

## CURRICULUM VITAE

### Prof. Dr. –Ing. John Mwangi Gathenya

BSc Agric Eng. (Nairobi) MSc Agric. Eng. (Nairobi) Ph. D. (Kaiserslautern)

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Date of Birth: 11.12.1963  
Marital status: Married  
Nationality: Kenyan  
Languages (in order of proficiency to speak, write, read): English, Kikuyu, Kiswahili, German

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#### UNIVERSITY EDUCATION

1995-1999: University of Kaiserslautern, Institute of Hydraulic Engineering and Water Management, Kaiserslautern, Germany from April 1995 to September 1999. Awarded PhD in Engineering (Dr. –Ing.) in September 1999. Title of thesis: Einsatz von Wasserhaushaltsmodellen zur Wasserbewirtschaftung am Beispiel des Thika-Chania Gebietes in Kenia (Application of water balance models for water management: The example of Thika-Chania catchment in Kenya. Grade: Very good.

1989-1992: University of Nairobi, Nairobi, Kenya. Awarded MSc (Agricultural Engineering) in November 1993 Title of thesis: Water Balance of Sections of Naromoru River

1985-1988: University of Nairobi, Nairobi, Kenya. Awarded BSc (Agricultural Engineering) 2<sup>nd</sup> Class Honours, Upper Division in November 1988.

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#### EMPLOYMENT RECORD

01 August 2010 to Present: Visiting Scientist, World Agroforestry Centre ICRAF (GRP6- Developing policies and incentives for multi-functional landscapes with trees that provide environmental services). On Sabbatical leave from JKUAT. Giving support to PRESA project especially in looking at relationship between land use and ecosystem services.

01 June 2010 to Present: Associate Professor, Jomo Kenyatta University of Agriculture and Technology, Biomechanical & Environmental Engineering Department.

01 Oct 2002 to 30 to May 2010: Senior Lecturer, Jomo Kenyatta University of Agriculture and Technology, Biomechanical & Environmental Engineering Department.

25 Nov 1999-01 Oct 2002: Lecturer, Jomo Kenyatta University of Agriculture and Technology, Agricultural Engineering Department.

08 Nov 1993 – 24 Nov 1999: Assistant Lecturer, Jomo Kenyatta University of Agriculture and Technology, Agricultural Engineering Department. (Study leave for PhD from Sept 1994 to October 1999).

01 Nov 1989 – 07 Nov 1993: Graduate Assistant, Jomo Kenyatta University of Agriculture and Technology, Agricultural Engineering Department. (Study leave for MSc from Sept 1989 to Dec 1991)

10 Aug 1988 – 30 Sep 1989: Agricultural Officer II, Ministry of Agriculture, Provincial Irrigation Unit, Eastern Province, Embu.

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#### PUBLICATIONS IN REFEREED JOURNALS OR BOOKS

1. Gathenya, J. M., Mwangi, H., Coe, R., Sang, J. 2011. Climate- and land use-induced risks to watershed services in the Nyando River Basin, Kenya. *Experimental Agriculture*. Paper accepted on 13 Jan 2011.
2. Gathenya, J. M., Ngeera, C. 2010. Dynamics and Environmental Impacts Land Use Cover Changes in River Buathonaro Catchment in Meru County, Kenya. *International Journal of Sustainable Water and Environmental Systems*. (paper accepted 24 November, 2010).
3. Gathenya, J.M., Kinyari, P.K. and Home, P.G. (2010) Domestic Rainwater Harvesting Tank Sizing Calculator and Nomograph. *Journal of Agriculture Science and Technology*. Accepted for Publication April 2010.
4. Mwangi, J. K., Gathenya, J. M. & Ondieki, C. M. (2008). Estimating parameters of IHACRES Conceptual Model

- for Tana Basin, Kenya. *International Journal for Disaster Management & Risk Reduction*, ISSN: 1992-2744, 1(2), pp69-82.
5. Mwangi, J. K., Gathenya, J. M. & Ondieki, C. M. (2008). Application of IHACRES Conceptual Rainfall-runoff Model to Simulate Daily Stream Flow in Upper Tana Basin, Kenya. *Journal of Civil Engineering, Research and Practice* [Online], ISSN: 1729-5769, 5(2), pp69-82.
  6. Mwangi, J., Gathenya, J., & Ondieki, C. (2007). Regionalising Parameters of a Conceptual Rainfall-Runoff Model for Stream Flow Estimation in Ungauged Catchments. *Journal of Civil Engineering Research and Practice* [Online], ISSN: 1729-5769, 4(2). pp61-74 Available: <http://www.ajol.info/viewarticle.php?id=36806>.
  7. Sang, J., Gathenya, M. & Ndegwa, G., (2007). Evaluation of reservoirs as a flood mitigation measure in Nyando basin, Western Kenya using SWAT. *European Journal of Scientific Research*, ISSN: 1450-216X, 18(2). pp231-239.
  8. Muthusi F.M., Gathenya, M., Gadain, H., Kaluli, W., & Lenga, F. K. (2005). Application of the USGS Streamflow Model to the Nyando Basin, Western Kenya. *European Journal of Scientific Research*, ISSN: 1450-216X, 12(1). Pp 9-19.
  9. Gathenya, M. (2005). Methodology for Evaluating the Regional Impact of Climate Change on Water Resources In: Jansky, L., Haigh, M.J., & Prasad, H. (2005). *Sustainable Management of Headwater Resources*. United Nations University Press. ISBN 9280811088, pp205-218
  10. Gathenya, J. M. 1999. The application of water balance models for water management on the Thika-Chania catchment in Kenya. University of Kaiserslautern, Institute for Hydraulic Engineering and Water Management, 1999 ISSN 1433-4860 (written in German)

#### PUBLICATIONS IN REFEREED JOURNALS UNDER REVIEW

1. Home, P. G., Gathenya, J.M., Dienya,R.N. (under review). Reservoir construction alternatives for full potential rice irrigation development in the river Nyando Basin, Kenya. Paper submitted to *Journal of Civil Engineering, Research and Practice*.

#### PUBLICATIONS IN CONFERENCE / SEMINAR PROCEEDINGS AND TECHNICAL BULLETINS

1. Moriasi, D., Steiner, J., Arnold, J., Allen, P., Dunbar, Sang, J., Shisanya, C., Gathenya, J.M., Nyaoro, J. (2009). Impact of converting cropland to forested stream buffers on soil loss and water quality at watershed scale. Poster presented at 2nd World Congress of Agroforestry: Agroforestry-The future of global land use, UNEP, Nairobi, 24th -28th August, 2009
2. Kigira, F. K., Gathenya, J.M., Home, P. G. 2008: Modeling the influence of land use changes on hydrology and sediment yield in a river catchment using SWAT model. Paper presented at 3rd Int. Conf. On Appropriate Technology, 12th-15th November, 2008, Kigali, Rwanda.
3. Gathenya, J.M, Ritho, C.N., Home, P.G., Ngamau, C.N. & I.G. Munyiri (2008). Characterization of smallholder pumped irrigation in Kenya. Proc. Commission for Higher Education Research Dissemination Workshop, 26th to 31st August 2008, Mombasa, Kenya.
4. Home, P. G. Dienya, R. N. Gathenya, J. M. 2007. Evaluating the damming alternatives of upper Nyando River to meet full potential rice irrigation development in the Kano Plains. Proceedings of 2007 JKUAT Scientific, Technological and Industrialisation Conference. 25-26 October 2007, JKUAT, Kenya.
5. Kigira, F. K., Gathenya J.M., Home, P. G. 2007. Modelling the influence of land use changes on sediment yield and hydrology in Thika River Catchment. Proceedings of 2007 JKUAT Scientific, Technological and Industrialisation Conference. 25-26 October 2007, JKUAT, Kenya.
6. Mutie, S. M., Mati, B. M., Home, P. G., Gadain, H., Gathenya, J. M. 2006. Evaluating land use change effects on river flow using USGS Geospatial streamflow model in the Mara river basin, East Africa. A paper presented during the second Workshop of the EARSeL SIG on Remote Sensing of Land Cover, Bonn, Germany, 28<sup>th</sup>-30<sup>th</sup> September, 2006.
7. Kaluli, W. Nganga, K. Gathenya, J., Kihoro, J. and Muriuki, A. 2005. Water harvesting for household and agricultural water use in Kaiti. Proceedings of 2005 JKUAT Scientific, Technological and Industrialisation Conference. 27-28<sup>th</sup> October 2005, JKUAT.
8. Nderitu, A. Kaluli, W., Gathenya, M. 2005. Use of watershed models for enhanced water resources management in arid and semiarid watersheds: Kaiti watershed case study. Proceedings of 2005 Scientific, Technological and Industrialisation Conference. 27-28<sup>th</sup> October 2005, JKUAT.
9. Gathenya, J. M., Kinyari, P. K., 2005. Rainwater harvesting tank sizing nomograph. Proceedings of 2005 Scientific, Technological and Industrialisation Conference. 27-28<sup>th</sup> October 2005, JKUAT.
10. Gathenya, J. M. and W. Kaluli 2004. Hydrologic Data Availability For Water Resources Planning In Makueni District WAITRO Biennial Congress , 6th – 11th September 2004, Nairobi, Kenya
11. Gathenya, J. M. 2003. Influence of spatial discretization on catchment water balance simulation. Proc. Int. Civil Engineering Conference on Sustainable Development in the 21<sup>st</sup> Century, 12-16<sup>th</sup> August 2003, Nairobi,

Kenya.

12. Gathenya, J. M., Gichuki, F. N. and Liniger H. P. 2000. Problems of River-Water Management for a Basin West of Mount Kenya: Challenge to Water Resource Planners. In: F. N. Gichuki et. al (Eds) 2000. Land and Water Management in Kenya. Towards Sustainable Land Use. Proc. 4<sup>th</sup> National Workshop, 15-19 February, 1993, Kikuyu, Kenya.

#### TRAINING COURSES, WORKSHOPS, SEMINARS AND CONFERENCES ATTENDED

1. Synthesis Workshop on Trees in Multi-Use Landscapes in South East Asia (TULSEA): A negotiation support toolbox for Integrated Natural Resources Management. Feb 22-26, 2010, Batu, East Java, Indonesia.
2. Methods and Approaches for Assessing Multifunctional Landscapes with Trees that Provide Environmental Services - Case Studies from RUPES in SEA and PRESA in EA, Writeshop held at Kentmere Club, Limuru, 18-19<sup>th</sup> August 2009 Organised by ICRAF with funds from PRESA project.
3. 2<sup>nd</sup> World Congress of Agroforestry: Agroforestry-The future of global land use, UNEP, Nairobi, 24<sup>th</sup> -28<sup>th</sup> August, 2009.
4. Building Ecosystem Services Capacity for Semi-Arid Africa. Organized by ICRAF, Macaulay Landuse Research Institute, 24<sup>th</sup> March 2009 to 4<sup>th</sup> April 2009, ICRAF and Embu, Kenya.
5. DAAD Alumni Summer School 2008. Topics of Integrated Watershed Management – Water Demand in Participatory Watershed Management. 17<sup>th</sup> – 28<sup>th</sup> November, 2008, Meru, Kenya.
6. Commission for Higher Education Research Dissemination Workshop, 26<sup>th</sup> to 31<sup>st</sup> August 2008, Mombasa, Kenya.
7. Budgeting and Procurement Course. Organized by JKUAT, facilitated by Kenya Management Institute, 28<sup>th</sup> to 30<sup>th</sup> July 2008, Nakuru, Kenya.
8. DAAD Alumni Summer School on Rural Sanitation Management and International Trade Fair on Water and Wastewater Recycling, 27<sup>th</sup> April– 10<sup>th</sup> May, 2008, Gummersbach and Munich, Germany.
9. DAAD Alumni Expert Seminar 2007 on “Topics on Integrated Watershed Management”. Bagamoyo, Tanzania, 4<sup>th</sup> -11<sup>th</sup> November 2007. Organised by University of Siegen/ Kenyatta University/ University of Dar-es-Salaam.
10. Implementation of ISO 9001:2001. Seminar organized by JKUAT and facilitated by Kenya Bureau of Standards, 2<sup>nd</sup> – 4<sup>th</sup> May 2007, Nairobi, Kenya.
11. Training of Trainers Course for ISO 9001:2001. Seminar organized by JKUAT and facilitated by Kenya Bureau of Standards, 8<sup>th</sup> – 9<sup>th</sup> May 2007, Nairobi, Kenya.
12. Leadership for Ecoagriculture, Course organized by Ecoagriculture Partners, ECOTRUST and Centre for Sustainable Resource Development, 15<sup>th</sup> to 22<sup>nd</sup> April 2008, Jinja, Uganda.
13. Leadership and Management Capacity Development. Training organized by JKUAT and offered by Kenya Institute of Management, 13<sup>th</sup> to 16<sup>th</sup> February 2008, Nanyuki, Kenya.
14. DAAD Alumni Summer School 2007. Topics of integrated Watershed Management: Participatory Monitoring of Watershed Management Plan for Bwathonaro Watershed in Meru, 5-18 August 2007. Organised by University of Siegen/ Kenyatta University.
15. DAAD Alumni Summer School 2006. Topics of Integrated Watershed Management: Development of Participatory Watershed Management Plan for Bwathonaro Watershed in Meru, 17-29 July 2006. Organised by University of Siegen/ Kenyatta University.
16. 2nd Workshop of the EARSeL Special Interest Group on Remote Sensing of Land Cover, Bonn, Germany, 28th-30th September, 2006.
17. Geo-informatics for environmental modelling. JKUAT, 6<sup>th</sup> –10<sup>th</sup> February 2006. (coordinator of Workshop). Jointly held between JKUAT and University of Bonn, Germany, Geography Department, Remote Sensing Research Group
18. ISO 9001:2000 Quality Management Systems Training Workshop, Nairobi, 2<sup>nd</sup> – 4<sup>th</sup> May 2007
19. Geo-information for Environmental risk management in Africa: A contribution to the University Network for Disaster Risk Reduction in Africa. 13-23 June 2006. RCMRD, Nairobi, Kenya
20. Geo-informatics for Hydrological modelling. Facilitated by ITC, Netherlands, 3-14<sup>th</sup> October 2005, National University of Rwanda, Butare, Rwanda
21. Regional Workshop on e-Content development for Science and Engineering University Staff, 20<sup>th</sup> -29<sup>th</sup> October 2004, KIST, Kigali, Rwanda, organised by ANSTI/UNESCO.
22. Training of the Trainers of eLearning. Workshop organized by Kenya Education Network (KENET) and JKUAT, 14<sup>th</sup> -18<sup>th</sup> June 2004 at Institute of Computer Science and Information Technology, Jomo Kenyatta University of Agriculture and Technology.
23. National Water Sector Reforms -Information to Academia. Seminar organized by BEED, JKUAT, 18<sup>th</sup> June 2004, Jomo Kenyatta University of Agriculture and Technology.

24. USGS/FEWS NET Geo-spatial Stream flow Model (GeoSFM) Training Workshop. 22<sup>nd</sup> to 25<sup>th</sup> October 2002 held at IMTR, Nairobi, Kenya. Organized by USGS in collaboration with Drought Monitoring Centre, Nairobi (DMCN).
25. Dynamic Atlas Training. 14<sup>th</sup> to 18<sup>th</sup> October 2002, Regional Centre for Mapping of Resources for Development, Nairobi, Kenya. Organized by FAO Program for Somalia.
26. 28<sup>th</sup> International Postgraduate Course in Agricultural Meteorology. Tel Aviv, Israel, 20<sup>th</sup> May – 16<sup>th</sup> June 2002. Organised by Israeli Ministry of Foreign Affairs, Center for International Cooperation (MASHAV), World Meteorological organisation (WMO) and Israeli Meteorological Service (IMS)
27. RAF/8/034-Isotope Hydrology Integration in the Water Sector: National Training Workshop. 6<sup>th</sup>-10<sup>th</sup> May, 2002, Hotel Kunste Nakuru. Organised by National Council for Science and Technology (NCST) and Ministry of Environment and Natural Resources, Water Development Department.

#### TRAINING COURSES AND WORKSHOPS ORGANIZED OR FACILITATED

1. Introduction to GIS. A short course offered to Ministry of Energy Senior Staff, JKUAT, Kenya. July-Aug 2010.
2. Building Ecosystem Services Capacity for Semi-Arid Africa. Organized by ICRAF, Macaulay Landuse Research Institute, 24<sup>th</sup> March 2009 to 4<sup>th</sup> April 2009, ICRAF and Embu, Kenya.
3. DAAD Alumni Summer School 2008. Integrated Watershed Management – Financial Aspects of Watershed Management. 14<sup>th</sup> – 25<sup>th</sup> September, 2009, Moshi, Tanzania.
4. DAAD Alumni Summer School 2008. Topics of Integrated Watershed Management – Water Demand in Participatory Watershed Management. 17<sup>th</sup> – 28<sup>th</sup> November, 2008, Meru, Kenya.
1. Watershed Modeling using SWAT. Organized by BEED, JKUAT, 28<sup>th</sup> July to 1<sup>st</sup> August 2008, JKUAT.
2. Geo-informatics for environmental modelling. JKUAT, 6<sup>th</sup> –10<sup>th</sup> February 2006. (coordinator of Workshop). Jointly held between JKUAT and University of Bonn, Germany, Geography Department, Remote Sensing Research Group.
3. DAAD Alumni Expert Seminar 2007 on “Topics on Integrated Watershed Management”. Bagamoyo, Tanzania, 4<sup>th</sup> -11<sup>th</sup> November 2007. Organised by University of Siegen/ Kenyatta University/ University of Dar-es-Salaam.
4. DAAD Alumni Summer School 2007. Topics of integrated Watershed Management: Participatory Monitoring of Watershed Management Plan for Bwathonaro Watershed in Meru, 5-18 August 2007. Organised by University of Siegen/ Kenyatta University.
5. DAAD Alumni Summer School 2006. Topics of Integrated Watershed Management: Development of Participatory Watershed Management Plan for Bwathonaro Watershed in Meru, 17-29 July 2006. Organised by University of Siegen/ Kenyatta University.

#### MEMBERSHIP PROFESSIONAL SOCIETIES

Kenya Society of Agricultural Engineers (KSAE)	- Associate Member
Institution of Engineers of Kenya (IEK)	- Graduate Member
Kenya Engineers Registration Board	- Graduate Member)
Hydrological Association of Kenya (HAK)	- Fellow
International Association of Hydrological Sciences (IAHS)	- Member

#### MEMBERSHIP PROFESSIONAL NETWORKS

German Water Alumni Network GAWN  
 WaterNet  
 UNEDRA – University Network for Disaster risk Reduction in Africa  
 KDSA – Kenya DAAD Scholars Association

#### TEACHING / TRAINING EXPERIENCE

- ✓ Hydrology, Watershed management, Agro-meteorology, GIS & Remote Sensing, Irrigation and Drainage, Computer modelling and simulation to MSc & BSc students
- ✓ Resource person in AICAD sponsored Training Course on Irrigation and Water resources Management 2004
- ✓ Resource person DAAD Alumni Summer School. Series on “Topics of integrated Watershed Management”: 2006-2008.
- ✓ Facilitator Building Ecosystem Services Capacity for Semi-Arid Africa (BESSA) project –April 2009
- ✓ Coordinator/ Trainer Workshop on Geo-informatics for environmental modelling. 6<sup>th</sup> –10<sup>th</sup> February 2006. JKUAT.
- ✓ Water Resources Management Authority: Facilitator for Water Resources Information Management Systems.

COMPLETED MSC STUDENT PROJECTS SUPERVISED SINCE 2004:

1. 2004: Evaluation of USGS Streamflow Model for flood simulation (Nyando basin case study) F. M. Muthusi. JKUAT.
2. 2005: Modelling the Impacts of Changes in Land Use, Climate and Reservoir Storage on Flooding in the Nyando Basin. J. K. Sang, JKUAT.
3. 2006: Hydrologic Modelling as a Tool for Water Resources Planning in ASAL Hillside Watersheds: Kaiti Watershed Case Study by A. Nderitu, JKUAT.
4. 2007: Estimation of streamflows in ungauged catchments of the upper Tana Basin Kenya by J. K. Mwangi, Kenyatta University.
5. 2007: Integrated Water Resources Management for crop production and domestic water supply in Kaiti Watershed, Eastern Kenya. S. K. Ng'ang'a, MSc, JKUAT.
6. 2007: Assessing the spread of *Prosopis juliflora* in Marigat Division, Kenya using Geographical Information System and Satellite Remote Sensing. Muuo., M.K., MSc, JKUAT.
7. 2007: Use of WEAP model for integrated water management in Nyando Basin Kenya. R. N. Dienya, MSc, JKUAT.
8. 2007: Modelling the influence of land use change on water and sediment yield in Thika River Catchment using SWAT Model. F. K. Kigira, MSc. JKUAT
9. 2009: Hydrologic analysis of Lake Naivasha-Malewa watershed as a basis for implementing PES. Ogweno, L.P., MSc, JKUAT
10. 2009: Comparison of spatial rainfall interpolation techniques: Case study Nyando basin, Kenya. Mutua, F. N., MSc project, JKUAT.
11. 2009: Using GIS Techniques to determine RUSLE's R and LS factors for Kapingazi River Catchment. MSc Project Mbugua, Esther, GEGIS Department, JKUAT.
12. 2009: Application of GIS and Remote Sensing in the estimation of RUSLE's K, C and P factors for Kapingazi Catchment Soil Erosion Assessment. Mokuia F. Ogoro, MSc Project Report, GEGIS department, JKUAT.
13. 2009 Assessment of suspended sediment loadings and their impact on environmental flows of upper transboundary Mara river, Kiragu, G. M., MSc thesis, JKUAT.
14. 2010 Assessing the influence of catchment characteristics on the cost of water treatment using GIS and Remote Sensing. MSc project Report by Viola Kirui, JKUAT, supervised by E. H. Waitthaka and J. M. Gathenya.

ONGOING PHD STUDENT RESEARCH PROJECTS:

1. 2005-Present: Application of GIS and Remote Sensing for Management of Floods in the Lake Victoria Basin. Gaya, C. O., PhD Student, GEGIS, JKUAT.
2. 2008 – Present: Assessment of land use and its impact on soil erosion and water quality as a basis for developing PES: Case study of Sasumua Watershed, Kenya. Mwangi, J.K., PhD Student, Kenyatta University. ]
3. 2009 to present Evaluation of water use, institutional and environmental aspects of public irrigation schemes: the case of Mwea Irrigation Scheme. Kamundia, S M.

ONGOING MSC STUDENT RESEARCH PROJECTS:

1. Modelling water quality status of Ngong River, Nairobi. P. K. Kinyari, MSc student, JKUAT
2. Participatory mapping of biophysical changes in Bwathonaro Catchment and assessment of impacts on water resources. Ng'eera, C., MSc Student, JKUAT
3. Technical, economic and environmental assessment of smallholder irrigation systems. Kangau, S. N., MSc Student, JKUAT.
4. Assessment of groundwater quality in Nairobi city, Kenya. Muraguri, P.M., MSc student, IEET, JKUAT.
5. Assessment of runoff harvesting potential for irrigation at Kabiruini Catchment Nyeri. MSc research, George Karara, JKUAT.
6. Evaluation of the impact of conservation practices on ecosystem services in Sasumua watershed, Kenya using SWAT model. MSc Research by Hosea Mwangi, JKUAT
7. Drivers of land use change, impact on watershed functions and responses. Kapingazi catchment case study. MSc research by W. Gathinji, JKUAT. Supervised by J. M. Gathenya and D. M. Mburu.

FUNDED RESEARCH PROJECTS

July 2009 – June 2011 Low Cost Water Drilling Rig. This is a collaborative project between JKUAT and Penn State University in USA funded by NCIIA. The PI is Dr. Tom Colledge and I am the co-leader at JKUAT.

July 2008 –March 2009. Scoping study on potential for a PES scheme for the Sasumua Catchment.

- Kenya Agricultural Productivity and Sustainable Land Management Project (KAPSLM Project funded by World Bank, in collaboration with ICRAF, Nairobi City Council Water and Sewerage Services Company, KARI, NEMA.
- Total funding USD 102,000 shared between ICRAF, JKUAT and other partners.
- As Leader of Hydrology and Water quality Analysis Module,
  - Completed initial water balance modelling using SWAT model
  - Identified sources and types of pollution reaching Sasumua reservoir
  - Participated in stakeholder Workshop to disseminate findings.
  - Offered support to one PhD student
- Will support the newly formed WRUA to develop a Subcatchment Management Plan together with WRMA and other project researchers.

March 2009 - Dec 2009: Building Ecosystem Services Capacity for Semi-Arid Africa (BESSA). In collaboration with Macaulay Land Use Research Institute, Scotland, and ICRAF

- As Co-researcher in the project, I
  - Facilitated the Training Workshop held at ICRAF and Embu
  - Offered training opportunities to 3 JKUAT staff members
  - Initiated useful contacts between JKUAT and Macaulay Land Use Research Institute, Scotland and University of Aberdeen, UK.
  - Will lead to development of a MSc programme to be offered at JKUAT
  - Possibilities of BESSA Project to be scaled up after completing a further proposal.

2008-2010: Assessing basin scale potential impact of conservation agriculture in the Mara River Basin. IFS funded research, USD 11,100.

- Project ongoing.
- Finished data collection and modelling going on.
- Supported one BSc student in final year project.

2008-2009: Managing uncertainty: Innovation systems for coping with climate variability and change. Project funded by ICRISAT. (USD 8,000).

- Project involves watershed modelling and building in climate change scenarios to investigate how stream flow and sediment yield in Nyando basin will evolve under climate change.
- It introduces the element of risk to conventional deterministic data presentation.
- It is a proof-of-concept project designed to show what is possible and can be repeated in other areas.
- Watershed modelling is complete, scenario building and data analysis is going on.
- Project expected to generate two journal papers and build capacity in statistics and modelling.
- Supported 3 JKUAT staff and 1 MSc student to participate in a 14-wk eCourse on Statistics in Agricultural Climatology offered by University of Reading, UK.
- Supported training on 4 JKUAT staff watershed modelling using SWAT model
- Supported and supervised one JKUAT MSc student who has completed.

2006-2008: Development of alternative irrigation technologies for higher water, labour and nutrient efficiency in water scarce areas of Kenya. Project funded by Commission for Higher Education, Started October 2006, Ksh. 3,000,000 – Principal Investigator.

- Characterized smallholder pumped irrigation systems in Kenya and wrote a paper on findings.
- Identified technical and socioeconomic factors influencing profitability of smallholder irrigation
- Now developing training materials for use by extension agents
- Trained 120 farmers in Matuu, Taveta, Garissa, Lodwar and Laikipia West on gross-margin analysis, irrigation water management, marketing, crop protection, and maintenance of irrigation systems.

June 2006- August 2007: Payment for Watershed Services: feasibility study for Naivasha – Malewa catchment.

- Project Funded by WWF at KSh. 600,000 – As Principal Investigator.
  - Highlighted pertinent water management issues in the basin
  - Assessed impact of different land management practices on the quantity and quality of water flowing into Lake Naivasha
  - Recommended target subcatchments where Payment for Ecosystem Services (PES) Scheme could be implemented on pilot basis

- Recommended land use and land management options that could improve water quality to Lake Naivasha
- Supervised and supported the research project of one MSc student
- Currently contracts between Upstream WRUA and downstream beneficiaries are being drawn with support from CARE/WWF and WRMA.

April 2003- March 2006: Integrated Water Resources Management for Makueni District, funded by African Institute for Capacity Development (AICAD), Co-researcher, USD 10,000. As co-researcher in the project, I

- Co-supervised 2 JKUAT MSc students who were supported by the project
- Participated in training and dissemination of research findings in a workshop attended by 30 stakeholders
- Participated in awareness creation demonstration of water harvesting and drip irrigation.
- Now a dam and reservoir to supply community with water being constructed at our study site

#### INNOVATIONS

- Low cost water drilling rig (in collaboration with Penn State University, USA)
- Developed a honey extractor – exhibited in ASK shows.
- Development of a low capacity petrol powered pump
- Development of a low cost water drilling rig

#### EQUIPMENT AND SOFTWARE BOUGHT FROM FUNDS RAISED

- 2005: Equipment worth 2.2 Million obtained through proposals written to DAAD and World University Service. These include two Etrex Garmin Hand-held GPSs, HP Laser Printer, Software (ERDAS Imagine and ArcGIS), four laptops, 1 Server, HPDesignJet 24 in Plotter, A2 Digitiser. All these are currently in use in the department.
- 2006: Equipment worth KSh. 150,000 bought from CHE research funds. These include HP Laptop and two Etrex Garmin GPSs.
- Equipment worth KSh 90,000.00 for bringing the departmental Flame Photometer to working condition. These include Compressor, Cylinder, Butane Gas and Servicing of photometer.

#### CONSULTANCY PROJECTS:

- 2010 Hydrology Assessment for EPWS project, Mara River Catchment in Kenya, Awarded by WWF-ESARPO
- 2010 Hydrology Assessment for EPWS project, Sigi River Catchment , East Usambara Mountains, Tanzania, Awarded by WWF, Tanzania
- 2009: Monitoring of EPWS Project, Mfizigo River Catchment, Uluguru Mountains Tanzania. Awarded by CARE Tanzania
- 2009 Monitoring PES Project implementation Lake Naivasha Malewa catchment, Awarded by WWF EARPO
- 2007-2008: Short term technical assistance, MIKE BASIN/TAE Water Resources Information Management Systems, Water Resources Management Authority, Kenya in Charge of Tana and Athi basins, October 2008
  - As a consultant, I offer technical support to WRMA staff during scheduled training sessions, assistance in data management during the process roll out of MIKE BASIN /TAE platform. This platform will contain all national river flow data and will be linked to the permit database so that planning of water allocation can be done based on a better information base. It calls for knowledge of hydrology, watershed modelling, SQL Server and GIS.
- 2007-2008: Hydrological Assessment of Sasumua watershed. ICRAF, NEMA, KAPP, NAWASCO
- 2007: Feasibility Assessment for Naivasha - Malewa Payment for Watershed Environmental Services: Hydrological Assessment Component. Contract awarded by WWF, Kenya. Completed August 2007
  - The findings of this study guided the implementation of the first Payment for Environmental Services (PES) scheme in Kenya. This has now become a show case for other watersheds. It is currently being implemented by CARE/WWF and WRMA in Naivasha watershed.
- 2006: Development of roof rainwater harvesting tank sizing nomographs for Kenya. Contract awarded by RELMA in ICRAF completed June 2006.
  - I prepared a nomograph of 50 Kenyan towns that can be used as a decision support tool for sizing of water harvesting tanks. It needs easily available data such as roof size and average water consumption rates.
- 2007: Baseline Survey of Sagana Irrigation Project, given by ISCOM, Kenya

#### EXTERNAL EXAMINATION AND JOURNAL PAPER REVIEWS, RESEARCH PROJECTS ASSESSMENT:

- June 2007: Testing and Evaluation of the Agricultural Non-Point Source Pollution Model (AGNPS) on Malewa Catchment of Lake Naivasha Drainage Basin, Kenya. MSc Thesis, Egerton University by R. A. Onyango.
- Apr 2008: Evaluation of capillary wicks for use in irrigation for intensive horticultural crop production in Kenya, Research Project submitted to RPE, JKUAT.
- Aug 2008: Analysis of Catchment response under changing land use: The case of upper Molo River Catchment, Kenya. Kirui, W. K.
- Aug 2008: Determination of spatially distributed event-based runoff, sediment yield and erosion within river catchments: A case study of Upper Njoro River Catchment, Kenya. MSc Thesis, Egerton University.
- May 2008: Development of an electronic based system for water quality control. Ngumbi, P. K. MSc student, Dept of Physics, JKUAT.
- Nov 2007: Comparative performance of water use of Eucalyptus Grandis, Eucalyptus Hybrids, Grevillea Robusta and Cordia Africana. Kuya, S. MSc Thesis, Botany Dept, JKUAT.
- Nov 2008: Use of washed quarry dust in the treatment of industrial effluents: Case study of electroplating industry. Mungania, K. J., MSc student, JKUAT, Civil Eng. Dept.
- May 2007: Evaluation of evaporation loss in a saturated sand media: Case of effects of albedo and sand media stratification. Mutungi, K., MSc, Civil Engineering, JKUAT.
- June 2006: Analysis of Soil Erosion, Infiltration and Runoff in Different Land Uses in Upper River Njoro Watershed in Kenya. MSc Thesis by Malachi Omondi Okelo, Egerton University
- May 2006: Estimation of direct runoff and sediment yield in upper River Njoro Catchment. MSc Thesis by Otieno, H., Egerton University.
- June 2006: Application of remote sensing and GIS techniques to evaluate impact of land use and land cover change on stream flows: the case of Njoro River catchment in Eastern Mau, Kenya. PhD Thesis by P. M. Kundu, Egerton University

#### RESPONSIBILITIES AT JKUAT:

- June 2006- July 2010: Head of Biomechanical and Environmental Engineering Department (BEED). The department has 30 staff members comprising of academic staff, technicians and support staff. It runs two 5-year BSc programs with 250 students, three MSc programs with approximately 20 students in various stages and 5 PhD students. During my tenure, the department underwent several transformations including transfer from to Faculty of Engineering, introduction of staff performance appraisal and implementation of service charter and ISO 9001:2008 standards.
- Dec 2005 – July 2010: Coordinator International Association for Exchange of Students for Technical Experience (IAESTE) JKUAT. This is a programme that arranges for student attachment at universities and industries abroad and vice-versa, attachment of foreign students in Kenya industrial and University sector. On average 20 students were attached per year.
- 2006-2010: Member of JKUAT Annual Conference Organizing Committee
- 2008-2009: Member of 6th Global Consortium of Higher Education and Research for Agriculture (GCHERA) organizing committee, in charge of logistics.
- 2001-2005: Coordinator, Departmental Teaching Time-table
- Oct 2005 – Mar 2009: JKUAT Students Christian Union Patron
- 2005: Member, University's eLearning Committee

#### RESEARCH INTERESTS

1. Predicting impacts of land use and climate change on agricultural and environmental systems using computer models.
2. Integrated Watershed Management
3. Remote Sensing and GIS Applications in Environmental modelling
4. Payments / Rewards for Ecosystem Services



OTHER RESPONSIBILITIES OUTSIDE UNIVERSITY

- 2005-2009 Church Elder and Youth Patron, Christian Church International, Joy Christian Church Juja.

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