




Definitions

- ❑ A zoonosis is a disease or infection which is naturally transmitted between animals and man
- ❑ A simpler definition is a disease that normally infects animals, but can also infect humans, e.g. RVF, Rabies, Anthrax, Plague, Trypanosomosis, Influenza, Ebola
- ❑ Emerging and re-emerging zoonoses are diseases caused either by totally new or partially new agents, or by micro-organisms previously known, but now occurring in places or in species where the disease was previously unknown e.g. Influenza, Ebola, SARS, etc

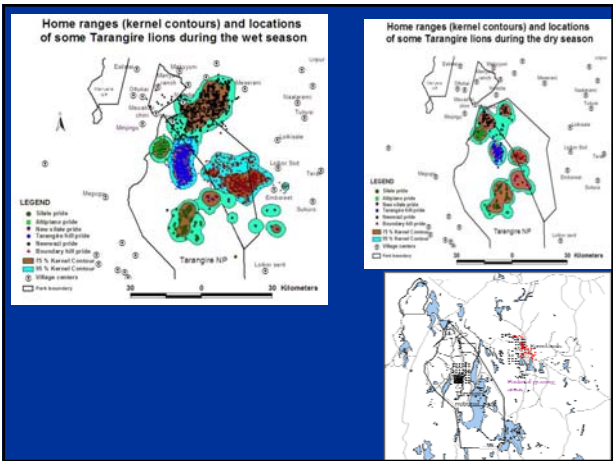
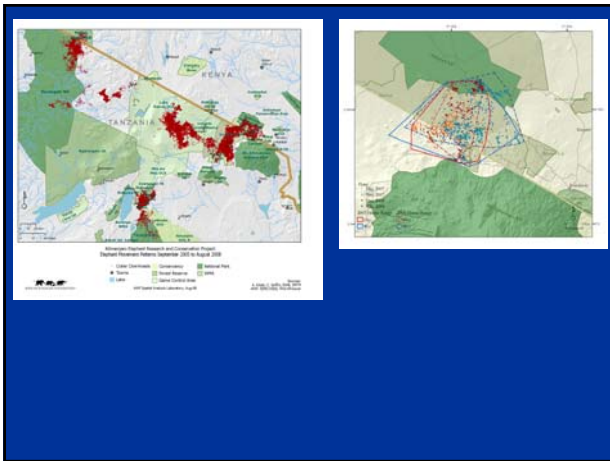


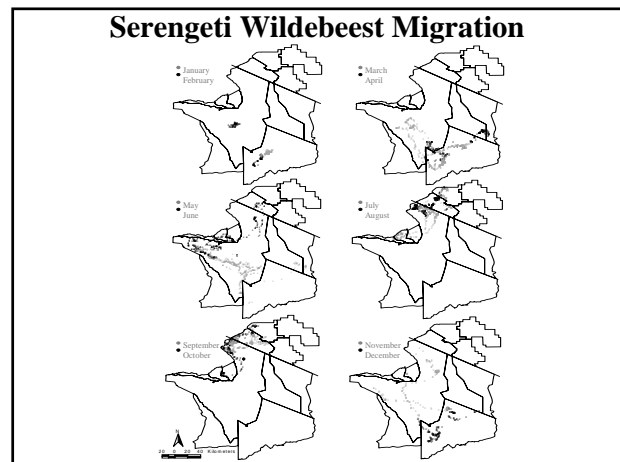
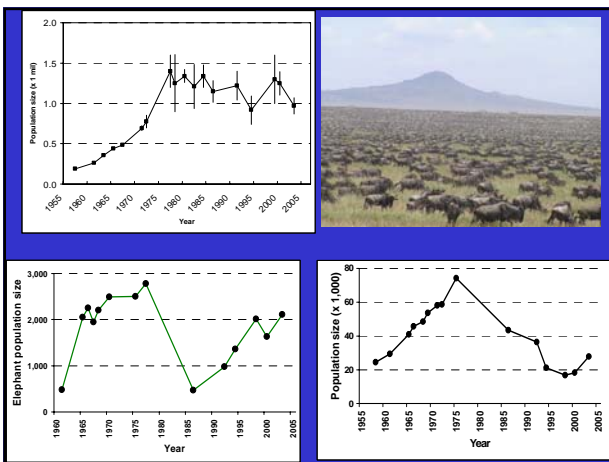
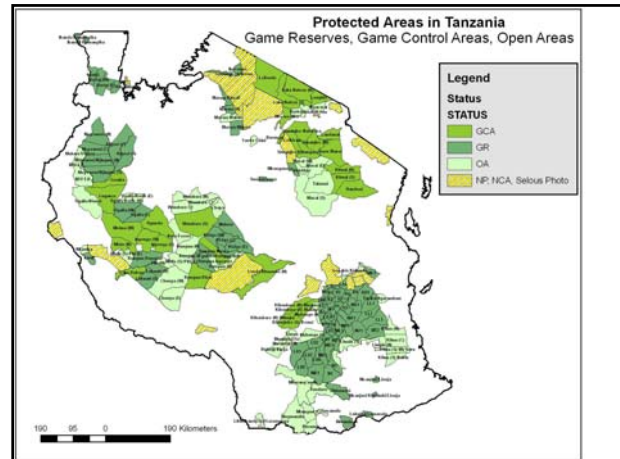
Wildlife-livestock-human interaction and zoonoses

- ❑ There has been a significant increase in wildlife-livestock-human interactions especially in Africa due to :-
 - Human population growth
 - Encroachment to protected areas
 - Changes in land use plans
 - Increase in livestock population
- Wildlife-livestock-humans need more or less similar resources (water, food, shelter, etc)
- Wild animals constantly move within and outside protected areas and domestic animals are moving into protected areas in search of resources

Wildlife-livestock-human interaction is a REALITY

- ❑ Sharing of infectious agents between wildlife-livestock and humans have been very common due to interaction at the interface, and some disease agents have been crossing the species specific barrier
- There is increasing evidence that wildlife spent most of their time outside protected areas;
 - Elephants in west Kilimanjaro spent 37% time in PA and 63% in open/unprotected areas
 - Lions in Tarangire NP spent up to six months outside protected areas
 - Camera trap survey in Tarangire: out of 19 carnivore species recorded, 19 were recorded in the NP, 18 in grazing land and 6 in cultivated land; and out of 22 non carnivores species recorded, 18 were recorded in the NP, 22 in grazing land and 14 in cultivated areas





Rift Valley Fever (RVF)

- RVF in livestock: 1997/98 (*El Nino* rains), 2006/07 (19 regions)
 - 418 buffalo and other wildlife samples were tested at CVL in 2008; 4% of wildlife is exposed to RVF in Northern Tanzania, highest NAT observed in buffaloes
 - Wildlife are multiplier epidemic hosts with high mortalities during epidemic
 - There is a possible sentinel role for wildlife, if monitored closely they show signs early than livestock, e.g. gerenuk
- We need joint surveillance to know maintenance hosts

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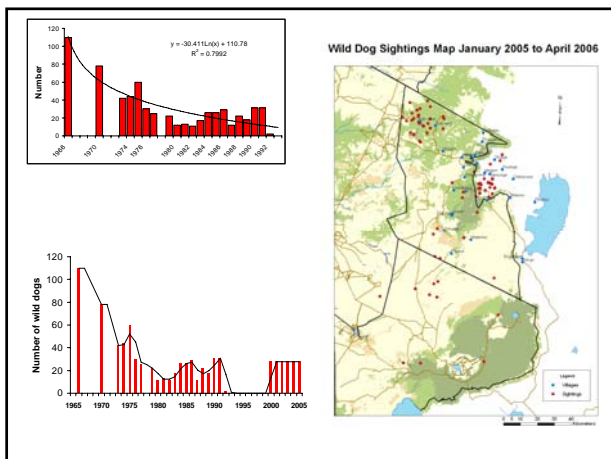
- Anthrax outbreaks in wildlife: 1984, Impala in Manyara NP; 1989, hippos died in Ruaha NP; 1998, in SNP killed 1000 impalas and other herbivores; 2000 and 2001, in hippos in Ugalla GR and Mtera; 2003, SNP and NCA (impalas); 2003, hippos in RUNAPA; 10 buffaloes died in ANAPA; and in 2004, 360 impala, 4 elephants, 2 giraffes and 4 buffaloes died from anthrax (8 outbreaks)
- Anthrax outbreak in October 2009 in Maswa Game Reserve; 91 buffalo carcasses found, 2 giraffes, 1 eland, 1 warthog, 1 duiker, 5 elephants
 - Most outbreaks are associated with concurrent outbreak in livestock
 - From 1996 in SNP, affected species are wildebeest, buffalo, impala, zebra, giraffe, hippo, elephant, topi, eland, duiker, warthog (11 species affected),

Bovine tuberculosis

- Prevalence in cattle: 21% in Rungwa-Ruaha ecosystem (n=919) and 6.7% (SICTT) and 25% (RT) in Serengeti ecosystem (n =302); 5% of lymphonodes were positive for *M.bovis*
 - In 2006, *M. bovis* was isolated from a buffalo and impala in PIWMA
- Using AEIA: 4% in Serengeti lions, 6% in Tarangire buffaloes (n=17), 2% in Serengeti wildebeest (1998-2001 serum samples)
 - *M. bovis* has been isolated from 3 cattle, 1 goat and 1 African civet
 - Non-tuberculous Mycobacteria have been isolated from 13 cattle, 2 goats, 1 bat-eared fox and 1 lion
 - *M. bovis* has been recovered in 10% of apparently health wildebeest that did not show lesions on post-mortem
- *M. bovis* occurs in a range of wildlife species with an impact that appears to be less than in other African wildlife populations, a spill over??

Rabies

- Rabies was reported for the first time in Tanzania in 1932, and became endemic from 1983
- Over 90% of cases are from domestic dogs and 3-4% from wildlife (**jackals, hyaenas, mongoose, bat eared-foxes**; human bites (99% dogs vs 1% wild animals)
- Rabies outbreak in late 1980 and early 1990 in the SMME caused population decline of African wild dogs and bat-eared foxes
- From 1986-1991, all 15 wild dog packs in the SE died or disappeared
- From 1987-1988; 60% of male and 20% female bat eared foxes died due to rabies
- Long term studies have shown that domestic dogs play a great role in the maintenance of rabies , current prevalence in domestic dogs is **5-10%**
- A **single rabies major variant (Africa 1b)** is circulating within the ecosystem, and there is no evidence of species specific grouping
- A ring vaccination program of all domestic dogs in villages surrounding the Serengeti ecosystem is ongoing



Brucellosis

- Brucellosis was first reported in Tanzania in 1920s
- Prevalence in cattle: Southern (16.2%), Northern (8-12.2%), Central (5.13%), Coastal (7.6-22%) zones, SE (11.5%); **Average (11%)**
- Prevalence in buffaloes (2007); SNP (22%), NCA (30%); Overall (24%, n=103)
- Prevalence in wildebeest (2207); SNP (17%), NCA (19%), Overall (17%, n=106) using Rosebengal test and C-ELISA tests
- Usangu; 3-8% *B. abortus* in cattle and 20% *B. mellitensis* in goats
- Brucellosis is a big problem in **buffaloes and wildebeests**, it has also been detected in topi
- *B. abortus* is circulating in both livestock and wildlife, exposure is high in wildlife in the SE, humans are at a high risk of infection

Trypanosomosis

- Tsetse flies are a problem in most areas but trypanosomosis is not a problem to wildlife, but are major reservoirs of infection
- Prevalence of *T. brucei* infection (using PCR) in western Serengeti
 - 5.4% in cattle (n=518)
 - 5.5% in wild animals (n=220)
 - 1.25 % in domestic dogs (n=155)
- Overall prevalence of *T. brucei rhodesiense*
 - 1.2% in cattle
 - 1.8% in wild animals
 - 0% in domestic dogs
- There are occasional human cases of sleeping sickness, e.g. 1997/98; 2009 (5 cases)
- Wildlife play an important role in the transmission of trypanosomosis to cattle; outside SE, trypanosomosis has caused death of 4 horses



One World One Health (OWOH)

- Started as a 'One Health Concept', then 'One Medicine Concept'; and is also known as One World One Medicine (OWOM) Concept
- The concept was triggered by outbreaks of Ebola HF, Mad Cow Disease, SARS, Avian Influenza, etc which reminded the world that human, domestic animal and wildlife health are intimately connected, e.g. there is an essential link
- Therefore, in order to have a broader understanding of health and disease, a unity of approach through a consilience of human, domestic animal and wildlife health is a pre-requisite-this unity was called 'ONE HEALTH'
- It was a 'product' of a meeting of health experts from around the world which met on September 29, 2004 for a symposium focused on **the current and potential movements of diseases among human, domestic animal, and wildlife populations** organized by WCS and hosted by The Rockefeller University.

Facts on movement of diseases between humans and animals

- 60% of human pathogens are zoonotic
 - 80% of animal pathogens are multi-host
 - 75% of all emerging diseases being zoonotic
 - Nearly all emerging diseases of humans originate from animal reservoirs
- Of the 335 emerging diseases recorded since 1940; 60.3% were zoonoses with most of these (71.8%) originating in wildlife
- Currently, a new disease is emerging every after seven months
- To effectively control these diseases, concerted efforts between disciplines are therefore important and essential.



OWOH facts

- For many years, there has been no or very little link/collaboration between human, domestic animal and wildlife health professionals
- No one discipline or sector of society has enough knowledge and resources to prevent the emergence of diseases in today's globalized world.
- Only by breaking down the barriers among agencies, individuals, specialties and sectors can we unleash the innovation and expertise needed to meet the challenges of health of people, domestic animals, and wildlife and to the integrity of ecosystems.
- Since 2004, four OWOH events/symposiums have been held in New York (2004), Bangkok (2004), Beijing (2005) and Brazil (2007).

OWOH Concept definition

- One Health concept is a Worldwide strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, domestic animals and wildlife
- It is an international, interdisciplinary and cross-sectoral holistic approach for combating/preventing epidemic/epizootic disease and for maintaining ecosystem integrity for the benefit of humans, their domesticated animals and the foundational biodiversity that supports us all
- Therefore, diseases of livestock, wildlife and human populations call for national and inter-disciplinary control strategies involving medical, veterinary and allied science experts in disease research, detection, identification, etc



THANK YOU

