

CURRICULUM VITAE

SURNAME : MUCHEMI
OTHER NAMES : GERALD K.MWANGI
ADDRESS : UNIVERSITY OF NAIROBI
C.A.V.S.
FACULTY OF VET. MED.
DEPT. OF PUBLIC HEALTH
PHARMACOLOGY & TOXICOLOGY
P.O. BOX 29053-00625
NAIROBI.
: TEL: 254-020- 2453621
: MOBILE: 254-722 357381
: EMAIL: gmuchemi@uonbi.ac.ke
DATE OF BIRTH : OCTOBER 1, 1952
MARITAL STATUS : MARRIED
NATIONALITY : KENYAN

ACADEMIC RECORD

	UNIVERSITY/SCHOOL	DATE	QUALIFICATIONS
1.	University of Nairobi	1975-1979	Bachelor of Vet Med (BVM)
2.	University of Guelph Canada	1980-1982	Master of Science (Pathology)
3.	University of Liverpool U.K.	1987-1992	Ph.D.

SHORT COURSES ATTENDED

1. Helminth Taxonomy; Commonwealth Institute of Parasitology, U.K.; Feb-March, 1982
2. Data Handling and Biostatistics; Danish Bilharziasis Laboratory, Denmark (Sponsors); August, 1993
3. Parasitic Diseases; Advanced Laboratory Diagnosis; London School of Hygiene and Trop. Medicine; September, 1993
4. Curatorial and Animal Husbandry techniques; Wildlife Conservation Society, Bronx Zoo, New York, U.S.A; June - July, 1998
5. Effective Project Planning and Evaluation in Biomedical Research. ó Skill building course; WHO, TDR; March, 2006
6. Effective Project Planning and Evaluation in Biomedical Research. ó Train the Trainers Course; WHO, TDR; May, 2006
7. Application of E-learning in Public Health; University of Nairobi and Tufts University U.S.A.; July, 2006
8. Proposal and Scientific Writing Course; University of Nairobi and ASARECA; November 2006

CONSULTANCIES UNDERTAKEN

- 1 June 6-15, 1999. Training Veterinarians and Wildlife Managers from East and Central Africa on Rinderpest sampling and wildlife immobilization techniques. Sponsor- O.A.U./I.B.A.R./A.W.V.P., Project, Nairobi, Kenya.
- 2 August 23- October 17, 1999. Training Wildlife Managers and Animal Keepers at Accra and Kumasi Zoos. Curatorial and standard operation protocols. Sponsor - Ghana Wildlife Department and Friends of the National Zoo (FONZ), Accra, Ghana.
3. June-September, 2007. Consultant (Wildlife Component) Environmental Impact Assessment, Tana Delta Integrated Sugar Project. Mumias Sugar Company and Tana and Athi River Development Authority.
- 4 February, 2010. Consultant (Wildlife Component). Status of wildlife component in the proposed G4 Kenya farm project area, Tana Delta.
5. March ó April 2010. Consultant (Wildlife Component). Environmental Assessment of the Aberdare conservation area (ACA) fence. Effect of ACA fence on wildlife. Sponsors ó Rhino Ark, East African Wildlife Society, UNEP.
6. July 2009. Preparation of a Draft Curriculum for *Statistics and Computer Applications in Research - PREPARE-PhD* Joint Course for University of Nairobi and other regional Universities.
7. February ó May 2014. Instructor and Facilitator. Training on Surveillance and Epidemiology of Trade- related Transboundary Animal Diseases for veterinarians from the Greater Horn of Africa (GHOA). Kenya School of Government. Sponsors- AU-IBAR, USAID, IGAD.

RESEARCH PROJECTS

1. Co-investigator: Enhancing the Quality of graduates of agriculture to meet tomorrow's food security challenge (PREPARE-BSc) funded under the ACP-EU Co-operation Programme in Higher Education (EDULINK II).

EMPLOYMENT RECORD

DATES	ORGANISATION	POSITION	RESPONSIBILITIES
Present	University of Nairobi, Dept. of Public Health Pharmacology and Toxicology, Faculty of Vet Medicine P.O. Box 29053 Nairobi	Senior Lecturer	<ul style="list-style-type: none"> - Teaching undergraduate and postgraduate students in the following subjects: - Veterinary Epidemiology - Biostatistics - Wildlife diseases, conservation and husbandry - Supervision of MSc and PhD Students - Internal Examiner for MSc and PhD theses - Departmental Co-ordinator ó Biostatistics Course - Departmental Seminar Co-ordinator
2004-16 th July 2014	University of Nairobi, Dept. of Public Health Pharmacology and	Lecturer/Wildlife Veterinarian	<ul style="list-style-type: none"> - Teaching undergraduate and postgraduate students in the following subjects: - Veterinary Epidemiology - Biostatistics

	Toxicology, Faculty of Vet Medicine P.O. Box 29053 Nairobi		<ul style="list-style-type: none"> - Wildlife diseases, conservation and husbandry - Supervision of MSc and PhD Students - Internal Examiner for MSc and PhD theses - Departmental Co-ordinator of Biostatistics Course - Departmental Seminar Co-ordinator
2000 - 2003		Consultant Wildlife Veterinarian	<ul style="list-style-type: none"> - Consultant on various aspects of wildlife diseases and veterinary issues including - Medicine - Management - Husbandry - Holding facilities planning and construction - Conservation
July 1979 - April 1984	Ministry of Agriculture and Livestock Development P.O. Kabete, Kenya	a) Veterinary Research Officer, Wildlife Disease Section	<ul style="list-style-type: none"> - Participation in Wildlife disease research activities. These included research on Theileriosis, Trypanosomiasis and Taeniasis/Cysticercosis. - Undertook Post graduate (MSc) studies and research on Wildlife Taeniasis/Cysticercosis life cycles in carnivores and wild antelopes particularly Wildebeest in the Maasai Mara Game Reserve. Thesis registration and defense was at the Ontario Veterinary College, University of Guelph, Canada.
		b) Head, Wildlife Disease Section	<ul style="list-style-type: none"> - In addition to above activities took over from expatriate researcher as Head of Section. Duties included management of a captive wild animal colony of Buffalo, Eland, Oryx, Waterbuck, Hyaenas and Jackal as well as supervision of 4 veterinarians and 27 technical and support staff.
May 1984 - May 1997	National Museums of Kenya P.O. Box 40658 Nairobi Kenya (i) Institute of Primate Research P.O. Box 24481 Karen	a) Veterinary Clinical Officer	<ul style="list-style-type: none"> - Veterinary care for a colony of about 400 Non-human primates. - Coordination of animal care and participation in research activities. - Supervision of animal care personnel.
		b) Veterinary Parasitologist	<ul style="list-style-type: none"> - Participated in the setting up of a Parasitology Department at IPR. - Carrying out parasitological diagnosis on clinical and field samples from primates. - Pursued a doctoral study and research on schistosomiasis in non-human primates, particularly baboons, leading to award of a Ph.D. degree by the University of Liverpool, U.K.

		c) Senior Research Scientist and Head of Animal Resources	<ul style="list-style-type: none"> - Continued above activities in addition to heading the Animal Resources Department <p>Duties included:-</p> <ul style="list-style-type: none"> - Management of the Animal Resources at the Institute. - Co-ordination of animal experimentation, allocation to projects and setting up of standard operating procedures.
	ii) Nairobi Snake Park, National Museums		<ul style="list-style-type: none"> - Seconded to the Snake Park from Institute of Primate Research. The main assignment was to develop Veterinary Husbandry and Management techniques for the reptile colony that included various snake species, tortoises, turtles, crocodiles and monitor lizards. Also advised on plans to set up collaborative research with National and International institutions e.g. in venom/anti-venom production. <p>Co-ordination of management of reptiles in other regional museums.</p>
June 1997 - July 2000	Kenya Wildlife Service, P.O. Box 40241, Nairobi, Kenya.	Animal Curator, Nairobi Safari Walk	<ul style="list-style-type: none"> - Participated in the planning, development and construction of the Nairobi Safari Walk at the KWS Headquarters, Langata, Nairobi. - Participated in planning and construction of a temporary mini-orphanage to house the wildlife species that were in the old animal orphanage site and translocation of species that could not be accommodated at the mini-orphanage to other sanctuaries. - Management of the orphanage animal collection and supervision of animal care personnel. - Participated in other veterinary activities and research involving wildlife in the national parks and sanctuaries in various parts of Kenya including translocation of threatened or endangered species ó rhino, elephant, lion, leopard and cheetah.

OTHER RESPONSIBILITIES

- 1 Guest Lecturer on Wildlife diseases of Public health importance. Meat Training Institute. P.O. BOX 55, Athi River, Kenya (1983 - 2000)
- 2 Guest Lecturer on Schistosomiasis to the M.Med. Postgraduate Class, Dept. of Medical Parasitology, University of Nairobi, April 1993.
- 3 Scientific Collaborator and Co-investigator on Animal Reservoirs and Ecology of Human Schistosomiasis with scientists from Ministry of Health, Division of Vector-Borne Diseases and Kenya Medical Research Institute (KEMRI). 1993 to date.
- 4 Guest Lecturer on Epidemiology of Helminth Zoonoses. Institute of Tropical Medicine and Infectious Diseases (ITROMID) ó KEMRI/JKUAT, October, 2003 to date.
- 5 Appointed as member, Wildlife Disease Association (WDA), Student Awards Committee, 2003.
- 6 Guest Lecturer on Statistics. Egerton University. Department of Animal Science, 2007.

- 7 Guest Lecturer on Statistics. African Nazarene University. Department of Dry Land Resource Management (DRM). 2010 to 2012.
- 8 Guest Lecturer in Epidemiology, Biostatistics and Research Methodology. Mount Kenya University. 2012 to date.

MEMBERSHIP TO PROFESSIONAL SOCIETIES AND ORGANIZATIONS

- 1 Registered with the Kenya Veterinary Board
- 2 Member ó Kenya Veterinary Association (KVA)
- 3 Member - International Primatological Society (IPS)
- 4 Member - Wildlife Disease Association (WDA)ó Africa and Middle East Section
- 5 Member ó Green Belt Movement (GBM)
- 6 Member ó Wangari Maathai Institute (WMI) Working Committee.
- 7 Member- Sweet Waters Chimpanzee Sanctuary Steering Committee (SCS-SC), Ol Pejeta Conservancy
- 8 Member- Grevys Zebra Disease Response Committee- KWS

POSTGRADUATE STUDENT SUPERVISION (SUMMARY)

PhD Students Supervised to date:

Status:

Completed =3

Writing thesis =1

Registered /Ongoing =3

MSc Students Supervised to date:

Status:

Completed = 17

Registered/ Ongoing = 4

POSTGRADUATE STUDENT SUPERVISION (RECORD)

PhD Students (Completed):

1.	Matete, George	PHPT	2010
2.	Gakuya, Francis	PHPT	2011
3.	Manyibe, Thomas	Vet Path	2013

PhD Students (On going):

1. Obada, Vincent Vet Path
2. Chepkwony, Eunice Vet Path
3. Nanyingi, Mark PHPT
4. Othieno, Joseph Agri Econ
5. Ndeere, David CSD

MSc Students:(Completed)

<u>Name</u>	<u>Dept</u>	<u>Year of graduation</u>
1. Okanga, Sharon	CSD	2005
2. Kamanja ,Irene	PHPT	2007
3. Njogu, George	PHPT	2008
4. Asava, Lucas	PHPT	2009
5. Nanyende, David	PHPT	2009
6. Olwande, Portas	PHPT	2009
7. Sarioyo, Joseph	PHPT	2010
8. Moenga, Bernard	PHPT	2010
9. Mohamed, Hassan	PHPT	2010
10. Chepkwony, Eunice	Vet Path	2011
11. Mwai, John	FSNT	2011
12. Ochola, Francis	PHPT	2012
13.Lekolool, Isaac	PHPT	2012
14.Omolo, Juliet	FSNT	2012
15.Chege, Stephen	PHPT	2013
16.Muthike, Caroline	FSNT	2013
17.Mabior, Mabil	PHPT	2013

Msc.Students (On going):

1. Nguue, Dennis	PHPT
2. Ogola, Joseph	PHPT
3. Muriuki, John	PHPT
4. Kirui, Eric	FSNT

REFEREES

- 1 Dr. Gerald M. Mkoji,
Centre for Biotechnology Research and
Development,
Kenya Medical Research Institute (KEMRI),
P.O. Box 54840-00200 City Square,
NAIROBI. KENYA
Phone: +(254-2)-2722541 Ext 3283
Fax: +(254-2)-2715105 or 2720030
e-mail:gmkoji@africaonline.co.ke
[:gmkoji@nairobi.mimcom.net](mailto:gmkoji@nairobi.mimcom.net)
2. Prof. Samuel Mutwiri Arimi
Department of Public Health Pharmacology & Toxicology

University of Nairobi
P.O. Box 29053-00625
Nairobi, Kenya
Email: smarimi@uonbi.ac.ke

3. Prof. S. G. Kiama, BVM, MSc. (UON), PhD (Bern)

Ag. Director Wangari Maathai Institute for Peace and Environmental Studies

P. O. Box 30197 00100, Nairobi, Kenya

Email: kiama123@yahoo.com or kgitahi@uonbi.ac.ke

Tel +254722380971 or +254202181370

PUBLICATIONS (G. MUCHEMI)

1. **Muchemi G.K.M.** (1982). A study of Muscle Cysticercosis in Wild animals of Kenya. MSc thesis. University of Guelph, Ontario Canada.
2. **Muchemi G.**, (1989). The use of wild carnivores and wild antelopes in the study of Taeniasis and cysticercosis. Proceeding of the First East African Conference on Laboratory Animal Science, November, 1989, Nairobi, Kenya.
3. **Muchemi, G.** (1990), Monkeys suffer from bilharzia too. Swara (East African Wildlife Society) 13 (3):23.
4. **Muchemi, G.K.M.** (1992) Baboons as maintenance hosts of human schistosomiasis in Kenya. Ph. D. thesis. University of Liverpool, U.K.
5. **Muchemi, G.K.M.** (1994), Reservoirs of schistosomiasis in Kenya with specific reference to baboons. Proceedings of the Symposium on epidemiology and Control of Schistosomiasis, KEMRI/JICA, October 1994, Nairobi, Kenya.
6. Stevenson, P., **Muchemi G.** and Karstad, L. 1982 Taenia saginata infection in East African antelopes. Veterinary Record 111:322.
7. Allsopp, B.A. MacPherson, C.N.L., Jones, A. and **Muchemi, G.K.** 1984. Techniques for the identification of gastrointestinal helminths obtained from carnivores in Kenya. Proceedings of the KEMRI/KETRI Conference. Feb 1984. Nairobi, Kenya.
8. Harrison L.J.S., **Muchemi, G.K.M.** and Sewel, M.M.H. 1985. Attempted infection of calves with cysticerci of Taenia crocutae and their subsequent serological response. Research in Veterinary Science 38:383-385.
9. Eley, R.M., Strum S. and **Muchemi, G.** 1986. Nutritional effects upon physical condition of three free-ranging troops of baboons in Gilgil, Kenya. Primate Report 14:136.
10. Bin hazim, A.A., Githure, J.I., **Muchemi G.K.** and Reid, G.D.F. 1987. Isolation of Leishmania major from a naturally infected vervet monkey (Cercopithecus aethiops) caught in Kiambu district, Kenya. Journal of Parasitology 73 (6): 1278-1279.
11. Eley, R.M. Strum, S.C., **Muchemi, G.** and Reid, G.D.F. 1989. Nutrition, body condition, activity patterns and parasitism of free-ranging troops of olive baboons (Papio anubis) in Kenya. American Journal of Primatology 18:209-219.
12. Jaoko W.G. **Muchemi G.**, Oguya F.O. 1996 Praziquantel side effects during treatment of Schistosoma mansoni infected pupils in Kibwezi, Kenya. East African Medical Journal. 1996 Aug; 73 (8): 499-501.

13. Chai, D., Farah, I. and **Muchemi, G.** 1997. Sparganosis in non-human primates. *Onderstepoort Journal of Veterinary Research* 64:243-244.
14. Njenga, M.N. Farah, I.O., **Muchemi, G.K.** and Nyindo, M. 1998 Periportal fibrosis of the liver due to natural or experimental infection with Schistosoma mansoni occurs in the Kenyan baboon. *Annals of Tropical Medicine and Parasitology*, 92 (2): 187-195.
15. Munene E, Otsyula, M. Mbaabu, D.A.N., Mutahi, W.T., Muriuki, S.M.K. and **Muchemi, G.M.** 1998. Helminth and protozoan gastrointestinal tract parasites in captive and wild-trapped African non-human primates, *Veterinary Parasitology*, 78:195-201.
16. Ouma, J.H., Fulford, A.J.C., Kariuki, H.C., Kimani, G., Sturrock, R.F., **Muchemi, G.**, Butterworth, A.E. and Dunne, D.W. 1998. The development of Schistosomiasis mansoni in an immunologically naïve immigrant population in Masongaleni, Kenya. *Parasitology*, 117: 123-132.
17. Mkoji, G.M., **Muchemi, G.K.**, Kipsha, F.S., Mungai, B.N. and Machai, P. 1998. Schistosoma mansoni ova in urine of children from an endemic area of Kenya: a short report *East African Medical Journal* 1998 Sept 75(9): 558-559.
18. Mungai, B.N., Agola, E.L., Morgan, J.A.T, DeJong, R.J., Karanja, D.M.S., **Muchemi, G.M.**, Loker, E.S. and Mkoji, G.M. 2003. Schistosoma rodhaini in Kenya revisited. Abstract presented at the Biodiversity of African Freshwater Snails 6th Workshop on Freshwater Snails in Africa. Sept 9-12, 2003, Kampala, Uganda.
19. Mungai, B.N., Njagi, E.M.N., Muli, F.W., Agola, E.L., Morgan, J.A.T, DeJong, R.J., Karanja, D.M.S, **Muchemi, G.M.**, Loker, E.S. and Mkoji, G.M. 2003. The presence of Schistosoma rodhaini in Western Kenya, and its implication on the epidemiology of Schistosoma mansoni. Abstract presented at the 24th African Health Sciences Congress, African Union Conference Centre, Addis Ababa, Ethiopia. Sept 28-Oct 2, 2003.
20. Morgan, J.A.T., et al.(including **Muchemi, G.M.**) 2005. Origin and diversification of the human parasite Schistosoma mansoni. *Mol Ecol.* 2005 Oct;14(12):3889-902.
21. Odula Olwande P, Ogara WO, Okuthe SO, **Muchemi G**, Okoth E, Odindo MO, Adhiambo RF. 2009. Assessing the productivity of indigenous chickens in an extensive management system in southern Nyanza, Kenya. *Trop Anim Health Prod.* 2009 Aug 13.
22. Asaava LL, Kitala PM, Gathura PB, Nanyingi MO, **Muchemi G**, Schelling E. 2009. A survey of bovine cysticercosis/human taeniosis in Northern Turkana District, Kenya. *Prev Vet Med.* 2009 Jun 1;89(3-4):197-204.
23. Sharon Okanga, **Gerald Muchemi**, Nicholas Maingi, Eddy Mogo, Elphas Munene. 2006. Gastrointestinal parasites of free-ranging colobus monkeys (*Colobus angolensis palliatus*) in Kwale District, Kenya coast. *African Journal of Ecology* Volume 44, Issue 3, Date: September 2006, Pages: 410-412.
24. Matete G O , Maritim W, **Muchemi G**, Maingi N, Gathuma J M and Ogara W 2010: Long-term performance of electronic identification devices and model traceability system for cattle under pastoral production systems of Kenya. *Livestock Research for Rural Development. Volume 22, Article #181*. Retrieved August 23, 2011, from <http://www.lrrd.org/lrrd22/10/mate22181.htm>
25. Matete G O, Maingi N, **Muchemi G**, Ogara W and Gathuma J M 2010: Design and development of an electronic identification and traceability system for cattle under pastoral production systems: A case for Kenya. *Livestock Research for Rural Development. Volume 22, Article #139*. Retrieved August 23, 2011, from <http://www.lrrd.org/lrrd22/8/mate22139.htm>
26. Matete G O , Gathuma J M, **Muchemi G**, Ogara W, Maingi N, Maritim W and Moenga B 2010: Institutional and organisational requirements for implementing the Livestock Identification and Traceability System in Kenya. *Livestock Research for Rural Development. Volume 22, Article #182*. Retrieved August 23, 2011, from <http://www.lrrd.org/lrrd22/10/mate22182.htm>
27. Gakuya F, Rossi L, Ombui J, Maingi N, **Muchemi G**, Ogara W, Soriguer RC and Alasaad S. 2011. The curse of the prey: Sarcoptes mite molecular analysis reveals potential prey-to-predator parasitic infestation in wild animals from Masai Mara, Kenya. *Parasites & Vectors* 2011, 4:193 (6 October 2011)

28. Chepkwony E.C. ,C.G Gitao and **G.M Muchemi**.2012. Seroprevalence of Foot and Mouth Disease in the Somali Eco-System in Kenya.International Journal of Animal and Veterinary Advances 4(3): 198-203, 2012.
29. Chepkwony E.C. , C.G. Gitao, **G.M. Muchemi**. 2014. Characterisation of foot and mouth disease virus isolates from the Somali ecosystem in Kenya American Journal of Research Communication www.usa-journals.com 2014: Vol 2(5) ajrc.journal@gmail.com
30. Mutinda, W.U, P. N. Nyaga ,P .G. Mbuthia , L .C. Bebora and **G.Muchemi**. 2014. Risk factors associated with infectious bursal disease vaccination failures in broiler farms in Kenya.Trop Anim Health Prod. *Accepted: 23 December 2013*
31. Othieno O Joseph, Mugivane I Fred, Nyagah Philip and **Gerald Muchemi**. 2014 Integrating Social Network Analysis and correlation in agricultural extension: Case of climate change adaptation communication Global Science Research Journals Vol. 2 (2), pp. 063-068, <http://www.globalscienceresearchjournals.org/>

CONFERENCE AND WORKSHOP PRESENTATIONS

1. **Muchemi, G.M.**, Munene, E., Mungai, B.N. and Kiriama, L.2004. Clinical fascioliasis in a herd of free-ranging impala (*aepyceros melampus*) in Kisumu impala park, Kenya.4th Biennial Scientific Conference (FVM), Sept, 2004
2. **Muchemi, G.M.**, Maingi,N., Otieno, R.O. Mkoji, G.M., Mungai, B.2006. Zoonotic helminth parasites recovered from dogs in Kisumu and their public health importance 5th Biennial Scientific Conference (FVM), Sept, 2006.
3. **Muchemi,G.M.** and D. S. Yole .2008. Humane methods of capture and care of non-human primates for conservation and biomedical research. 6th Biennial Scientific Conference (FVM), Sept,2008.
4. **Muchemi Gerald M** .2010.Wildlife-livestock interface in a changing environment 7th Biennial Scientific Conference (FVM),Sept,2010.
5. **Muchemi Gerald** .2010. Statistics and computer applications in research. Prepare- PhD Workshop ,Faculty of Vet Med. July 2010.
6. Ochola F.O, **G.M.Muchemi**, J.M.Mbaria and J.K.Gikunju. 2011. Pharmaco-epidemiological and toxicological study of snake envenomations in selected areas of Kenya. 3rd International Symposium on Field Toxicology, 7-8 September 2011, Lusaka, Zambia.
- 7 Chege S.M., Kitale, P. and **Muchemi G**. 2012.Factors associated with morbidity and mortality in selected ungulate species in Al Ain wildlife park and resort, United Arab Emirates. 8th Biennial Scientific Conference (FVM) and the 46th Annual Scientific Conference (KVA), Safari Park Hotel, Nairobi 25th April 2012.

8. Nanyingi M.O, Kiama.S.G, Thumbi.S.M, **Muchemi.G.M** and Bett,B 2012. Climate change vulnerability,adaptation and mitigation of livestock systems in Kenya.8th Biennial Scientific Conference (FVM) and the 46th Annual Scientific Conference (KVA), Safari Park Hotel, Nairobi 25th April 2012.
9. Nanyingi M O, Thumbi S M, **Muchemi G M**, Rashid I M, Bett B, Kiama S G and Njenga K.2014. Rift Valley fever: Socioeconomics and burden impact using knowledge, attitudes and practices in Garissa ,Kenya.KVA Scientific Conference ,Boma Hotel Eldoret 25th April 2014.
- 10.Nanyingi M,Ogola E, Olang G, Otiang E, Munyua P, Thumbi S, Bett B, **Muchemi G**, Kiama,S. and Njenga,K.2014. Spatial Risk Assessment of Rift Valley fever potential outbreaks using a vector surveillance system in Kenya. KVA Scientific Conference ,Boma Hotel Eldoret 25th April 2014.
- 11.Muriuki John, Philip Kitala, **Gerald Muchemi**, Bernard Bett . 2014. Modelling malaria transmission dynamics in irrigated areas of Tana River County, Kenya. Clinic on the Meaningful Modelingof Epidemiological Data .June 2-13, 2014, Muizenberg , Cape Town,South Africa.