

MACTION KATUNDU KOMWA, Ph.D.

CONTACT INFORMATION

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AREAS OF SPECILIZATION

- Primary research areas
 - Conservation GIS and Planning
 - Geographic Information Systems
 - Remote Sensing and GIS for Sustainable Food Security
 - Sustainable Development
 - Spatial Epidemiology and Infectious Diseases
 - Global Environmental Change
 - *Area Specializations* – Uganda, Kenya, Ethiopia, Malawi, and United States
- University Administration including:
 - Online Education
 - Student Mentoring and Supervision
 - Collaboration and Research
- Extensive teaching experience at both the undergraduate and graduate university levels

EDUCATION

Ph.D., Environmental Science and Policy

George Mason University (Fairfax, Virginia, USA), August 2011

Graduate Certificate, Epidemiology

George Mason University (Fairfax, Virginia, USA), May 2008

M.Sc. Geographic Information Science for Development and Environment

Clark University (Worcester, Massachusetts, USA), February 2003

Diploma, Computer Studies (an NCC-UK accredited program)

National College of Information Technology (Blantyre, Malawi), May 1998.

Certificate in Agriculture

Natural Resources College (Lilongwe, Malawi), July 1988.

Academic Appointments and Teaching Experience

George Mason University (2018 – Present), Fairfax, Virginia – Assistant Professor

Responsible for teaching undergraduate and graduate students in the department of Geography and Geoinformation Science.

George Mason University (2011 – 2018) –Adjunct Professor: Responsible for teaching undergraduate and graduate students in the departments of Geography and Geoinformation Science and Global Community Health.

A list of the graduate courses taught include:

- Sustainable Development; Global Food Security, Society and Environment; Perspectives on Food Security; and Global Non-Communicable Diseases.

A list of undergraduate courses taught include:

- Introduction to Geographic Information Systems; Physical Geography; Geography of Natural Resources; Population Geography; World Regional Geography; Sustainable Development; Environmental Policy Making in Developing Countries; Nutrition for Health Professionals; International Health Policy and Practices; and Global Health Interventions: Emerging Issues.

Georgetown University (Fall 2014, 2015, 2016 & 2017) – Adjunct Professor

Environment in Africa: This course helps students to explore human and natural environmental interaction in Africa. Students gain further knowledge about the application of Geographic Information Systems for environmental management and conservation planning in Africa.

STUDENT ADVISING AND MENTORSHIP

- Dissertation Committee Member for graduate students.

Faculty Advisor for WYSE: Washington Youth Summit on the Environment (WYSE)

- Faculty Advisor to the rising high school juniors and seniors for an experiential and intensive conference focusing on leadership and environmental science and conservation. This has been an on-going summer program since 2010 and the program is facilitated by George Mason University | Smithsonian-Mason School of Conservation in collaboration with the National Geographic Society and the Smithsonian National Zoo. WYSE brings 250 delegates, which are selected from all the 50 states based on their GPA.

Advisory Role

- ***The National Science Foundation (NSF) - 2014 – 2017***
 - Evaluating scientific proposals with the Directorate for Social, Behavioral & Economic Sciences and recommended proposals to be awarded funding.
 - Providing constructive comments to researchers to strengthen their research projects.
- ***Advisory Board Member and Nutrition Faculty - 2016 – 2017***
 - Serving as Advisory Committee Member to review proposed Bachelor of Science program in Nutrition. The programs include an MS in Nutrition, an undergraduate minor and certificate, a graduate certificate in Public Health Nutrition and graduate certificate in Food Security.

Research & Teaching-Related Activities and Awards Recognition

Provost Multidisciplinary Research Initiatives - 2016 -2017 Award

- Co-PI: On-going multidisciplinary research on Indigenous food security and nutrition in rural Kenya.
- CIMMYT/Borlaug foundation LEAP fellowship through the mentorship of Dr. Dawn Parker and Dr. Todd Benson. “Exploring Cropping Choices and Their Impact on Land use in Uganda: Integrating Household Survey and GIS Data into a Simulation Model.
- Collaborative Research Agreement “Agent-based modeling of sustainable resource use (Uganda),” with T. Berger, P. Schreinemachers, and M.K. Komwa.
- Collaborator/Consultant, International Food Policy Research Institute “Uganda Strategic Criteria for Rural Investments in Productivity: Spatial analysis of production systems,” with M.K. Komwa, S. Wood, and T. Benson.

Curriculum Development, Department of Nutrition & Food Studies – George Mason University, 2011:

- Provided leadership in developing a novel curriculum regarding perspectives on relevant concepts related to food and nutrition security, which has become a vital part of the Graduate Certificate program.

Awards and Recognition

- Nominated for 2018 Mason Teaching Excellence Award
- ***GMU Provost's Excellence in Teaching Award:*** recognized for high-quality teaching in general education courses, 2007 & 2016.
- ***Borlaug Leadership Enhancement in Agriculture Program (LEAP) Fellowship:*** Feed the Future/US Davis & International Food Policy Research Institute (IFPRI), 2006--2007. Funding support for doctoral research in Uganda.
- ***Robert Bosch Foundation Award:*** Funding for qualitative doctoral research in Uganda, 2006.

Publications

- Gewa, C.A; Onyango, A.C; Angano, F.O., Stabile, B, **Komwa, M.K**; Thomas, P; Krall, J. 2019. Mothers' beliefs about indigenous and traditional food affordability, availability and taste are significant predictors of indigenous and traditional food consumption among mothers and young children in rural Kenya. *Public Health Nutrition* pp 1-12.
- Durairaj, A.E, Gewa, C., **Komwa, M.K.**, and Pawloski, L. 2017. "Our Turn to Eat:" Shifting Gender Norms and Food Security in the Wakiso District of Uganda. Manuscript accepted for Publications, - *Journal of Hunger & Environmental Nutrition*, DOI: 10.1080/19320248.2017.1403407.
- Tadesse, H.K., Qu, J.J., Aguire, A.A., **Komwa, M.K.**, & Maggioni, V. 2017. Land Use Classification and Analysis Using Radar Data Mining in Ethiopia. *International Journal of Advanced Remote Sensing and GIS*, 6(1) 2006-2022.
- Chillimba A.D.C., Shano B., Chigowo M.T., and **Komwa M.K.** (2014). Quality assessment of compost manure produced by smallholder farmers in Malawi. In: Kabambe V, Tembo Y and Ngwira A, eds. Proceedings of the first Integrated Soil Fertility Management Symposium, Lilongwe University of Agriculture and Natural Resources, Bunda Campus, Lilongwe, Malawi. *SoHCoM Publication* (09), pp. 142.
- Howard, A.L., **Komwa, M.K.**, Yohane, R., and Jacobsen, K.H. 2011. Household Market Participation and Stunting in Preschool Children in Lilongwe, Malawi. 2011. *South African Journal of Clinical Nutrition*, 24(4),202-204.
- **Komwa, M.K.**, Jacobsen, K.H., and Parker, D.C. 2010. HIV/AIDS-Associated Dietary and Work Beliefs and Practices in the Mayuge District of south-eastern Uganda. *Journal of Population, Health & Nutrition*, 28(1), 76-85.
- Parker, D.C., Jacobsen, K.H., and **Komwa, M.K.** 2009. A Qualitative Study of the Impact of HIV/AIDS on Agricultural Households in south-eastern Uganda. *International Journal of Environmental Research & Public Health*, 6(8),2113-2138.
- **Komwa, M.K.**, 2008. The Effects of HIV/AIDS on Household Agricultural Land Productivity in Southeastern Uganda. *Research Brief W06-08-01-LEAP*.
- Parker, D.C., and **Komwa, M.K.** 2007. The Interface Between HIV/AIDS Status, Household Nutrition, Agricultural Production & Household Welfare in Uganda. *Global Studies Review*, 3(3).

Other Publications

- Chilimba A.D.C, Shano B., Chigowo M.T. and **Komwa M.K.** 2013. Use of Manure: A compliment to inorganic fertilizers in increasing crop production. Soil Health Consortium of Malawi. A technical bulletin for ISFM disseminators. Lilongwe University of Agriculture and Natural Resources, Bunda Campus, Lilongwe, Malawi.
- Parker, D.C., and **Komwa, M.K.** 2007. The interface between HIV/AIDS status, household nutrition, agricultural production, and household welfare in Uganda. *Global Studies Review* 3(3), 14-16.
- Chilimba, A.D.C., and **Komwa, M.K.** 2003. Soil Fertility Status in Lilongwe Agriculture Development Division. Final report for the Promotions of Soil and Water Conservation and Rural Production (PROSCARP). Soil fertility network and Malawi Government. Lilongwe, Malawi: Department of Agricultural Research.
- Gilbert, R.A., **Komwa, M.K.**, Benson, T.D., and Sakala, E.D. 2002. A Comparison of Best Bet Soil Fertility Technologies for Maize Grown by Malawian Smallholders. A research report on the nationwide on-farm cropping system verification trial by Action Group 1. *Maize Productivity Task Force*. Lilongwe, Malawi: Malawi Department of Agriculture and Irrigation.
- Benson, T., Nambuzi, S., and **Komwa, M.K.** 1998. Assessing the agro-ecological suitability of combined organic and inorganic soil fertility technologies in Malawi using crop simulation model. *Annual Report*. Lilongwe, Malawi: Malawi Department of Agricultural Research.

CONFERENCE ATTENDED & RESEARCH PRESENTATIONS

- Innovations in Teaching and Learning. George Mason University. Sept 14, 2018.
- The World Food Prize Conference - 2017 Borlaug Dialogue. Des Moines. October 18- 20, 2017.
- 12th Annual CTEC Symposium: New Approaches to Conservation Conflicts. 2017. Center for Tropical Ecology and Conservation (CTEC) Symposium - Round Table Facilitator. Antioch University New England, Keene, NH.
- Food Security, Household Caloric Availability, and HIV status in Mayuge District, Uganda. Paper presented at the Association of American Geographers, San Francisco, on March 30, 2016. The same paper was presented at a Summit on Global Food Security and Health. School of Policy, Government and International Affairs George Mason University, Arlington Campus - Founders Hall 113. October 16, 2014.
- TOPS Designing for Behavior Change (DBC) Workshop for Program Backstops and Consultants. March 12-17, 2012 in Silver Spring, MD.
- Cost-effectiveness approaches in the control of mosquitoes in developing countries. A case study for public health protection in Uganda. Promoting Community IPM for Preventing Tick-Borne Diseases Conference. Arlington, Virginia. March 30-31, 2011.
- Combining Quantitative and Qualitative Information to Parameterize a MAS Model of HIV-affected Agricultural Households in Uganda. Poster presented at the 2nd World Congress in Social Simulation, Fairfax, VA. July 14-17, 2008.
- Effects of mortality from HIV/AIDS on household agricultural land productivity in south-eastern Uganda. Presented at the American Association of Geographers Annual Meeting, San Francisco, CA. April 18-21, 2007.
- The effects of HIV/AIDS on cropping decisions and their impact on land use and environment in Uganda: Integrating household survey and GIS data into an agent simulation model. American Association of Geographers Annual Meeting, Chicago, IL Mar. 7-11, 2006.
- Exploring cropping choices and their impact on land use in Uganda: Integrating household survey

and GIS data into an agent simulation model. 6th Open Meeting of the IHDP, Bonn, Germany, Oct. 9-13, 2005.

- Utilizing non-spectral and ancillary information to enhance image classification of southeastern Malawi. Poster presented at the American Association of Geographers Annual Meeting, Philadelphia, PA. March 14-19, 2004.

PROFESSIONAL MEMBERSHIPS

- Association of American Geographers(AAG)

PEER REVIEW SERVICE

- **Proposal reviewer:**
 - National Science Foundation
- **Journal manuscript reviewer:**
 - American Journal of Experimental Agriculture
 - British Journal of Applied Science & Technology
 - Gender in Research and Development (IGERD)
 - Journal of Geographic Information System (JGIS)
 - McGraw-Hill Education, Price Mastering ArcGIS, 6th Edition
 - Public Health Nutrition
 - World Medical & Health Policy

PROFESSIONAL AND WORK EXPERIENCE

Adventist Development & Relief Agency (ADRA) International (December 2013 – April 2014)

The overall objective of ADRA International team on USAID's Title II Development Food Assistance Programs was to provide technical support with developing partnerships, establishing strategic relationships, and analyzing the agricultural commodity value chain. My specific responsibilities as a Technical Consultant on this project are outlined below:

- Collected data remotely and in-country to inform proposal design and writing process for USAID Title II proposal.
- Coordinated and conducted workshop for ADRA International on how to approach request for applications (RFA) for Title II Development Food Assistance Programs in Malawi.
 - The workshop involved developing problem tree analysis and Indicator Performance Tracking Table (IPTT) that helped in the Title II proposal writing for Malawi.
- Conducted agri-food systems analysis with a focus on transforming traditional food production to practices with greater co-ordination across farmers, processors, retailers, and other stakeholders in the value chain system of different commodities (maize, groundnut, rice, pigeon peas, livestock, and dairy).
- Provided technical support to identify limits of data interpretation or available data/information and work with ADRA/Malawi and ADRA/International to fill gaps.
- Developed programs and effective models that created an enabling environment adapted to Malawi context regarding agriculture and natural resources management, risk management and climate change adaptation.
- Coordinated with partners to ensure the integration of their input into proposal sections.

Researcher, International Food Policy Research Institute (Summer 2013)

Productivity-Nutrition Model for the G8 New Alliance Technology Innovation Platform Project.

In an effort to reduce yield gaps in selected farming systems in Africa, the Technology Innovation

Platform of the G8 countries, under the New Alliance for Food Security and Nutrition, established a technical group to develop a productivity-nutrition model for three pilot countries – Tanzania, Ghana and Ethiopia. I was very instrumental in this project and below were my specific professional responsibilities:

- Compiled, managed, and analyzed comprehensive data that captured the performance of farming and food systems, the research activities around them, which were needed for validating the 10-year yield targets.
- Developed priorities to which the food systems contribute according to the national investment plans of the three selected pilot study countries.
- Generated information to help guide strategic investments in food & nutrition aimed at improving the livelihood of poor communities in Sub-Saharan Africa.
- Prepared communiqués that described how the analytical platforms developed could be replicated to other countries in sub-Saharan Africa.

Researcher, International Food Policy Research Institute (Summer 2012)

Instrumental in the Comprehensive Africa Agriculture Development Program (CAADP)-CGIAR Alignment Knowledge Base Project.

The Alignment Knowledge Base Project sought to evaluate how CGIAR's priorities were aligned with CAADP's priorities and to identify research areas that were over- or under-represented relative to national priorities under CAADP.

- Assembled spatially-referenced data on population density, poverty, rainfall, crop harvested areas, and market location for a specified watershed or agroecological zone within sub-Saharan Africa.
- Presented the assembled data into the CAADP-CGIAR Knowledge Base prototype for management and online technical tool designing and integration.
- Analyzed the spatial distribution patterns of farming and rural household characteristics with joint reference to CGIAR's research priorities and CAADP's priorities for agricultural and rural development across sub-Saharan Africa.

Development of the AgKnowledge Mapper

- Provided technical support in the development of web-based user interface technical tool - the AgKnowledge Mapper [<http://apps.harvestchoice.org/mappr/>] launched under the HarvestChoice initiative, an IFPRI research initiative that generates spatial knowledge products to help guide strategic decisions to improve the well-being of the poor in sub-Saharan Africa.
 - This digital application allows users to visualize or combine indicators from multiple spatial layers to produce customized knowledge products, including on market accessibility, demographic indicators, and agroecological zones.

Researcher, International Finance Corporation (IFC), World Bank, 2010

Provided technical support by working on poverty mapping at the national scale for developing countries using acceptable methodological approaches and gain access to underlying household data or to existing sub-national poverty results. Specifics of this project include:

- Gathered comprehensive spatial data for estimating poverty level in small geographical areas of the corresponding IFC investment locations in selected low and middle-income countries such as Kenya, Indonesia, and Brazil.
- Conducted a research project that helped design and develop an innovative poverty grading tool, which allowed the poorest people within a community to be identified more accurately and targeted by IFC investment projects and advisory services.
- Provided critical technical capacity that helped IFC better understand how its interventions can be used more effectively to deliver its mission to support development that will allow countries use

integrated private sector solutions to help people escape poverty and improve their lives.

- Evaluated the economic growth, including investments in projects designed to improve agricultural production and food security, supported by IFC funding and providing recommendations for improving how investments are made.
- Provided technical support in the IFC final report, which was very well received and was recognized for an IFC team award in 2014.

Researcher, International Food Policy Research Institute (Summer 2009)

Provided technical support in analyzing Moderate Resolution Imaging Spectroradiometer (MODIS) data products from 2000 – 2008 to generate regional and global maps. Specific duties aligned to this project were:

- Prepared and geo-processed MODIS data products and generated regional and global GIS layers on NDVI, temperature, Leaf Area Index and Gross Primary Production for mapping/visualization and statistical analysis.
- Analyzed MODIS data to create Normalized Difference Vegetation Index (NDVI) for a selected area in Eastern Africa. The aim of the analysis is to estimate spatial and temporal comparisons of vegetation conditions and land surface temperature, which aim at helping policy makers in decision-making regarding agricultural drought monitoring and crop water stress etc.

Researcher, International Food Policy Research Institute (Summer 2008)

- Assembled geospatial demographic and market data for sub-Saharan Africa.
- Prepared GIS and tabular datasets for human settlements, road infrastructure, market accessibility and regional trade corridor for Sub-Saharan Africa.
- Created metadata and uploaded to HarvestChoice Geonetwork Spatial Portal in preparedness for developing mapping tool.

Intern, International Food Policy Research Institute (Summer 2004 and 2005)

- Provided technical support in spatial analysis on production systems under the Strategic Criteria for Rural Investments in Productivity (SCRIP) and SPRAG activities.

Graduate Research Assistant Appointments

George Mason University, Fairfax, VA (2007-2011)

- Designed and conducted a cross-sectional survey of 246 households in rural southeastern Uganda to assess the impact of HIV/AIDS on household food availability.
- Designed and conducted a qualitative study of the impact of HIV/AIDS on household agricultural productivity using in-depth, semi-structured interviews with key informants.
- Conducted statistical analysis of the resulting datasets.

George Mason University, Fairfax, VA (2003 -2006)

- Conducted research on agent-based modeling of land inheritance practices in rural Uganda for Dr. Dawn Parker.
- Provided technical assistance on the development of a GIS database and spatial analysis plan for an NSF-funded integrated model of timber harvest and carbon sequestration in eastern deciduous forests and an NSF-funded analysis of residential land markets in northern Virginia.

Clark University, Worcester, MA - (2002-2003)

- Provided technical support at Clark Labs for the research and development of geospatial technologies for effective and responsible decision-making for environmental management, sustainable resource development, and resource allocation.

University of Florida, Gainesville, FL (Summer 2002)

- Conducted spatial data analysis on Malawian maize-based cropping technologies research

funded by Rockefeller Foundation.

Other Research Experience

Information Systems Supervisor, Malawi Ministry of Agriculture Headquarters (2001)

- Supervised data preparation clerks in the collection of personnel information and the processing of the Payroll Pension Personnel and Integrated System (PPPIS) under the Ministry of Agriculture and Food Security (“secondment agreement”).

Assistant Geographer, Malawi Department of Agricultural Research (1997-2000)

- Performed geographical analysis of soil fertility, cropping patterns, and the adoption of new research technologies by small-scale farmers in Malawi.
- Conducted crop model validation and simulation research.

Research Assistant, Malawi Department of Agricultural Research (1988 -1997)

- Assisted in evaluating and improving nutrient and cultural management practices in upland and irrigated rice varieties for smallholder cultivation in agronomic experiments such as:
 - cropping and farming systems, nitrogen fertilizer requirements, seeding rate, conservation tillage systems, planting and time harvesting methods, crop rotation systems, and herbicides evaluation trials among many others.

COMPUTER, STATISTICAL AND COMMUNICATION SKILLS:

Skilled and experienced in the use of statistical, GIS packages as detailed below:

- GIS software: ArcGIS 10.5, AutoCAD, Terrset/IDRISI, ERDAS Imagine
- GIS hardware: digitizing tablet, scanners, plotters, Trimble Explorer GPS System
- Graphics: Adobe Illustrator, Macromedia Fireworks MX, Corel Photo Paint, Corel Draw, Roxio Media Creator
- Microsoft Office: MS Word, MS Access, MS Excel, MS PowerPoint
- Statistics: STATA, SPSS, SAS, Epi Info, WHO Anthro
- Web page design: Dreamweaver, MS Front Page, Macromedia Fireworks Flush