

Swiss TPH



Swiss Tropical and Public Health Institute  
Schweizerisches Tropen- und Public Health-Institut  
Institut Tropical et de Santé Publique Suisse

Human and Animal Health Research Unit

# **RVF outbreak in Kenya: resource capacity, tasks and constraints of the public health and livestock sectors**

Esther Schelling, Swiss Tropical and Public Health Institute

Tabitha Kimani, Department of Veterinary Services Kenya

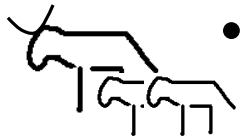
Tom Randolph, International Livestock Research Institute



## Rift Valley Fever

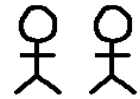
- Viral zoonosis
- Transmission to animals by mosquito species
- Main risk for people: Direct or aerosol contact to infected livestock (slaughter and necropsy!) and consumption of livestock products (milk!)
- → mass livestock vaccination most effective to prevent human cases
- El Niño / Southern Oscillation
- → can lead to abnormally heavy rains (e.g. East Africa)
- Mosquitoes lay eggs in flood-prone areas (arid and semi-arid lands) → Control of mosquito egg laying sites
- RVF virus passed from female mosquito to her eggs
- Eggs dormant in soil for long periods
- Heavy rainfall, eggs hatch (some are transovarially infected)

## Clinical symptoms and economic losses



- High mortality in ruminants (offspring!)
- Abortions in sheep and goats up to 50%
- 'Exotic' breeds more susceptible

- Clinical symptoms from mild febrile illness to hemorrhagic fever with complications (retinopathy, hemorrhagic fever, encephalitis [ $< 5\%$ ])
- Mortality  $\sim 1\%$

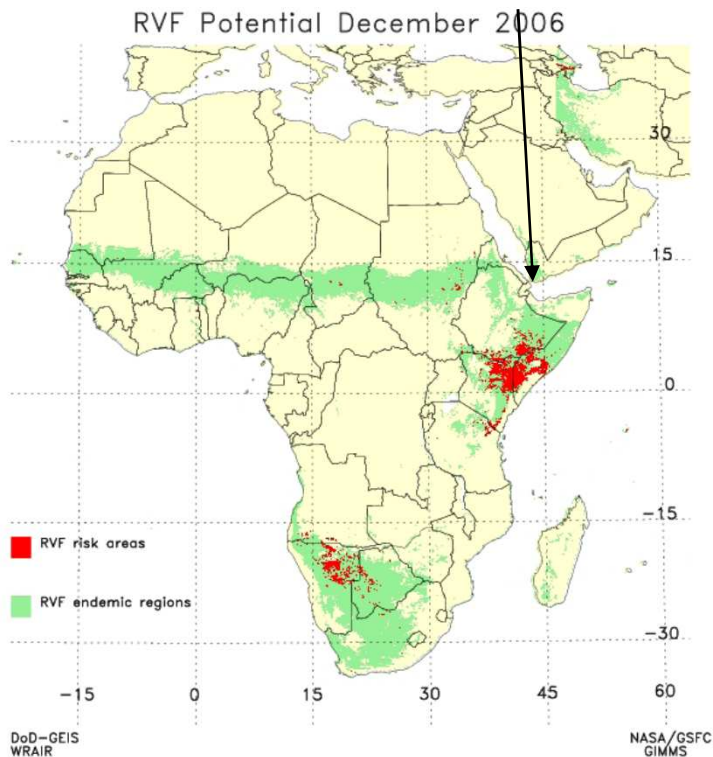


- Major economic consequences from livestock abortions, mortality; export bans; movement restrictions  $\rightarrow$  national and international trade losses, other sectors such as tourism

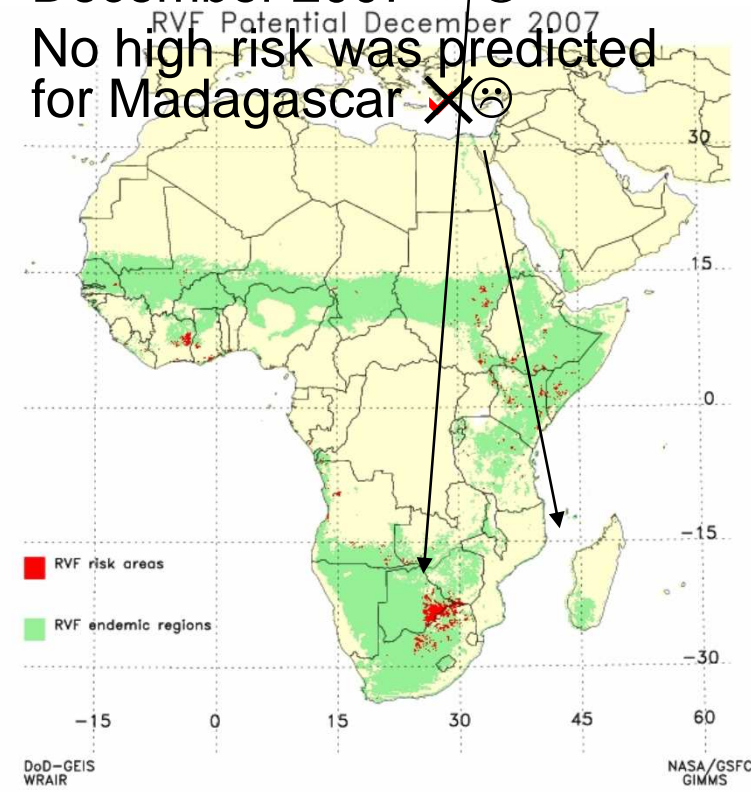


# Prediction

- Models using remotely-sensed environmental indicators are useful, but sometimes not appropriate (e.g., West Africa)
- Governments discouraged when outbreaks predicted and nothing happens
- Livestock trade must be considered to explain / predict RVF spread, e.g. Sudan, Egypt, Horn of Africa, Arabic peninsula
- December 2006 ✓ 😊

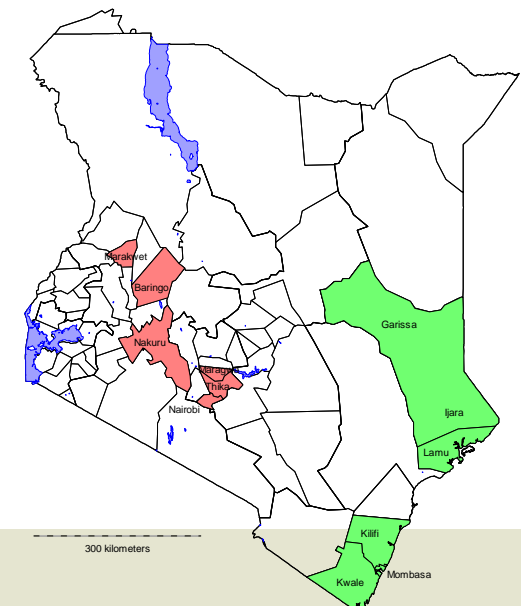


- December 2007 ✓ 😊
- No high risk was predicted for Madagascar ✗ 😞



## Just after the outbreak

- April – May 2007: Assess the human and animal health response capacity, costs and lessons learnt for design of enhanced and achievable response strategies and better awareness on multisectoral effects of RVF
- Livestock and veterinary sector: 14 interviews in North Eastern Province/Coast Province; 12 provincial/national authorities
- Public health sector: 6 structured interviews in Provinces; 1 interview with MoH
- Households: 27 structured interviews; in 24/27 hhs livestock was affected; 5 had a human case, 2 in 3 described a case in the vicinity
- Socio-economic impacts in the livestock and public health sectors, households and business also assessed in Nairobi, Central and Rift Valley Provinces by the Department of Veterinary Services

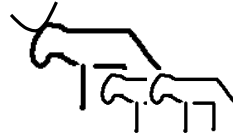


## Impact on hhs and coping strategies

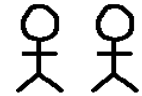
- Most important losses among small scale livestock keepers: 35% less food available; 46% fewer savings than previous year
  - Lack of market access for live animals, milk and manure
  - Reduced milk production (78%↓ during 1 month)
  - Food insecurity – no consumption of animal products
  - Livestock abortion and mortality
  - Costs for treatment and visits to the hospital
- Depending on other livelihoods (50%). Coping strategies

	Cattle		Goats		Sheep	
	N/C	R/N/C	N/C	R/N/C	N/C	R/N/C
– Crops, Charcoal burning, Petty trade, Casual labour						
– Borrowing						
– Relief aid						
– Stop paying school fees						
Morbidity	59	45	57	43	49	47
Abortion	17	14	47	26	60	26
Mortality	39	30	33	26	44	25

## Assigned tasks



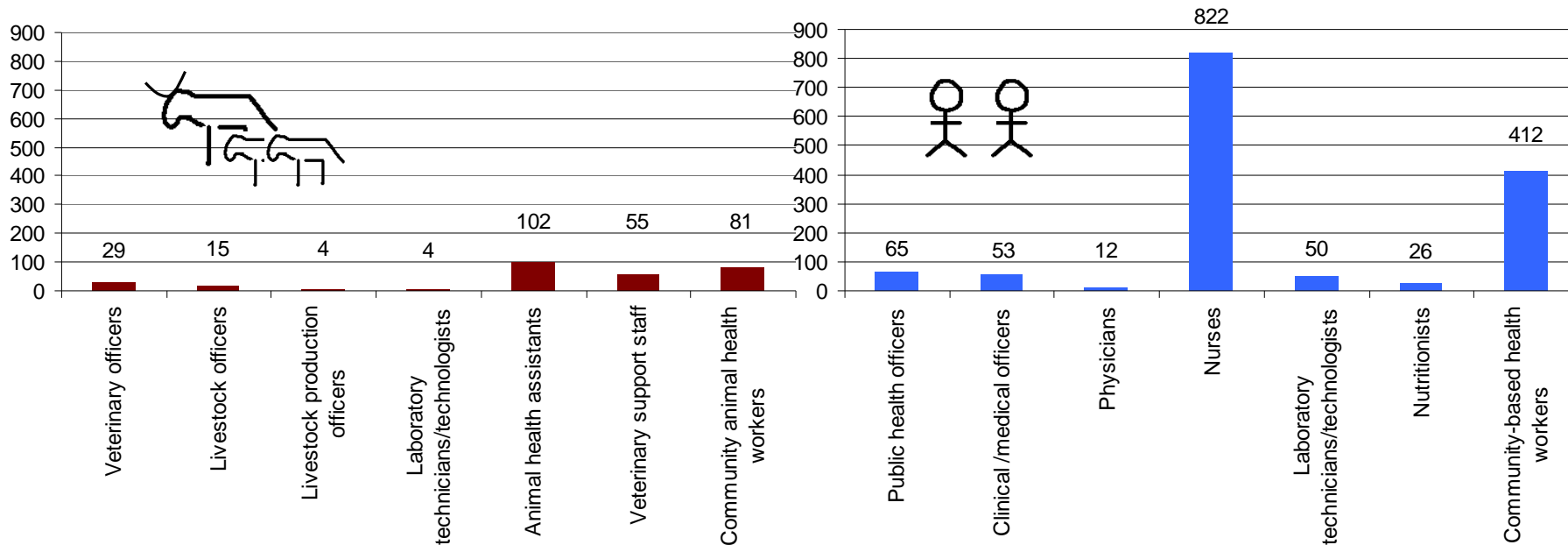
- Education/public awareness
- Vaccination
- Quarantine/isolation of sick animals
- Enforcement of slaughter and Movement bans and market closure
- Mosquito control
- Deworming of animals
- Surveillance/monitoring
- Outbreak investigation including sampling and testing



- Education/public awareness
- Consultation and treatment of patients
- Management of cases (surveillance, diagnosis and reporting of referrals and suspect cases)
- Mosquito control/mosquito nets
- Outbreak investigation including sampling and testing

# Response capacity

- Ratio of deployed health vs. veterinary staff was 5:1



- Diagnosis at CVL: only 1 veterinary officer, 3 technicians, 2 support staff, 5 expatriate experts
- The veterinary services had to borrow extra vehicles because there too few operational ones
- Lack of drugs and diagnostic capacity at local health facilities
- Flooding and damaged roads → inaccessibility
- Fear of contracting the disease from infected family members



Swiss TPH



International agencies	FAO; Red Cross; ILRI; WFP	CDC-KEMRI; WHO, Red Cross
NGOs	Terra Nuova; VSF; MDG project; NEPDP, Oxfam, Plan Kenya	MSF (Spain, Belgium), Kenyan Red Cross, Wellcome; and Merlin, Global Aids, Save the Children
Local administration	Municipal council; chiefs; the directorate of the Province; Churches, Schools; Livestock health and dip committees, Religious leaders, Provincial administration	(Schools, Churches and District administration)
Private sector	Media; Regional veterinary laboratories; Private veterinarians	

- Other active sectors: Entomologists, Arid lands project, Law enforcement of the Office of the President, Police, Military, Marine Life Conservation, Ministry of Information and Communications, UNICEF, World Food Program
- Private veterinarians: advisory role on hygiene and treatment, involved in closing of the slaughterhouse and markets

## Lessons of the veterinary services

- Allowances of livestock sector staff in 2 provinces for 1 month: more than 2x what has been immediately mobilized by the veterinary services for all affected districts
- → main lessons in the districts/provinces and the veterinary headquarters were:
  - Emergency funds need to be set aside
  - Continuous capacity-building of technical staff
  - Appropriate emergency and contingency plan
  - Pre-emergency preparedness including information material/distribution and local early warning
  - Improved collaboration with other sectors (communication, public health sector, meteorologists and vector control)
  - Better flow of information between and within departments

## **Conclusions management of RVF 2006/2007 outbreak Kenya**

- Development of safe and effective vaccines
- Sustained capacity, e.g. diagnostic laboratories
- Required response capacity of the livestock sector
- Early detection and confirmation based on community surveillance and sentinel herds
- Risk communication (avoid conflicting messages) and information flow needs to be enhanced
- Lack of emergency funds delayed response, resources are spread thinly
- Joint surveillance, preparedness and contingency planning elaborated with all line ministries and key partners (e.g. NGOs)

## Ongoing and next steps

- Full socio-economic impacts of RVF and its alternative control programmes to establish cost-effective and achievable realistic strategies
- Assess DALYs (use information on e.g. underreporting of cases - 80-95% in our rapid appraisal)
- Inter-epidemic transmission
- Show added value of a One Health approach