org/10.1016/j.atech.2024.100412
8. Ouma, G., **Wanyama, J***., Kabenge[1] I., Jjaggwe J., Mukulu, D., Muyonga, J. (2024). Assessing the Effect of Deficit Drip Irrigation Regimes on Crop Performance of Eggplant. *Scientia Horticulturae*, 325, 112648. https://doi.org/10.1016/j.scienta.2023.112648. **(*Corresponding Author**).
9. **Wanyama J**. and Bwambale E. (2024). Hydraulic modelling of irrigation canals for improved water use efficiency in Paddy. *ISH Journal of Hydraulic Engineering,* 30 (1),7-17. https://doi.org/10.1080/09715010.2023.2245785.
10. Kabenge I., Ssewankambo G., Nakawuka P., **Wanyama J.***, Zziwa A., Bamutaze Y., Gwapedza D., Tally Palmer T., Jane Tanner J., Mantel S. (2024) Storm Event-Based Sediment Yield and its Heavy Metal Loading: Case of Lake Victoria's Inner Murchison Bay Catchment in Uganda. *Modeling Earth Systems and Environment,* 10 (2), 1973 -1991. https://doi.org/10.1007/s40808-023-01876-2

11. **Wanyama J.*,** Kiraga S., Bwambale E., Katimbo, A. (2023). Improving nutrient use efficiency through fertigation supported by machine learning and Internet of Things in a context of developing countries: lessons for Sub-Saharan Africa. *J. Biosyst. Eng.* 48 (4), 375–391. https://doi.org/10.1007/s42853-023-00196-8
12. **Wanyama J.*,** Soddo P. Nakawuka P., Tumutegyereize P., Komakech A. J., Bwambale E. Oluk I., Mutumba W. (2023). Development of a solar powered irrigation control system kit. *Smart Agricultural Technology Journal*, 5 (2023), 100273. https://doi.org/10.1016/j.atech.2023.100273
13. **Wanyama, J.** and Bwambale, E. (2023). Precision Water Management. In: Zhang, Q. (eds) *Encyclopedia of Smart Agriculture Technologies. Springer, Cham*.1062-1069. https://doi.org/10.1007/978-3-030-89123-7_213-1.
14. Ntege I., Kiggundu N., **Wanyama J.,** Nakawuka P. (2023). Napier yield response under different irrigation strategies in a tropical setting. *Agricultural Water Management Journal,* 287, 108403. https://doi.org/10.1016/j.agwat.2023.108403.
15. Wamala F., Gidudu A., **Wanyama J.,** Nakawuka, P., Chukalla D. A., Bwambale., E (2023). Assessment of Irrigation Water Distribution Using Remotely Sensed Indicators: A Case Study of Doho Rice Irrigation Scheme, Uganda. *Smart Agricultural Technology Journal,* 4 (2023), 100184. https://doi.org/10.1016/j.atech.2023.100184.
16. Kyeyune I. and **Wanyama J.** (2023). Design optimization of communal solar-powered irrigation system. *African Journal of Agricultural Research*, 19(3), 272-286. https://doi.org/10.5897/AJAR2022.16294
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21. Mwebaze, C.E.; Majaliwa, J.-G.M.; **Wanyama, J**.; Gabiri, G. (2021). Assessing the Impact of Management Options on Water Allocation in River Mubuku-Sebwe Sub-Catchments of Lake Edward-George Basin, Western Uganda. *Water*, 13, 1-19. https://doi.org/10.3390/w13152009.
22. Okino J., Komakech J. A., **Wanyama J**., Ssegane H., Olomo E., Omara T. (2021). Performance Characteristics of a Cooking Stove Improved with Sawdust as an Insulation Material. Journal of Renewable Energy, 2021, 1-12. https://doi.org/10.1155/2021/9969806.
23. Munu N., Banadda N., Kiggundu N., Zziwa A., Kabenge I., Seay J., Kambugu R., **Wanyama J.,** and Schmidt A (2021). Transforming corn stover to useful transport

fuel blends in resource-limited settings. *Energy Reports,* 7 (2021) 1256–1266. https://doi.org/10.1016/j.egyr.2021.02.038

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