

Dynamic
Drivers of
Disease
in Africa



A research programme co-funded by DFID, NERC & ESRC and accredited by LWEC



Impact of anthropogenic activities on the emergency and spread of zoonotic diseases in Tana River County, Kenya

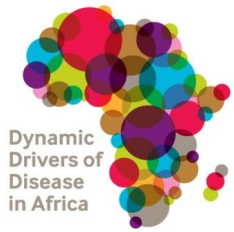
Enoch Ontiri

Bernard Bett, Johanna Lindahl, Mohammed Y Said, Shem C Kifugo and Fred Otieno

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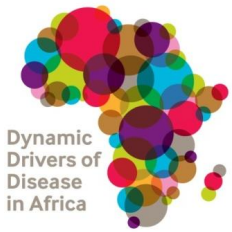


Ecohealth 2014 conference, Montreal, Canada, 11-15 August 2014



Outline

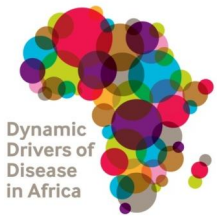
- Ecosystem dynamics
- Land cover land use changes
- Wildlife Dynamics
- Disease dynamics
- Conclusion



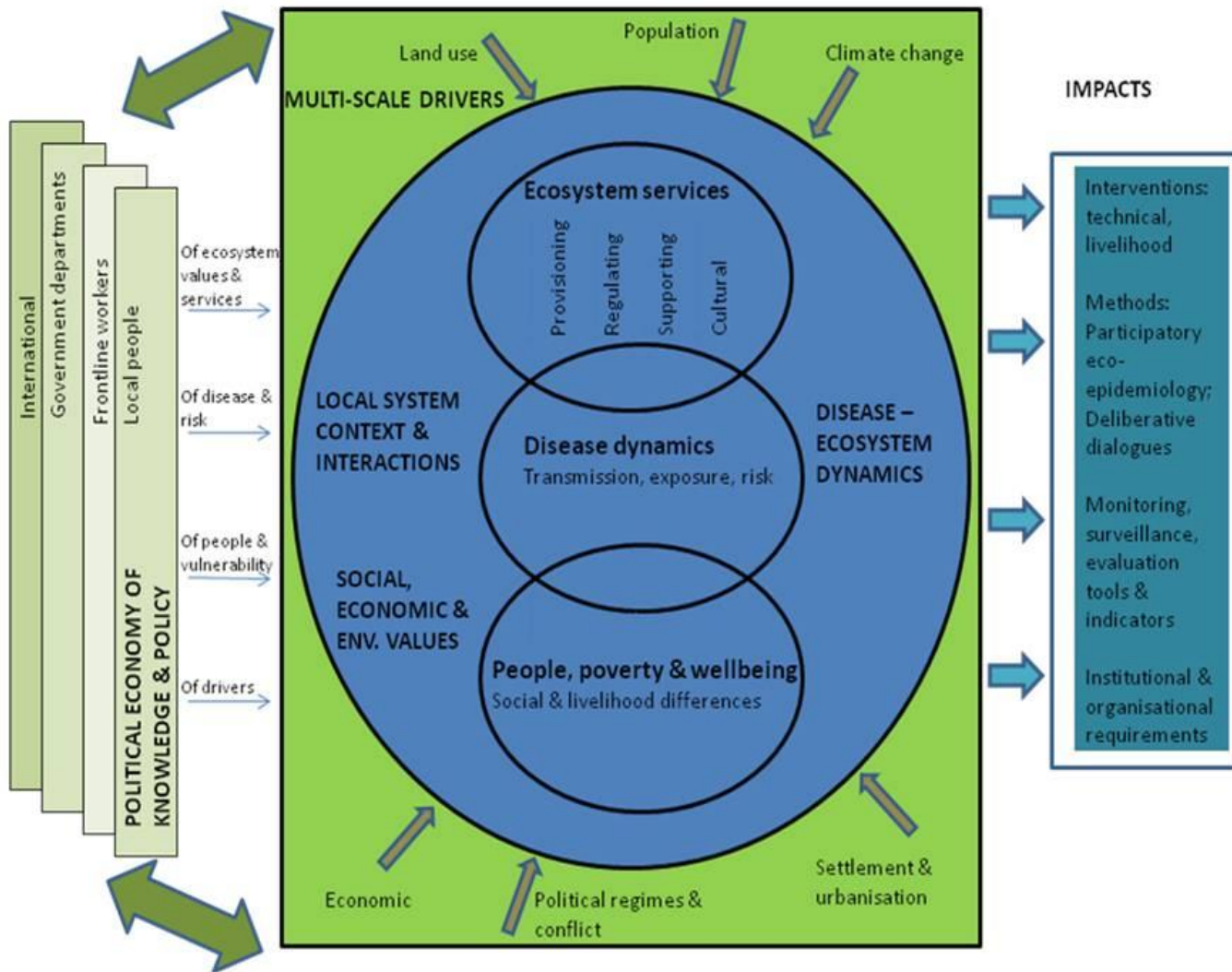
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Background

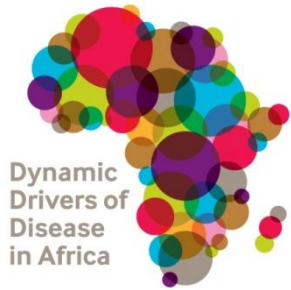
- Ecosystems – space/habitats, species and communities
- Constant interaction- relationships, competition, complementarity
- May improve human wellbeing through furnishing provisioning and disease regulating services); yet they can also generate ecosystem ‘disservices’ such as acting as a reservoir for new ‘emerging’ disease



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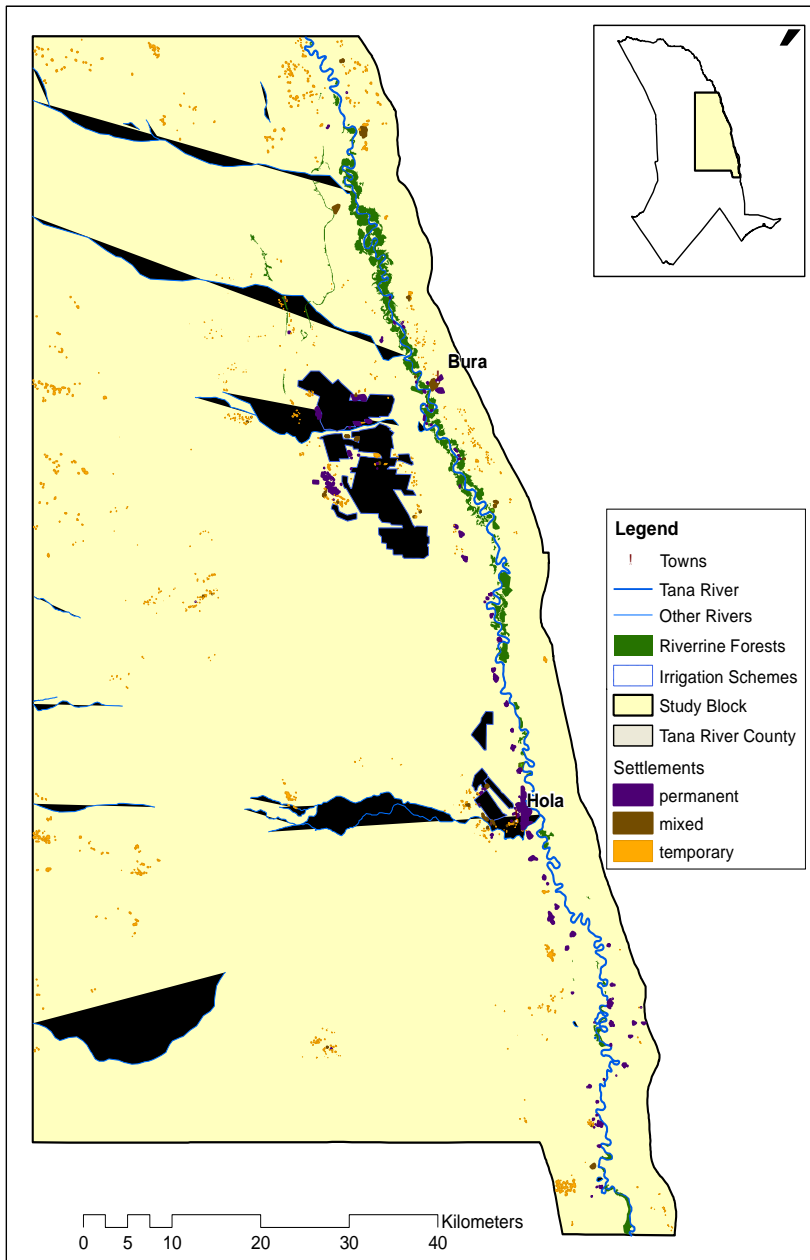
Source: DDAC report

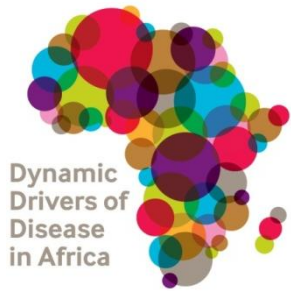


Background

Understanding and responding to the eco-social, social and economic conditions for disease emergence and transmission represents one of the major challenges for humankind today

Study Site Tana River





Driver of change

Land cover and land use

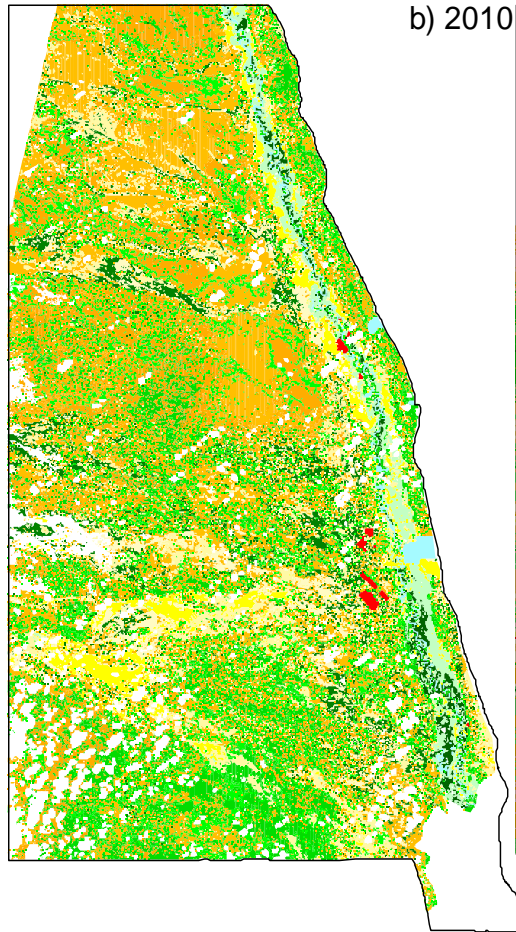
Remote Sensing Analysis



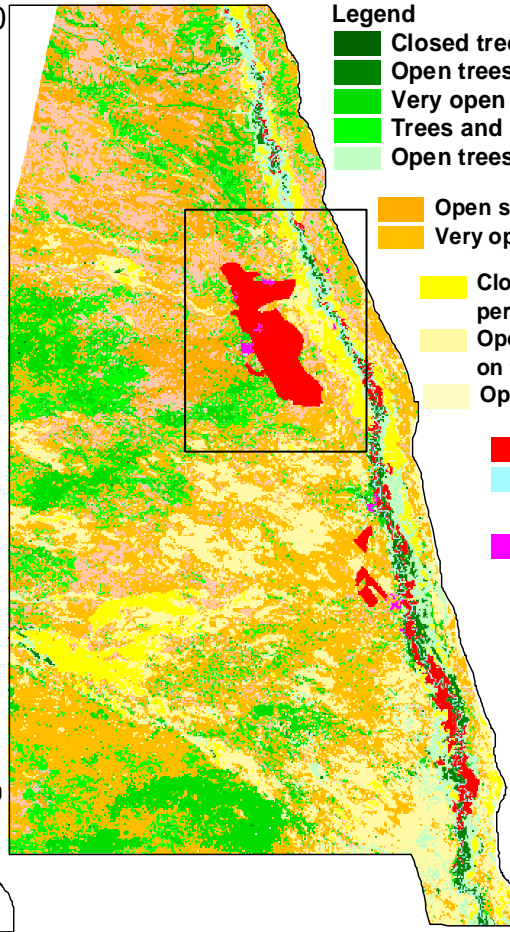
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Land cover changes

a) 1975

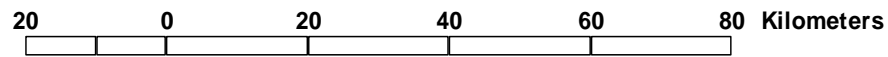


b) 2010



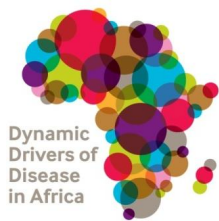
Legend

- Closed trees
- Open trees (65-40% crown cover)
- Very open trees (40-15% crown cover)
- Trees and shrubs savannah
- Open trees on temporarily flooded land
- Open shrubs (65-40% crown cover)
- Very open shrubs (40-15% crown cover)
- Closed herbaceous vegetation on permanently flooded land
- Open to closed herbaceous vegetation on temporarily flooded
- Open to closed herbaceous vegetation
- Irrigated land / Cropland
- Tana River-Waterbodies
- Clouds
- Urban and Rural Settements



Big plans to increasing irrigation, develop canals

Source: Said et al. (in prep)



Land cover changes statistics

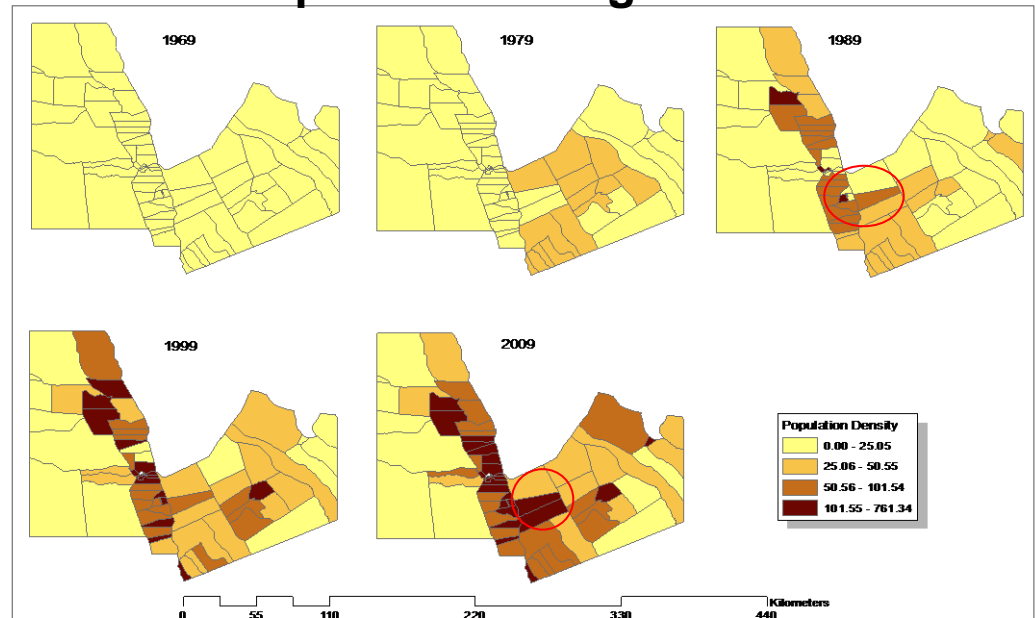
Land cover	1975		2010		Area Change (%)
	Area (km ²)	Area (%)	Area (km ²)	Area (%)	
Closed trees	62	1	0	0	-100
Open trees (65-40% crown cover)	370	7	68	1	-81
Very open trees (40-15% crown cover)	741	13	636	11	-14
Trees and shrubs savannah	744	13	439	8	-41
Open trees on temporarily flooded land	169	3	199	4	18
Open shrubs (65-40% crown cover)	836	15	699	12	-16
Very open shrubs (40-15% crown cover)	1516	27	1604	29	6
Sparse Shrubs	0	0	642	11	11
Open to closed herbaceous vegetation	244	4	0	0	-100
Closed herbaceous vegetation on permanently flooded land	181	3	244	4	35
Open to closed herbaceous vegetation on temporarily flooded	675	12	811	14	20
Cropland//irrigated	14	0	209	4	1359
Tana river-water bodies	50	1	42	1	-18
Urban and associated areas, rural settlements	0	0	9	1	1

Large losses of forests, riverine woodlands, increases in cropland and irrigated areas and development of urban and rural settlements

Population and human settlements



Human Population changes 1969 - 2009

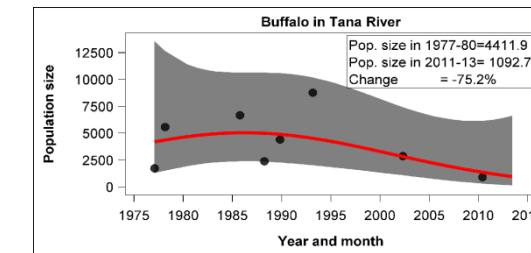
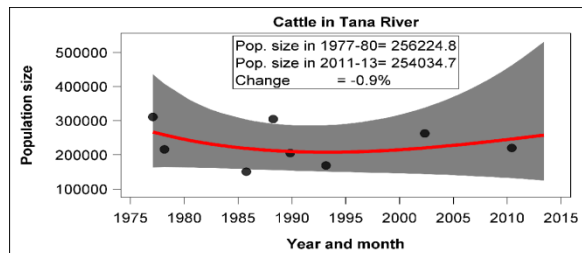
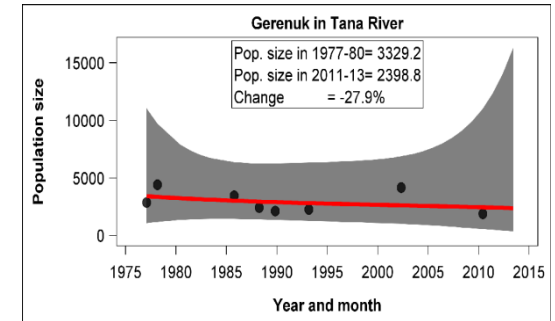
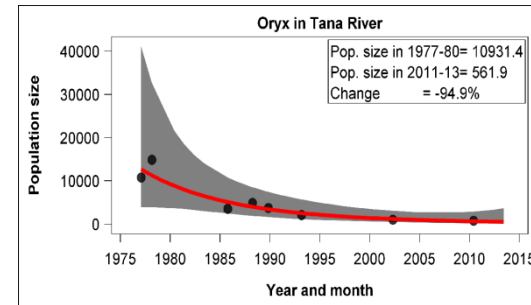
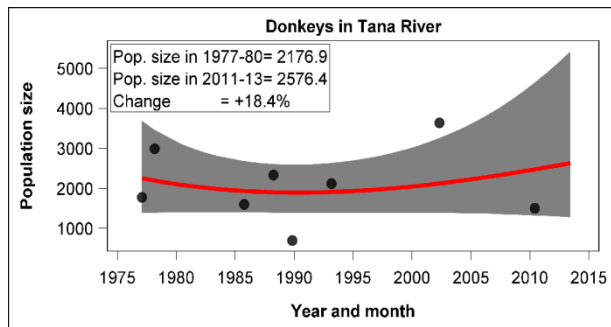
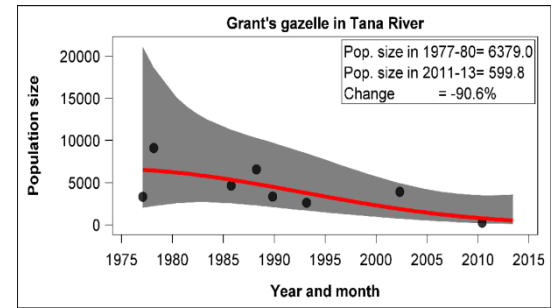
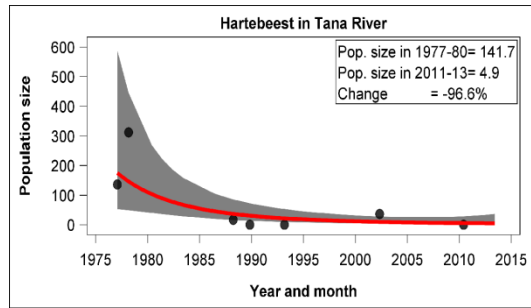
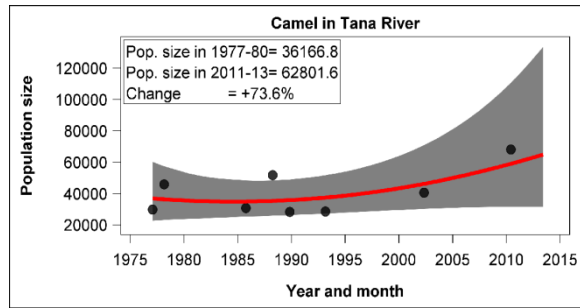
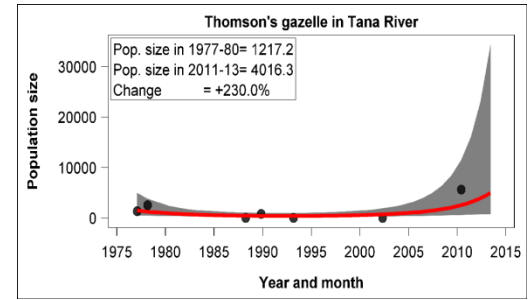
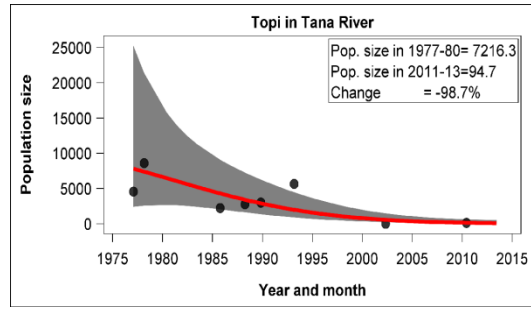
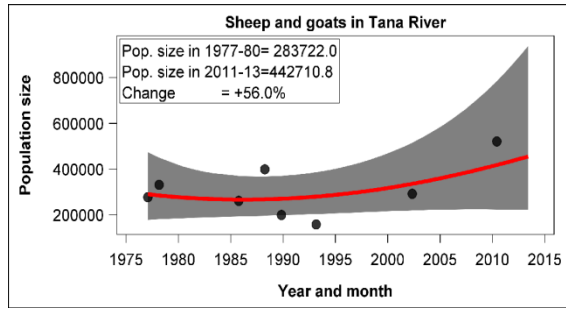


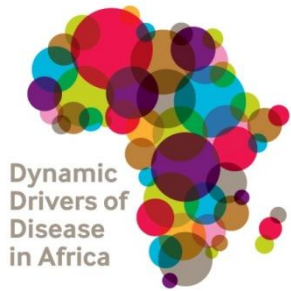


Changes in Biodiversity 1977 - 2013

Large herbivores (livestock and wildlife)

Trends in livestock and wildlife 1977 - 2013

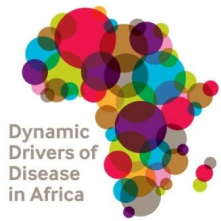




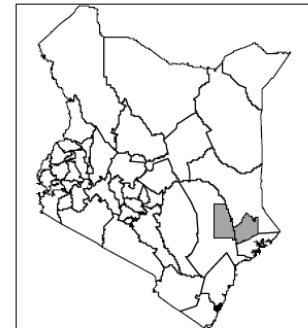
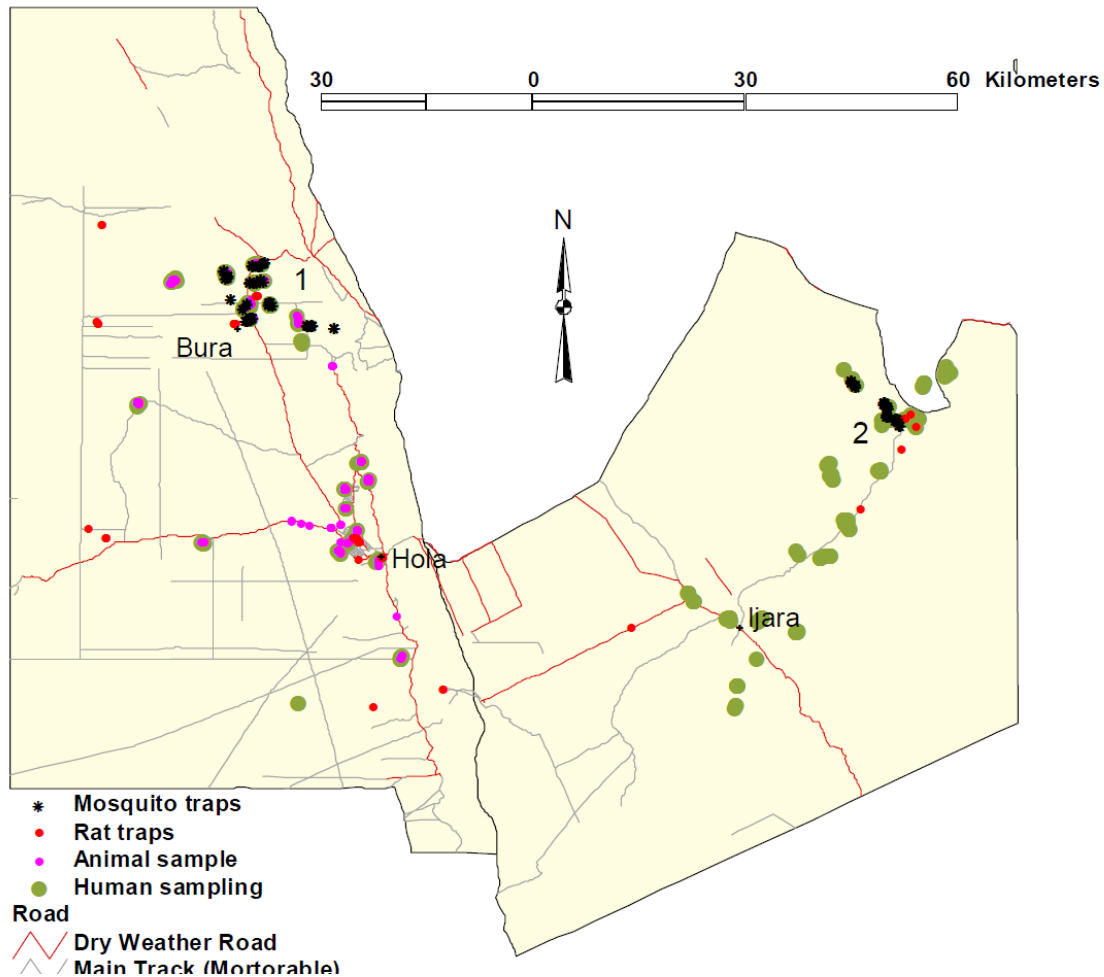
Disease Dynamics

Transmission, Exposure, risk

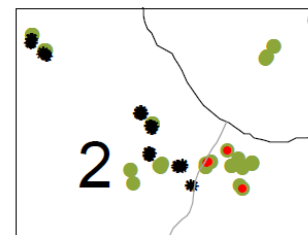
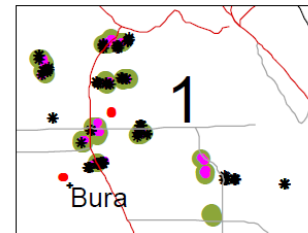
Disease data collection sites



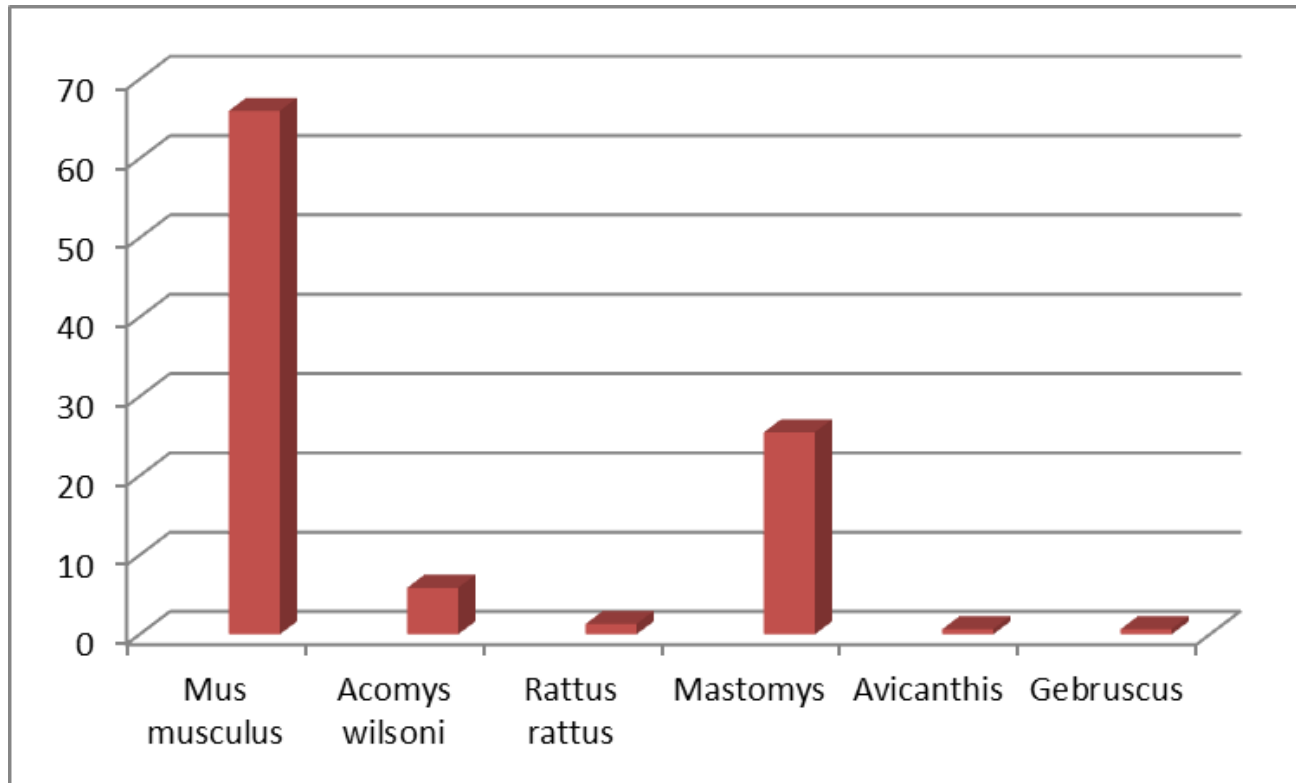
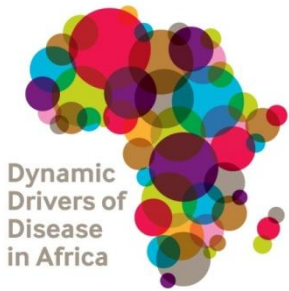
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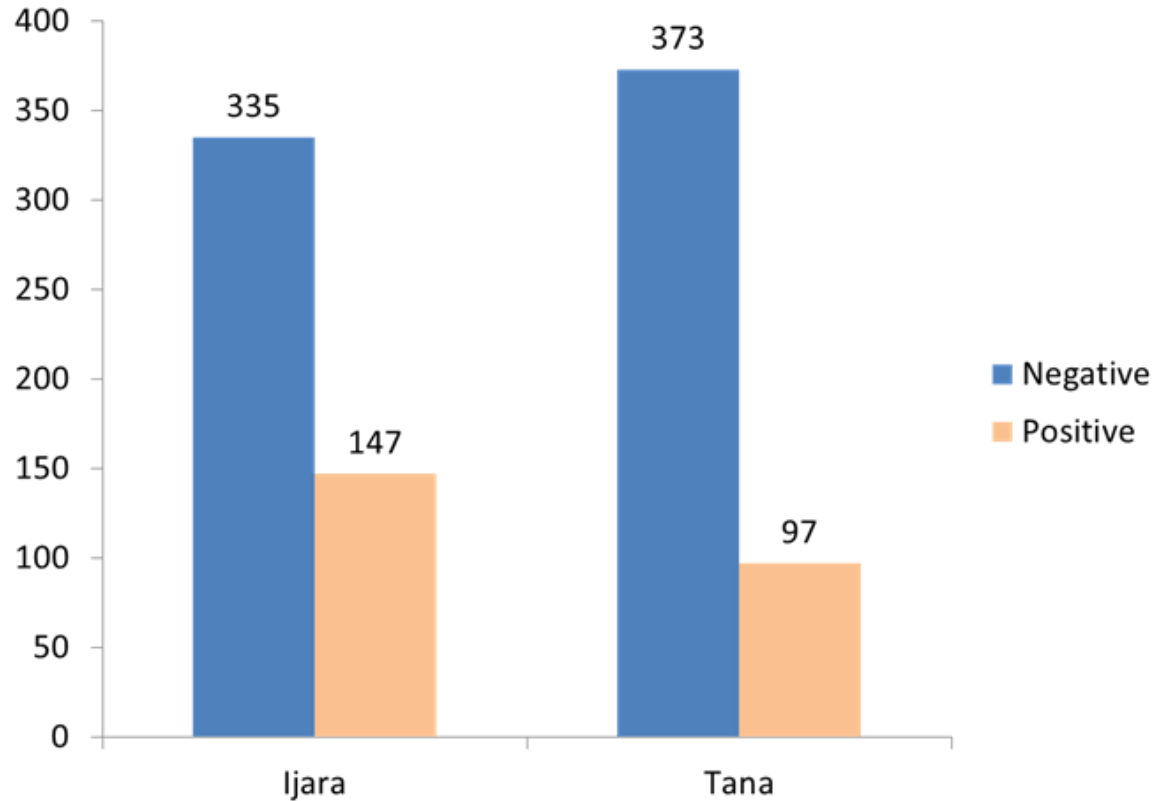
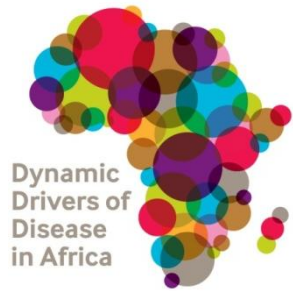
Location map



Zoom of site 1 and 2



48% success rate in trapping



Serological testing on human blood samples



Conclusion

- Rodent population has increased and is a problem to the community.
- *Leptospira* is present in the region
- There is a perception of more febrile infections in people and livestock since the expansion of the irrigation scheme.
- Policy dialogue between health, environment and biodiversity sector is necessary.



Agriculture Associated Diseases

<http://aghealth.wordpress.com>

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