

CURRICULUM VITAE

NAME: Dr. Eng. Duncan Onyango Mbuge
SEX: Male
DATE OF BIRTH: 28th Sept. 1971
NATIONALITY: Kenyan
CURRENT RESIDENCE: Kenya
I/D No.: 10927677
PASSPORT NO. A1633439
MARITAL STATUS: Married
LANGUAGES: English, Kiswahili, Dholuo
PRESENT ADDRESS: Department of Environmental and Biosystems Engineering
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EDUCATION

2005 –2009: Ph.D. Environmental and Bio-systems Engineering, University of Nairobi.
Research Thesis on the application of Plastic Lining in Water Reservoirs
1997 - 2000: M. Sc. in Agricultural Engineering, University of Nairobi. Thesis: ‘Mechanical Properties of Bamboo Grown in Muguga, Kenya.’
1990 - 1996: B. Sc. in Agricultural Engineering, Egerton University, Kenya
1986 - 1989: Alliance High School, KCSE
1982 - 1985: St. Mary's Mosoch, KCPE
1979 - 1981: Ong'icha Primary School

MEMBERSHIP TO PROFESSIONAL INSTITUTIONS

- Registered Engineer, Kenya Engineers Registration Board (Membership No. A 2706)
- Corporate Member, Institution of Engineers of Kenya (Membership No. M 4086)
- Lead Expert, Environmental Impact Assessment / Audit (NEMA No. 7780)

SELECTED CONSULTANCIES

2012 – Present, Processing Engineer / Course Coordinator (Seed Drying, Processing and Storage) Seed Enterprise Management (SEMIS) Project College of Agriculture and Veterinary Sciences, February 2010 to Date, Involves Training seed company employees on seed drying, processing and storage as well as participation in the design of seed processing plant at Kabete Campus, University of Nairobi.
February 2016, Evaluation of Project Proposals to be funded by the Deans' Committee, University of Nairobi
February 2016, Evaluation of Project Proposals to be funded by the Deans' Committee, University of Nairobi
April 2015, Prowater International, Food Security Master plan for Tharaka Nithi County for Trocaire International (Contribution on Renewable Energy and Agricultural Processing)
January 2015, Prowater International, Food Security Master plan for Embu County for Trocaire International (Contribution on Renewable Energy and Agricultural Processing)
May 2014, Trocaire and Catholic Diocese of Lodwar, Evaluation and Documentation of Crop Resilience & Fruit Trees Project in Loima District, Turkana
October 2013, Trocaire, Technical Support in Writing a Concept Note for ‘Building Resilience to Climate Extremes and Adaptation to Disaster Programme (BRACED)

August 2012, Prowater International, Food Security Master plan for Turkana County for the Catholic Diocese of Lodwar

April 2012, Presentation of rainwater technologies at the launch of Coca Cola Company rainwater harvesting initiative

April 2009, Rappporteur at the closing workshop of the Nile Basin Initiative (NBI) EUWAP project, Nairobi, Kenya

May 2008, Rappporteur at the IMAWESA write-shop on agriculture water management for managers of ADP projects in East and Central Africa, Arusha, Tanzania

August 2007, World Vision International, Training community leaders in rainwater harvesting technologies at Ndabibi ADP, Naivasha

July 2007, Kenya Rainwater Association, Training of agricultural officers from Malawi on rainwater harvesting technology for agricultural production through including supplemental and in-situ irrigation

March 2006, World Vision International, Training community leaders in rainwater harvesting technologies including supplemental and in-situ irrigation at Ndabibi ADP, Naivasha

2004, Participated in the supervision of design and construction of Mukogondo reservoir for rainwater harvesting at Kenya Rainwater Association

June 2003, World Vision International, Evaluation of rainwater harvesting projects in Makueni ADP

2003, Participated in the design and supervision of the Ndeiya Karai integrated rainwater harvesting project at Kenya Rainwater Association funded by DED

2001- 2002, Participated in the supervision of design and construction of Weruini and Sweetwaters rainwater harvesting reservoirs

WORK EXPERIENCE

UNIVERSITY TEACHING AND RESEARCH EXPERIENCE

UNIVERSITY OF NAIROBI

- Chairman - Department of Environmental and Biosystems Engineering (July 2017 – Present)
- Senior Lecturer, Department of Environmental and Biosystems Engineering (March 2012 – Present) - Lecturing and Research in Power and Machinery, Process and Food Engineering, Materials Science, Environmental management and conservation in construction, Renewable Energy, Infrastructure Engineering, Construction materials and workshop techniques.
- Chairman, College Environmental Quality Management Committee, College of Architecture and Engineering (August 2015 – Present) - Ensuring proper management of Environmental matters in the College.
- Project Coordinator, SAPDRY (Development of grain drying facilities that use super absorbent polymers and adjusting the properties of SAPs to optimize drying of grain and control of aflatoxin contamination). A collaborative project between University of Nairobi, ETH Zurich, University of Kassel and University of Venda.
- Senior Lecturer, Department of Biomechanical and Environmental Engineering, Jomo Kenyatta University of Agriculture and Technology (June, 2011 to March 2012)
- Lecturer, Department of Environmental and Biosystems Engineering (September 2008 to June, 2011)
- Tutorial Fellow, (September 2002 to July 20September 2008) - Lecturing and Research in Materials Science, Environmental management and conservation in construction, Infrastructure Engineering, Construction materials

UNIVERSITY OF PAVIA, ITALY

Visiting Junior Professor, (October - December 2014) in the Energy Agro-Food Synergies Project. Conducted joint research on Biogas Utilization in Kenya, developed teaching modules for renewable energy and trained in student internship programme management and quality assurance in higher education

ETH ZURICH, SWITZERLAND

Postdoctoral Fellow, Department of Food and Soft Materials (February 2012 - February 2013) - Visiting Scientist (May 2012) - Research into the use of super-absorbent polymers in drying maize to prevent aflatoxin contamination

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

Senior Lecturer, Biomechanical and Environmental Engineering Department (June 2011 – March 2012) - Lecturing and Research in Renewable energy, Post harvest technology, Production engineering

PROJECTS AND RESEARCH GRANTS / AWARDS

- 2016- ETH Zurich World Food System Center Grant (Co- Principal Investigator) to Investigate Soft Matter Approach to Effective Preservation of African Leafy Vegetables (ALVs) by Drying by Desiccant / Solar Hybrid System,
- 2015 - Senior Postdoctoral Fellowship by Volkswagen Foundation to design a hybrid desiccant / solar drying system for maize
- 2014 – Project Coordinator, Research Project by ERAFRICA to design a hybrid desiccant / solar drying system for maize
- 2012 - Research Fellowship funded by the Research Fellowship Partnership Programme (RFPP) entitled “Determination of the Effectiveness of Super Absorbent Polymers (SAPs) in Drying Maize and Prevention of Aflatoxin contamination”
- 2012 – Postdoctoral Fellowship funded by the National Council for Science and Technology entitled “Postharvest Control of Aflatoxin contamination in stored maize using super Absorbent Polymers (SAPS) in improved and Affordable Designs of Storage structure”
- 2012 – Project Coordinator, Jomo Kenyatta University of Agriculture and Technology, Innovation Research Grant to investigate the use of mechanical shakers for coffee harvesting.
- 2005 – Ph.D. Fellowship, by DAAD
- 1997 – University of Nairobi, M. Sc. Scholarship
- 1990 – Barclays Bank staff scholarship scheme, B. Sc. Scholarship

PUBLICATIONS

- Evans Mugeru Lusigi, Duncan Onyango Mbugu, John Paul Obiero, Stephen Conrad Ondieki, Peter Kuria Ndiba, 2017. Quality Assessment of Rain and Storm Water Runoff for Nairobi City Industrial and Sub-Urban Areas, International Journal of Innovative Research in Engineering & Management (IJIREM), ISSN: 2350-0557, Volume-4, Issue-1, January-2017.
- F.P. Langa, W.M. Muiru, D. Mbugu, L.R M. Ragwa, F.M. Olubayo and J.W. Muthomi, 2017. Influence of Endosperm Types, Seed Moisture Content and Threshing Methods on Germination and Seedling Vigour of Sorghum, American-Eurasian Journal of Agricultural & Environmental Sciences (Accepted for Publication)
- Sylvia Injete Murunga, Duncan Onyango Mbugu, Ayub Njoroge Gitau, Urbanus Ndungwa Mutwiwa and Ingrid Namae Wekesa, 2016. Isolation and characterization of methanogenic bacteria from brewery wastewater in Kenya, Vol. 15(47), pp. 2687-2697,

23 November, 2016, DOI: 10.5897/AJB2016.15551, Article Number: E58885261761, ISSN 1684-5315.

- G. P. Mutuli and D. O. Mbuge, 2016. Sorption Isotherms for Cowpea Leaves (*Vigna unguiculata*) and Jute Mallow (*Corchorus olitorius* L), African Journal of Science and Technology (AJST), Science and Engineering Series, Vol. 13 No. 2, October 2016.
- Duncan O. Mbuge, Renata Negrini, Livine O. Nyakundi, Serge P. Kuate, Ranajit Bandyopadhyay, William M. Muiru, Baldwin Torto, Raffaele Mezzenga. 2016. Application of superabsorbent polymers (SAP) as desiccants to dry maize and reduce aflatoxin contamination, *J Food Sci Technol* (August 2016) 53(8):3157–3165.
- Murunga, S. I., D. O. Mbuge, A. N. Gitau, U. N. Mutwiwa, and I. N. Wekesa. 2016. Characterization of brewery waste water and evaluation of its potential for biogas production. *Agricultural Engineering International: CIGR Journal*, 18(3):308-316.
- Odero S.O., D.O. Mbuge, E.K. Mutai and G.P. Mutuli, (2016). Evaluation of the Effectiveness of Super Absorbent Polymers (SAPs) In Air Dehumidification for Maize Drying, *International Journal of Innovative Research in Engineering & Management (IJIREM)*, ISSN: 2350-0557, Volume-3, Issue-3, May-2016.
- Ndisya, J., A. N. Gitau, D. O. Mbuge, and A. W. Hiuhu. 2016. Investigation of the effect of rake angle on draft requirement for ripping in sandy clay. *Agricultural Engineering International: CIGR Journal*, 18(4): 52-69.
- Ndisya, J., Gitau, A., Mbuge, D. and Hiuhu, A. (2016) The Effect of the Operational Parameters on the Draft Requirement of Ripping in a Sandy Clay Soil. *Open Journal of Optimization*, 5, 1-13. <http://dx.doi.org/10.4236/ojop.2016.51001>
- Kiburi, F.G., C. L. Kanali, and D. O. Mbuge. 2015. Modeling drying of seed maize using super absorbent hydrogel under hermetic conditions. *Agric Eng Int: CIGR Journal*, 17(4):257-264.
- Mutuli, G. P. and D. O. Mbuge (2015). Drying characteristics and energy requirement of drying cowpeas leaves and jute mallow vegetables, *CIGR Electronic Journal*
- Hiuhu, A., Gitau, A.N., Mbuge, D.O. and Mulwa, J.N. (2015), Optimization of the Angle of Frog in Mouldboard Tillage Operations in Sandy Clay Soil. *Open Journal of Optimization*, 4, 131-140. <http://dx.doi.org/10.4236/ojop.2015.44013>
- Kiburi F.G., Kanali C.L. and Mbuge D.O. (2014). Evaluating the performance of Super Absorbent Hydrogel in drying of seed maize under hermetic conditions. *Proceedings of 2014 International Conference on Sustainable Research and Innovation*, Volume 5, 7th-9th May 2014
- Kalungu, J.W., Filho, W.L., Mbuge, D. O., and Cheruiyot, H.K., 2014. Assessing the Impact of Rainwater Harvesting Technology as Adaptation Strategy for Rural Communities in Makueni County, Kenya. In *Handbook of Climate Change Adaptation*, Pp. 1 - 17, 06 Oct 2014, ISBN 978-3-642-40455-9, Springer Berlin Heidelberg
- Tonui, K.S., E.B.K. Mutai, D.A. Mutuli, D.O. Mbuge and K.V. Too, 2014. Design and Evaluation of Solar Grain Dryer with a Back-up Heater. *Research Journal of Applied Sciences, Engineering and Technology*, 7(15): 3036-3043.
- Kalungu, J. W. and Mbuge, D. O., 2013. Assessing the impacts of Kenyan universities in adapting to climate change, African Regional Conference of Vice Chancellors, Provosts and Deans of Science, Engineering and Technology (COVIDSET 2013)
- Mbuge, D. O., L. O. Gumbe and G. O. Rading, 2012. *Service Life of HDPE Plastic Dam Lining - Prediction Using Viscoelasticity*, Lambert Academic Publishing, Saarsbrücken, Germany. ISBN 978-3-8465-4724-3.
- Too. K.V., E.B.K. Mutai, J.M. Mutua, D.A. Mutuli and D.O. Mbuge, 2012. Viscoelastic Properties of Bulk Groundnuts, *Research Journal of Applied Sciences, Engineering and Technology* 4(10): 1260-1267, 2012 ISSN: 2040-7467

- Alex Oduor, Kipruto Cherogony, Jane Mutune, Maimbo Malesu, Anne Karuma, Douglas Nyolei, Jacqueline Kandagor & Duncan Onyango with Chris Ajele, Wilfred Wafula, Samuel Njalale, Alphus Lusweti, Peter Maina, Erick Towett, Arjen de Vries, David Tanui, Francis Mwangi, William Kimosop, Robert Kibunja and Saina Kiptoo, 2012. Food Security Framework for Turkana County. Diocese of Lodwar, ISBN: 978-92-9059-326-3
- Mbuge, D. O., L. O. Gumbe and G. O. Rading, 2011. Predicting the Service Life of HDPE Plastic Lining for Water Reservoirs Using Viscoelasticity, *Journal of Polymer Science and Engineering* Vol. 51, No. 6, Pp 1198–1205, June 2011, Wiley Publications.
- Mbuge, D. O. L. O. Gumbe, and G. O. Rading, 2011. Analysis of the Weld Strength of the High Density Polyethylene (HDPE) Dam Liner, *African Journal of Science and Technology (AJST)*, Science and Engineering Series Vol. 11, No. 2, pp. 12-24
- Mutai, E.B.K., P.O. Otieno, A.N. Gitau, D.O. Mbuge and D.A. Mutuli, 2011. Simulation of the Microclimate in Poultry Structures in Kenya, *Research Journal of Applied Sciences, Engineering and Technology* 3(7): 579-588, ISSN: 2040-7467
- Langat, S., D. O. Mbuge and E. B. K. Mutai, 2011. Determination of the Parameters for Design of Flexible Plastic Tank, *African Journal of Science and Technology (AJST)*, Science and Engineering Series Vol. 11, No. 2, pp. 35-44
- Mbuge, D.O. and P.K. Langat, 2008. Principles of a Mechanical Shaker for Coffee Harvesting. *CIGR Electronic Journal*, Vol. X. January, 2008.
- Mbuge, D.O., 2006. Design Protocol for the Design of Flexible HDPE tanks. Southern and Eastern Africa Rainwater Network (SEARNET) Conference, Mombasa, <http://betuco.be/water/Rainwater%20management%20for%20disaster%20mitigation.pdf>
- Mbuge, D.O., D.M., 2003. Advantages of Harvesting Rainwater in Urban Areas. Kenya Society of Agricultural Engineering (KSAE) Annual Conference, Nairobi.
- Mati, B., D. Mbuge, H. Mahoo, G. Kajiru and L. Gallet, 2008. Regional Training Workshop and Write-shop to Document Lessons Learnt from Projects and Programmes in Agricultural Water Management, IMAWESA Proceedings No. 17, November 2008.
- Ngigi, S., J. Thome, K. Mutunga and D. Mbuge, 2004. Proceedings of the GHARP/USAID OFDA Project Planning Workshop, GHARP Publication No. 4.
- Adhiambo, B., A. Oduor and D. Mbuge, 2003. Rainwater Harvesting for Improved Livelihoods, Exposition Catalogue 2003, Global Water Partnership (GWP) Associated Project of the Regional Land Management Unit (RELMA) and Kenya Rainwater Association.
- Onyango, D.M., 2003. Women at the Source of Life: The Experience of Kenya Rainwater Association, *FAO Dimitra Newsletter*, No. 8, October 2003, Brussels.
- Obiero, J.P.O, C.O. Thine and D.O. Mbuge, 2003. Rainwater Harvesting for Crop Production in Semi-arid Areas – A Hydrology Based Teaching / Training Manual, UON / Cranfield University / HRWallingford / ITAD / DFID collaboration.
- Wanyonyi, J.S., S. Ngigi, P. Mwangi and D. Mbuge, 2001. Workshop Proceedings, GHARP Strategic Planning and Project Implementation Planning Workshops, GHARP Publication No. 1.

CONFERENCE PROCEEDINGS

- Franz Roman, Oliver Hensel, Duncan Mbuge, Development of Grain Drying Facilities That Use Superabsorbent Polymers (SAP) to Optimise Drying and Control Aflatoxin Contamination in Kenya, “Solidarity in a competing world — fair use of resources”, Tropentag, September 18-21, 2016, Vienna, Austria

COMPLETED POSTGRADUATE SUPERVISION

- 2017, Sylvia Injete Murunga, PhD, Modeling and Optimization of Biogas Production from Brewery Waste Water
- 2017, Evans Mugeru Lusigi, M.Sc. Quality Assessment of Rain and Storm Water Runoff for Nairobi City Industrial and Sub-Urban Areas
- 2017, Ng'eno V.K, Assessment of Super Absorbent Polymer (SAP) on Plant Available Water (PAW) in different soil types
- 2016, Langa Fabiola Peter, M.Sc., Effects of Threshing Methods, Moisture Content and Endosperm Types on Threshability and Selected Seed Quality Parameters of Sorghum
- 2016, Peter Kimani Kangethe, M.Sc., Determination of Moisture and Temperature Variation in Wet Grain Silo over Time and Space to Effect Desiccant Drying, University of Nairobi
- 2016, Kennedy Wandera Makodiuh, M.Sc., Rake Angle Effect on Draft Power Requirement of a Sub-Soiler in Nitisols, University of Nairobi
- 2015, Hiuhu Angela Wambui, M.Sc., Optimization of the Angle of Cut of a Frog in Mouldboard Tillage Operations: Case Study of Clay Soil, University of Nairobi
- 2015, John Mulwa Ndisya, Numerical Simulation of the Resistance to Ripping in a Cohesive Soil, University of Nairobi
- 2015, Gibson Mutuli Peter, M.Sc., Determination of Effective Parameters of Drying African Leafy Vegetables (ALVs), University of Nairobi
- 2015, Shadrack Omondi Odero, M.Sc., Evaluation of the Effectiveness of Superabsorbent Polymers (Saps) in Air Conditioning for Grain Drying, University Of Nairobi
- 2015, Amos Abala Wambura, M.Sc., Determining the physical properties needed for evaluating performance of glass reinforced polymer as material for solar hot water tanks in the coastal areas, University of Nairobi
- 2014, Florence Gatwiri Kiburi, M.Sc., Moisture Sorption in Seed Maize (*Zea Mays L.*) during Hermetic Drying using Super Absorbent Hydrogel, Jomo Kenyatta University of Agriculture and Technology, JKUAT
- 2014, Livine Osiemo Nyakundi, M.Sc., The Effect of Superabsorbent Polymers on Aflatoxin Contamination in Maize, University of Nairobi

ON GOING PROJECTS / POSTGRADUATE SUPERVISION

Renewable Energy

- Characterization of Abattoir waste for biogas generation - M. Sc. Supervision
- Development of solar coolers for cassava preservation - M. Sc. Supervision

Process and Food Engineering

- Drying and growth characteristics of oyster mushroom - Ph.D. Supervision
- Drying of maize using desiccant to prevent aflatoxin contamination - Ph.D.
- Post harvest handling and drying of cassava - M. Sc. Supervision
- Drying characteristics of African leafy vegetables - Ph.D. Supervision

Power and Machinery Engineering

- Determination of energy requirements and costing regime for mobile thermal grain dryer - M. Sc. Supervision
- Determination of the effect of threshing on the germination and viability of sorghum - M. Sc. Supervision

Water and Environmental Engineering

- Determination of quality parameters in rainwater in Nairobi - M. Sc. Supervision

- Assessment of Super Absorbent Polymer(SAP) on Plant Available Water (PAW) in different soil types - M. Sc. Supervision

TRAINING, SEMINARS AND CONFERENCES

- VW Foundation soft skills training on Project and Time Management, 12 – 19 November 2016, Arusha, Tanzania
- American Society of Agricultural and Biological Engineers (ASABE), October 24th - 29th 2016 Engineering and Technology Innovation for Global Food Security Conference, Spier Wine Estate and Hotel, Stellenbosch, South Africa
- Commission for Agricultural and Rural Engineering, CIGR-AgEng Conference, 26-29 June 2016, Aarhus, Denmark
- VW Foundation soft skills training on experimental design, 23 – 27 March 2016, Addis Ababa, Ethiopia
- Energy Agro Food Synergies Project, Staff Exchange visit to Sokoine University of Agriculture, Morogoro, Tanzania, 17 -19 January 2016
- VW Project Inaugural meeting, 4 - 7 December 2015, University of Kassel, Germany
- ERAFRICA Annual Project Meeting, September 2015, University of Venda, Thoyohandou, South Africa
- Proposal writing for VW Foundation Senior Postdoctoral Scholarships, February 2015, University of Konstanz and University of Kassel, Germany
- Network on Humanitarian Aid (NOHA) Awareness Raising Seminar, University of Pavia, 7th November 2014, Italy
- Energy Agro Food Synergies Project, Study visit to University of Pavia, Italy, 20th October - 4th December 2014
- ERAFRICA Project Coordinators' Conference of 16 - 18 September 2014, Pretoria, South Africa
- University of Nairobi, Training on Supervision of Postgraduate student, July 2013
- University of Nairobi, Training on Pedagogy, July 2012.
- East Africa Climate Innovation Network (EACIN), Sharing knowledge, experience and best practices in climate change adaptation technology innovations, 17th - 18th January 2013, Kenya School of Monetary Studies.
- DIES (Dialogue on Innovative Higher Education Strategies) Training course Part II: “Proposal Writing for International Research Projects,” 09th – 14th April 2012, Sawela Lodge, Naivasha, Kenya, Nairobi. Organized by Deutscher Akademischer Austausch Dienst (DAAD), Freie Universität Berlin, in cooperation with the Universities of Bonn and Kassel
- DIES (Dialogue on Innovative Higher Education Strategies) Training course Part I: “Proposal Writing for International Research Projects,” 20th – 25th November 2011, Silver Springs Hotel, Nairobi, Kenya. Organized by Deutscher Akademischer Austausch Dienst (DAAD), Freie Universität Berlin, in cooperation with the Universities of Bonn and Kassel
- 11th International Conference on Frontiers of Polymers and Advanced Materials (ICFPAM), 22nd - 27th May 2011, University of Pretoria, South Africa.
- Tenth SEARNET Conference on Rainwater Harvesting and Management in Africa, 4-8 December 2006, Mombasa, Kenya
- 7th SEARNET Conference on Rainwater Harvesting and Management in Africa, Arusha, Tanzania, 1st - 5th December 2003.

KENYA RAINWATER ASSOCIATION

February 2001 to 2003 - Information Officer on rainwater harvesting and management

February 2003 to 2004 - Information Adviser on rainwater harvesting and management

- Design of plastic lined dams for drip irrigation system at Ndeiya Karai
- Participation in the design and construction of Weruini, Sweetwaters and Mukogodo dams

February 2006 to 2010 – Board Member, representing academic and research institutions.

REFEREES

Prof. Eng. L. O. Gumbe

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Department of Environmental and Biosystems Engineering,

Technical University of Kenya, NAIROBI.

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Dr. Moses Marenya

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