

Title	Establishing the Impact of Extreme Flooding of Lake Baringo on Livestock and Fisheries Productivity and Livelihoods among the Farming Communities Living around the Lake.
Principal investigator	Dr. Michael M. Gicheru Department of Zoological sciences, School of Pure and Applied Sciences, Kenyatta University. P.O. BOX 43844 00100, Nairobi, Kenya Email: muitaku@gmail.com ; gicheru.michael@ku.ac.ke Tel: Office +254 2 810901; Mobile +254 2 722 609765
Co- Researchers	Dr. Benson M. Mwangi; Dr. Joshua Mutiso; Dr. Daniel Mui; Ms. Lucy G. Kavinda
Purpose	To investigate the impact of extreme flooding of Lake Baringo on livestock & fisheries productivity and livelihoods among the farming communities living around the lake through training two MSc students and 4 undergraduates undertaking research projects
Project summary	It is widely recognized that climate change will have major impacts on livestock farming as well as human health, by increasing weather-related disasters and changing the distribution of water- and vector-borne diseases including livestock – human infections. Excessive flooding in and around Lake Baringo started in November 2011 and by October 2012, it had risen by over 2 meters. The lake level continues to rise unabated, inundating many homesteads, hotels, offices, sewers, pit latrines and other infrastructure. This has negatively affected the portability of the drinking water, aesthetic value and spread of both vector and water borne diseases as well as destruction of farming sites and increased livestock and human diseases. These factors pose great risks to the local communities’ health and food security. The ecological impacts of the extensive Lake’s flooding has been not been studied and there is need to urgently carry out research in this area in order to assess any possible negative or positive ecological impacts that the flooding may have, particularly in regard to livestock and fish productivity, invertebrate species colonization, and water quality. This research project will establish the impact of the Lake Baringo flooding on fisheries and livestock –

	<p>human diseases and effects on the livelihoods of the communities living around the lake with the objective of positive intervention for sustainable livestock and fisheries systems within the value chains that improve smallholder incomes. Data will be collected using questionnaires, direct observations, field measurements and laboratory analysis of samples utilizing molecular, immunological and parasitological and other characterization techniques. Capacity building, community sensitization and education will be highly emphasized as part of measures for improved livelihoods and increased fisheries and livestock productivity.</p>
Country and specific location	Kenya, Lake Baringo area
Participating institutions	Kenyatta University
Starting Date	1 st November 2014
End date	31 st October 2016
Amount of funding	60,197.5.



Michael Muita Gicheru (PhD)



Dr Michael Gicheru is an alumnus of Kenyatta University and University of Nairobi (Kenya) with academic training in Veterinary Medicine, Public Health and Immunology. He received training on tissue culture techniques, immunology of retroviruses and immunology of parasitic diseases in Vanderbilt University, Duke University and University of Pennsylvania in USA respectively. He is currently working as Senior lecturer, Head of immunology program at the Department of Zoological Sciences, Kenyatta University. Dr. Gicheru provides training and mentorship to both graduate and undergraduate students in diverse areas of zoological sciences including animal sciences, public health and immunology among others. He was the Chairman Department of Zoological sciences, Kenyatta University up to 31st March 2015. Prior to joining Kenyatta University, he served as a senior scientist at the Institute of primate research, National Museums of Kenya, where he headed Leishmaniasis research program. He is registered with Kenya Veterinary Board and is a member of Kenya Veterinary Association and Kenya Society for Immunology. He has received several grants a wards as a principal investigator, a few are stated here: PhD training Grant awarded by WHO/ TDR 1998; Training grant for holding an international training workshop on use of non-human primates in biomedical research from WHO/TDR, South to south Collaboration; Improving Food security and Human Health through integration of Livestock, Medicinal plants and water management to combat mosquito vectors in Ahero Rice paddies by Commission of Higher Education, Kenya; Tungiasis as a risk factor for HIV and AIDS in economically disadvantaged communities in Muranga North and characterization of most immunodominant antigen in Tunga penetrans with potential for vaccine development-NACOSTI grant -Kenya and RUFORUM- Establishing the impact of extreme flooding of lake Baringo on livestock & fisheries productivity and livelihoods among the farming communities living around the lake among other grants. Michael has supervised over 50 graduate students for both MSC and PhD in diverse areas of animal sciences, Public health, parasitology and Immunology. He has co-authored over fifty scientific articles in high impact journals. Through these engagement Michael has wide knowledge in research and administration and community out reach

Selected Publications

- Stevenson, P., Jones, K.R., Gicheru, M.M., & Mwangi, E.K. (1995). Comparison of Isometamedium chloride and homidium chloride as prophylactic drugs for trypanosomiasis in cattle at Ngurumani, Kenya. *Acta Tropica*. 59: 77 - 84.
- Gicheru, M.M., Otsyula, M., Spearman, P., Graham, B.S., Miller, C., Robison, H.L., Haigwood, N.L., & Montefiori D.C. (1999). Neutralizing antibody responses in African green monkeys infected with Simian immunodeficiency virus (SIVagm). *J. Med. Primatol* 28: 97-104

- Gicheru, M.M., Olobo, J.O., Anjili, C.O., Orago, S.S., Modabber, F., & Scott, P. (2001). Vervet monkeys Vaccinated with killed *Leishmania major* parasites and interleukin-12 developed a Type 1 immune responses but are not protected against challenge infection. *Infect and Immunity* 69: 245-251
- Masina, S., Gicheru, M., S., Demontz, S., & Fasel, N. (2003). Protection against cutaneous leishmaniasis in out bred vervet monkey with the histone H1 antigen. *J. Infectious Dis.* 188: 1250 -1257
- Eric, M.O., Muok, P., Mwinzi, N.M., Carla, I.B., Nganga, Z.W., Gicheru, M.M., Scor, M.E., Karanja, D.M.S., & Colley, D.G. (2009). Childhood coinfections with *Plasmodium Falciparum* and *Schistosomiasoma mansoni* result in lower percentages of activated T cell and Tregulatory memory cells than Scistosomiasis only. *Am. J. Trop. Med. Hyg.* , 80: 475-478
- Kinuthia, G.K., Kiarie-Makara, M.W., Gicheru, M.M., Kabiru, E., & Dong-Kyu, L. (2010). Relationship between control of parasitic infections and poverty levels. A case study of Njoro, District Kenya. *Kosin Journal of Health Sciences* 12, 77-95
- Mutiso, J.M., Macharia, J.C., Barasa, B., Taracha, E., & Gicheru, M.M. (2011). In vivo and in vitro antileishmanial Efficacy of a combination therapy of diminazine and artesunate against *Leishmania donovani* in BALB/C mice. *Rev. Inst. Med. Trop Sao. Paulo*, 53: 129-132
- Noyes H., Brassa, O., & Gicheru, M.M. (2011). Genetic and expression analysis of cattle identifies candidate genes in pathways responding to trypanosome Congolese infection. *Proceedings of The national academy of sciences, USA*, 108: 9304-9
- Mutiso, J.M., Macharia, J.C., Kioo, M.N., Mucheru, P.M., Nkoba, W.N., Maloba, F.C., & Gicheru, M.M. (2013). *Leishmania* parasites specific CD4⁺ synergizes and correlates positively with CD8⁺ T cells in production of gamma interferon following immunization of vervet monkey (*Chlorocebus aethiops*) model, *Science parasitology*, 14(1): 7-19
- Kiige, S.G., Mutiso, J.M., Laban, L.T., Khayeka-Wandabwa, A.C.O., Ingonga, J., Gicheru, M.M. (2014). F1 cross- breed between susceptible BALB/c and resistant swiss mice infected with *leishmania major* exhibit an intermediate phenotype for lesion sizes and type 1 cytokines but show low level of total IgG antibodies. *Experimental immunology*, 79: 283-291

Previously funded projects

- 1998: WHO/TDR PhD scholarship, USD. 45,000
- 2007: A study on determination of existence, distribution of stromal derived Factor-1 in Kenya population. The grant was awarded by Association of African Universities, HIV/AIDS project. Small grant for students Research Project, Accra- North Ghana. USD 1000.
- 2007: To evaluate the utility of HIV IgA ELISA in diagnosis and assessment of progression of HIV/AIDS in children less than 18 months. The grant was awarded by Association of African Universities, HIV/AIDS project. Small grant for students Research Project, Accra- North Ghana. USD 1000
- 2006: Training grant for holding an international workshop on use of non-human primates in biomedical research from WHO/TDR. USD 30,000

- 2007: Improving Food security and Human Health through integration of Livestock, Medicinal plants and water management to combat mosquito vectors in Ahero Rice paddies. The grant was awarded by Commission of Higher Education: KShs. 3 million.
- 2010: Tungiasis as a risk factor for HIV and AIDS in economically disadvantaged communities in Muranga North and characterization of most immunodominant antigen in Tunga penetrans with potential for vaccine development” National council for science and Technology awarded the grant. KShs. 1.3 million.
- 2011: Improving food security and human health through integration of Livestock, medicinal plants and water management to combat mosquito vectors in Ahero rice paddies. NACOSTI. KShs. 50 million
- 2014: Kenyatta University- Vice Chancellors grant. (KShs. 1.5 million)

