



Bhutan

**OIE Regional Workshop on Vector Borne Disease in the Asia-Pacific Region:
10-11 September 2018, Incheon, Republic of Korea**

[Tshewang Gempo]

[Department of Livestock, Ministry of Agriculture and Forests]

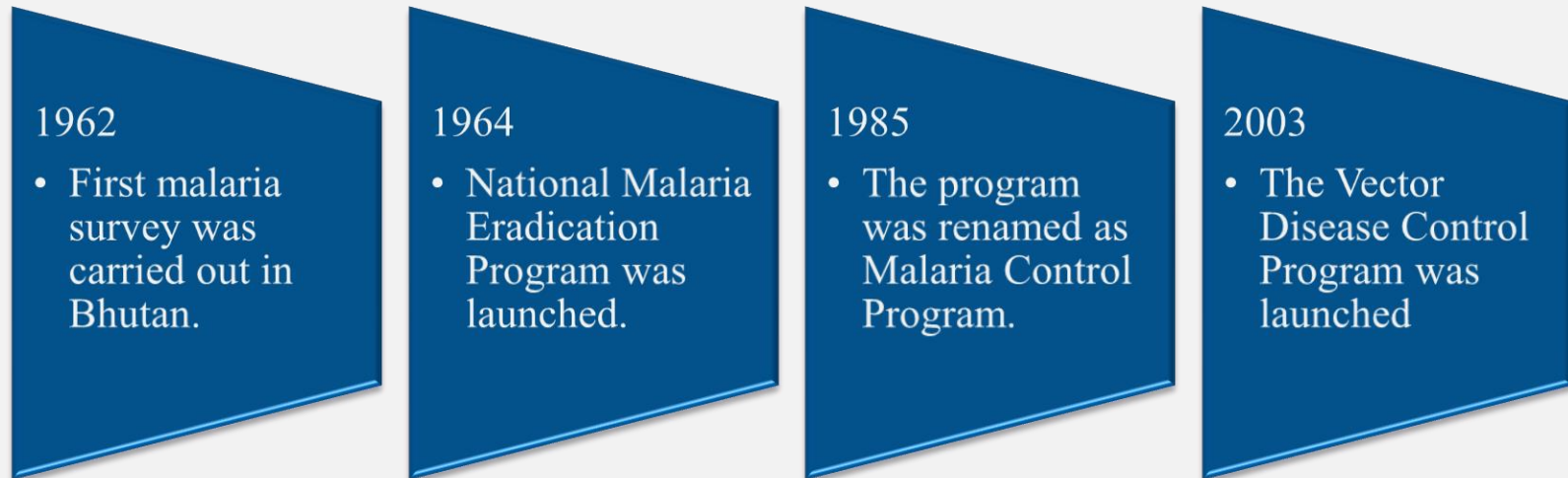
Country Profile

- Bhutan is located in South Asia in the eastern Himalaya
- Have human population of 0.635 million and 0.4 million livestock
- The country's development philosophy is driven by Gross National Happiness philosophy rather than the conventional Gross Domestic Product.



Background

- Limited studies were conducted on vector borne diseases in the country
- Main study was focused on Malaria and established Vector Borne Disease Control program



- The Vector-borne Disease Control Program (VDCP) is under the Communicable Disease Division (CDD), Department of Public Health Ministry of Health

Vectors/Vector Borne disease situation

Bhutan is in elimination stage of malaria

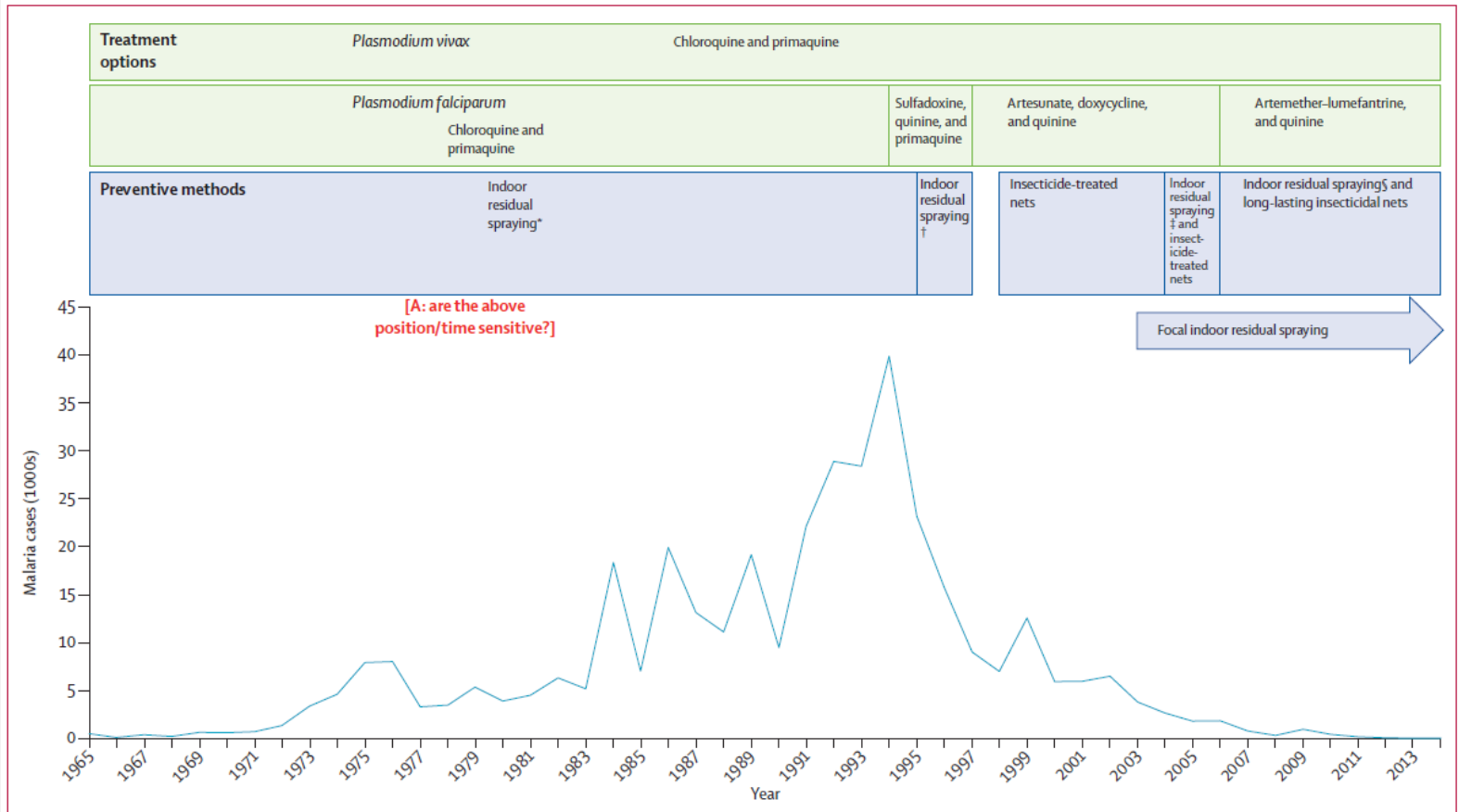
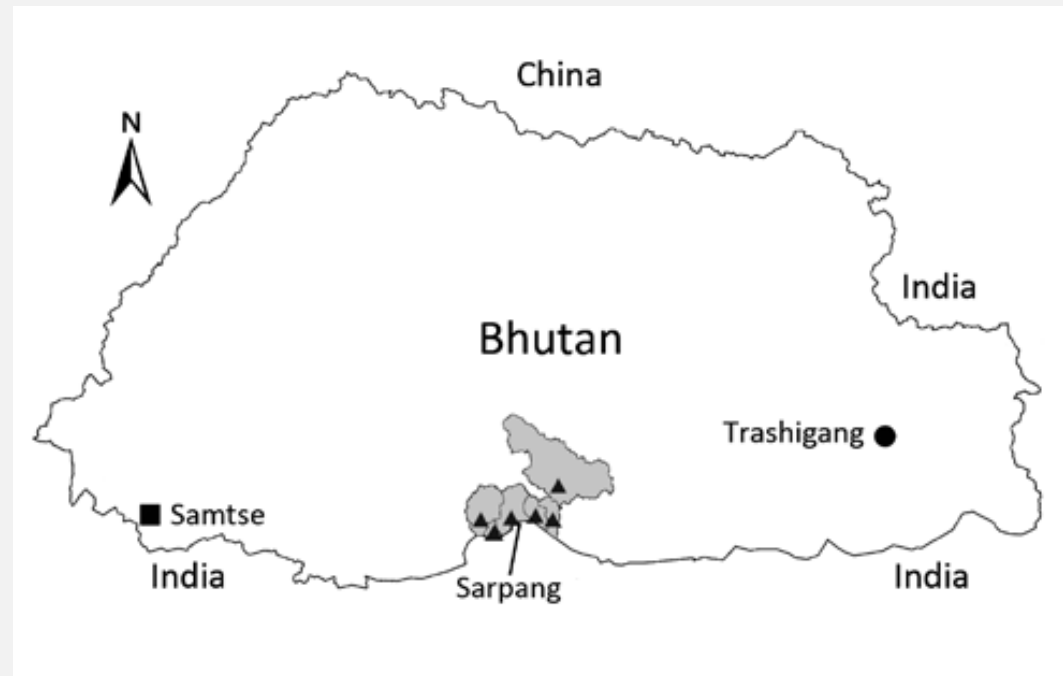


Figure 2: Trend (blue line) in malaria case numbers in Bhutan, 1965–2014

Vectors/Vector Borne disease situation

Evidence of Crimean-Congo Hemorrhagic Fever Virus IgG in Goats in south Bhutan

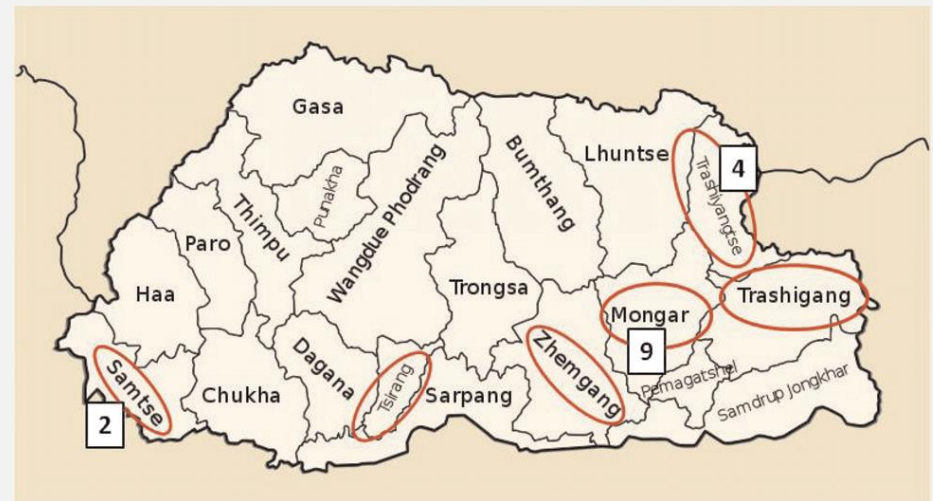
- CCHFV IgG was detected in 31 of 81 (38.2%) goats during 2015 in south Bhutan
- No human cases were reported so far



Wangchuk et al., 2016, Emerging Infectious Diseases, 22:919-920

Endemic Transmission of Visceral Leishmaniasis (Kala-azar) in Bhutan

- *Leishmania donovani* infection in human was first detected in Bhutan in 2006 and is being reported from some areas in Bhutan (*red circle area on map*)
- Vector - Sand fly (*Phlebotomus species identified*)
- Reservoir status in dog population is unknown



Pulimood et al., 2012. Natl Med J India 2012;25:148–50

Yangzom et al., 2012. Am. J. Trop. Med. Hyg., 87(6), 2012, pp. 1028–1037

Scrub typhus infection in Bhutan

- First cases of Scrub typhus infection in human was detected in a place called Gedu in south west Bhutan in 2006 and was named as “*Gedu Syndrome*” which was later confirmed as Scrub typhus infection
- Subsequently, large number of human cases were reported in many part of Bhutan
- Harvesting cardamom; toilet located outside the house; clearing bush and sleeping on grass were identified as important risk factors for Scrub typhus infection in Bhutan (Phuentshok et al., 2018: unpublished data)
- National Scrub Typhus Prevention and control guideline was prepared by Ministry of Health



Vectors/Vector Borne disease situation

Report of important zoonotic pathogens from rodents in Gedu, Bhutan

- 33.3% of rodents were found to be infected with one or more zoonotic pathogens

Rodent species	No. of rodent	No. of Positive						
		Leptospiraspp.	Orientia tsutsugamushi	Rickettsiaspp.	Anaplasma phagocytophilum	Ehrlichia chaffeensis	Bartonellaspp.	Borrelia spp.
Niviventer fulvescens	1	0	0	0	1	0	1	0
Mus spp.	2	0	0	0	0	0	0	0
Mus musculus	1	0	0	0	0	0	0	0
Rattus nitidus	4	1	0	0	0	0	1	0
Suncus murinus	4	0	0	0	1	0	1	0
No. of positives (%)	12	1(8.3)	0	0	2 (16.7)	0	3 (25.0)	0

Phuentshok et al., Unpublished data

OIE Regional Workshop on Vector Borne Disease in the Asia-Pacific Region:

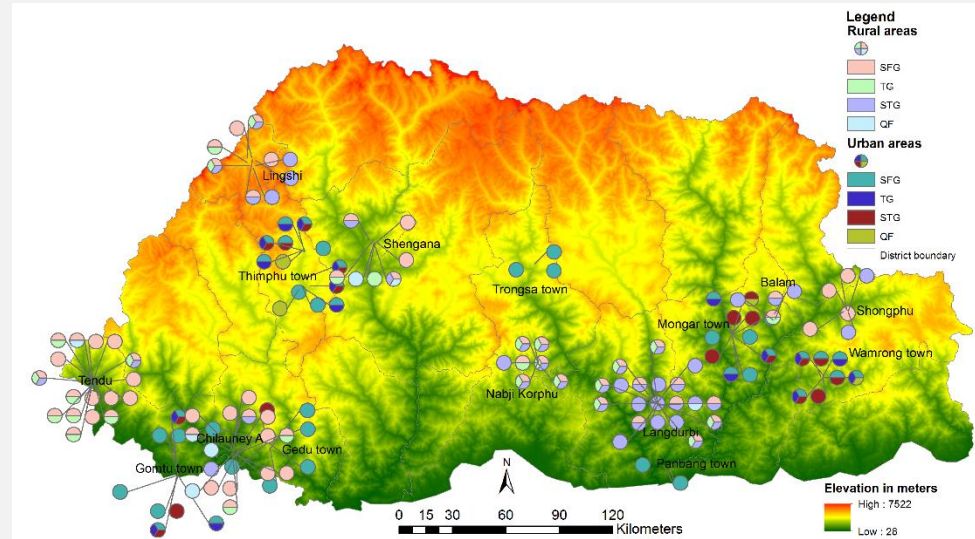
10-11 September 2018, Incheon, Republic of Korea

Vectors/Vector Borne disease situation

Serological Evidence of Rickettsia, Orientia, and Coxiella in Domestic Animals in Bhutan

Of the 294 domestic animals and dogs tested:

- 106 (36%) seropositive to Spotted fever group Rickettsia
- 62 (21%) seropositive to *Orientia*
- 45 (15%) seropositive to Typhus group
- 11 (4%) seropositive to *Coxiella*
- The seropositivity rates of domestic animals were consistent with similar infection in human population in the same areas and probably demonstrate a high prevalence of rickettsial diseases in Bhutan



Tsokey et al., 2018. *Vector borne and Zoonotic disease*

Tsokey et al., 2017. *PLoS Negl Trop Dis* 11(11): e0006107.

Vectors/Vector Borne disease situation

Studies on ticks and tick borne diseases in Bhutan

Following Tick species were identified in Bhutan

- *Haemaphysalis bispinosa* from dogs
 - *Haemaphysalis ramachandrai* from environmental sampling
 - *Ixodes ovatus* from Samber deer
 - *Ixodes acutitarsus* from Tiger and environmental sampling
 - *Rhipicephalus (Boophilus) microplus* from cattle
 - *Rhipicephalus sanguigenus* from dogs
-
- Tick borne disease such as **Babesiosis, Theileriosis** have been reported and confirmed in domestic animals
 - Detailed studies is necessary



Source: Training Report NCAH 2018

National surveillance system/activities for vector/vector borne diseases

- Malaria elimination program – VDCP
- Acute Undifferentiated Febrile Illness (AUFI) surveillance – RCDC
- Rodent borne pathogen surveillance (ongoing study)– NCAH

Issues

- South Asia is considered as global hotspots for emerging infectious diseases
- Tick borne diseases reported from India, Pakistan, China (KFD, CCHF, ASF)
- Presence of vectors which carry infectious pathogens in Bhutan – ticks, mosquitoes, sand flies, mites
- Climate change- Studies elsewhere shows climate change as an important driver of vector borne disease
- Limited studies on vector borne diseases in Bhutan
- Close association with pet and livestock (husbandry practices)
- Human settlements close to vegetation and forests (71% forest cover in Bhutan)
- Changing agricultural practices (e.g – extensive cultivation of cardamom which has been identified as a risk factor for scrub typhus transmission)

Lessons learned and limitations

- Lack of advanced diagnostic facilities in Bhutan for VBD
- Joint (One health) studies not conducted
- No legislation
- Poor knowledge on VBD of clinicians
 - Inadequate diagnosis often leading to wrong treatment and delayed recovery or death sometimes.
 - Limited number of entomologist (for pathogen carrying vector)
 - Inadequate surveillance system

Proposal/suggestion for new policy and strategy

- Develop National strategy for prevention and control/preparedness to emergence of VBDs
- Inter-disciplinary research on vectors and VBDs

Acknowledgements



WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future



**Department of Livestock,
Ministry of Agriculture and Forests**