

Protecting Himalayan Health: landscape based disease surveillance in wildlife and exploring zoonotic hotspots through one health approach

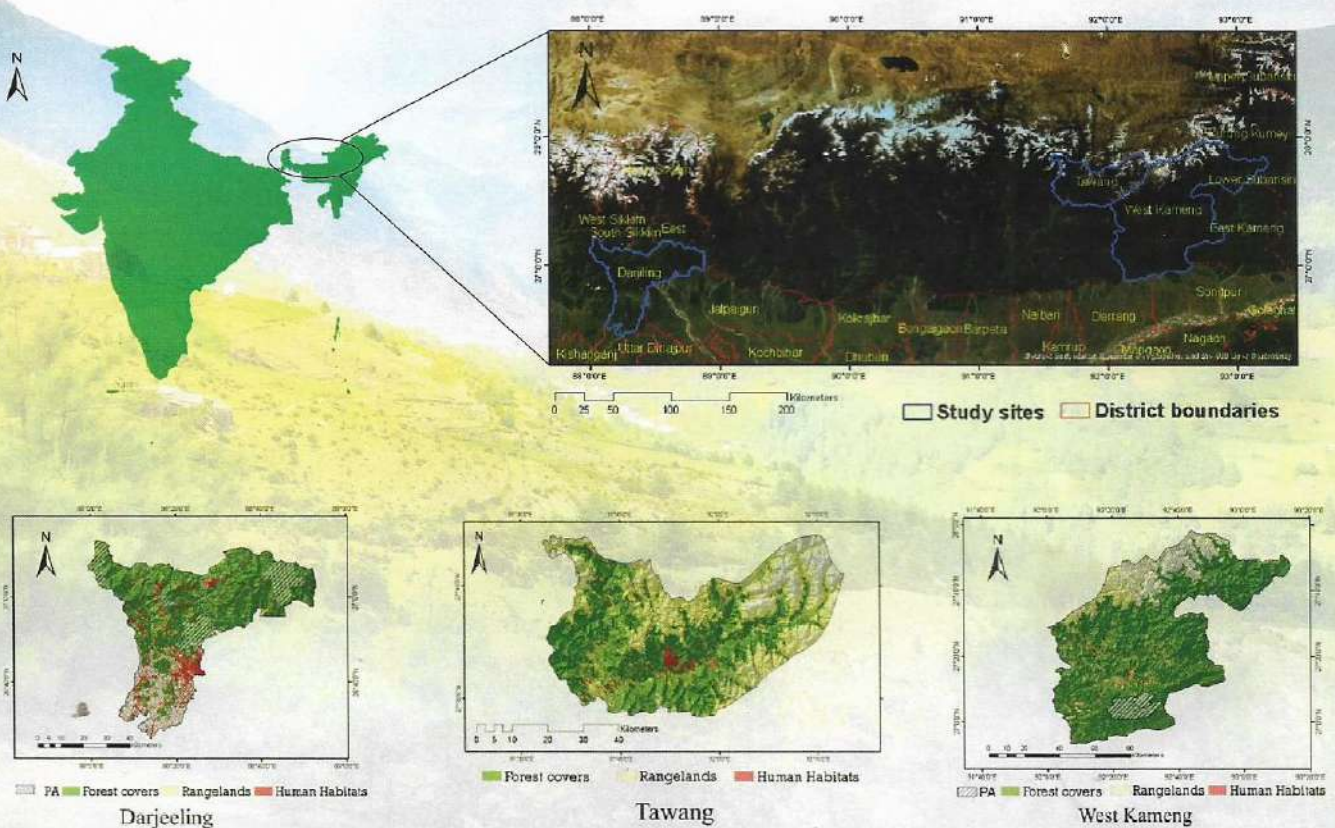
Zoonotic diseases, transmitted from animals to humans pose a serious global health threat, especially at the increasingly porous boundaries between wildlife, livestock, and people. Wildlife serves as natural reservoirs, with vectors like mosquitoes, mites and ticks aiding transmission. In biodiversity-rich nations like India, rising human-animal interactions and limited veterinary infrastructure heighten spillover risks. Globally, over 60% of emerging diseases are zoonotic, with nearly 75% originating in wildlife in the last three decades.

South and Southeast Asia, particularly India often act as hotspots for emerging zoonoses, driven by dense populations, rich biodiversity, and weak public health infrastructure. Recent outbreaks like Nipah, avian influenza, and SARS, highlight the urgent need for early detection and integrated surveillance. However, gaps remain in understanding pathogen diversity in Indian wildlife, especially in remote Himalayan regions. This study thus adopts a novel metagenomic approach using blood-fed ectoparasites to explore zoonotic pathogen dynamics, aligning with the One Health framework to strengthen local as well as global disease preparedness.

Project Objectives

- » Diagnose bloodborne pathogens in wildlife in Central and Eastern Himalayas using hematophagous ectoparasites
- » Assess the zoonotic potential by analysing both the local communities and surrounding livestock and wildlife map the disease hotspots
- » Develop RT-PCR-based diagnostic assays for rapid disease surveillance and produce trained professionals for wildlife health monitoring in project sites

Study Sites



Principal Investigator : Dr Mukesh Thakur, Scientist D, Zoological Survey of India, Kolkata
Co-Principal Investigator : Dr. Manisha Biswal, Professor, PGIMER- Chandigarh
Dr Ayan Mukherjee, Assistant Professor, WBUAFS, Kolkata

Adopted framework to implement the

Field surveys & sample collection



LULC classification & survey the forested habitats primarily in Wildlife-Livestock interface

Map/Identify and engage stakeholders



District Health Office/
Primary Health Centres



District Animal Husbandry,
Veterinary Hospital/Vet Centres



Forest deptt.

Establish One health interest



Stakeholder engagement

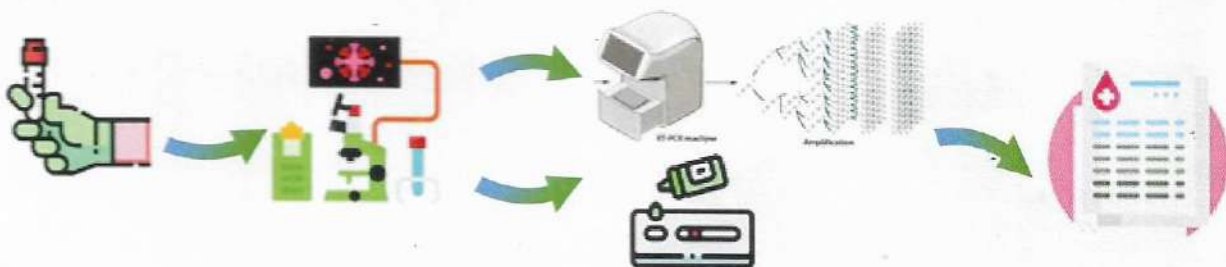


citizen consultation workshop



Identify and establish sustained Governmental support for One health

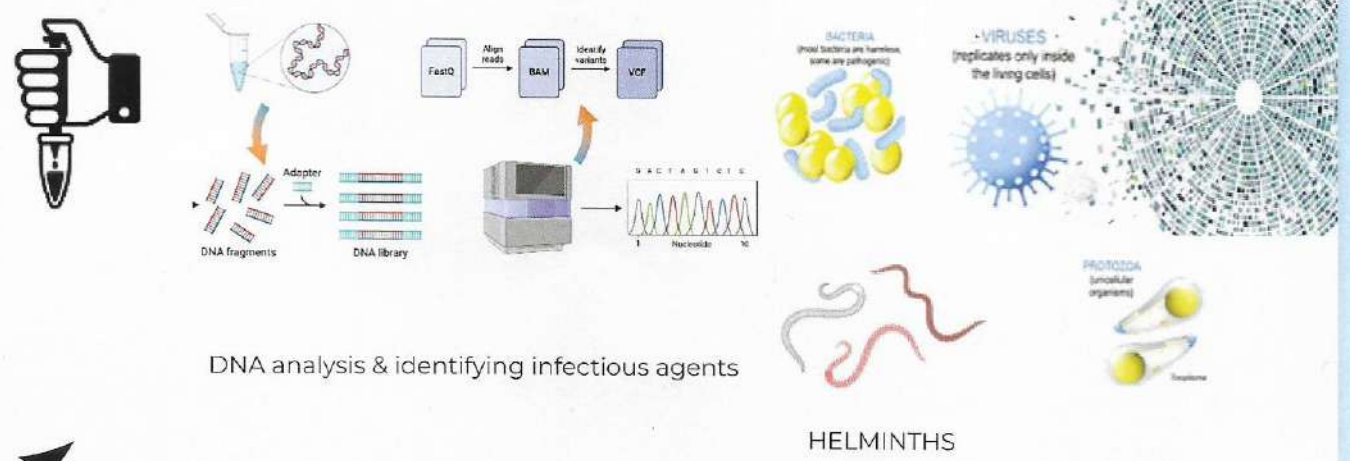
Novel assay for rapid diseases surveillance



Create diagnostics protocols /SOPs/ assays and Patents for Zoonotic disease surveillance

project following One Health approach

Identifying host, vector and pathogens



DNA analysis & identifying infectious agents

HELMINTHS



Collection of samples (livestock, local communities) and DNA analysis for identifying the pathogen

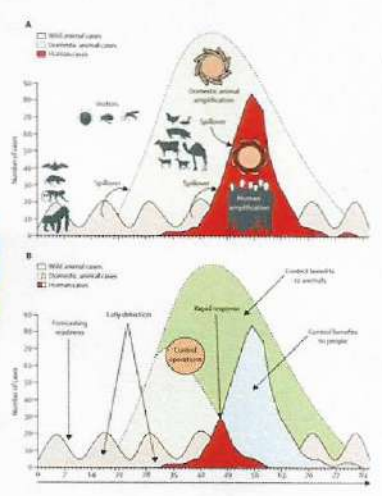
Livestock Sample collection from Animal Husbandry & District Vet Hospital



Human Sample collection from District Hospital

Mapping zoonotic diseases & develop controlling strategies

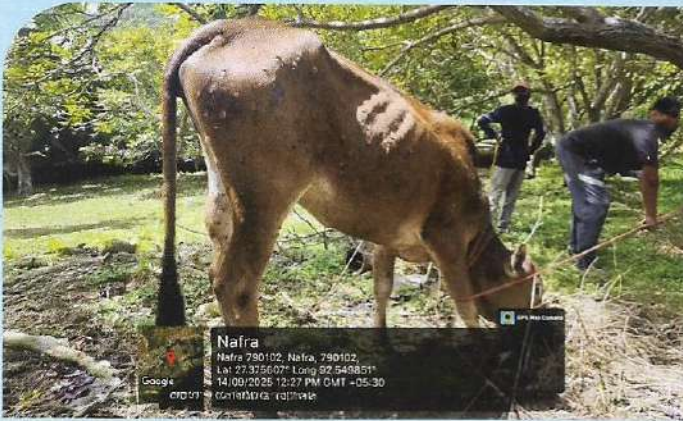
Prioritise zoonotic diseases



Sharing of protocols/assays with the trained professionals

Project Deliverables

1. Comprehensive cataloguing of Haematophagous ectoparasites, from wildlife, livestock, and Human samples.
2. Generation of novel DNA barcodes and digital sequence information (DSI) of pathogens and ectoparasites.
3. Identification and mapping of key zoonotic disease hotspots and high-risk zones.
4. Development of standard operating procedures (SOPs) and practical field manuals for effective pathogen detection.
5. Optimization and validation of advanced diagnostic assays for major zoonotic pathogens.
6. Organizing of four annual training programs, including one specialized workshop, for forest, veterinary, research and public health professionals.
7. Enhancement of a robust, multi-stakeholder network to drive One Health-based disease surveillance and conservation initiatives.



Project beneficiaries and partners

- » State Forest Department
- » Animal Husbandry and Veterinary Departments
- » Public Health Department
- » Local Community-Based Organizations (CBOs)

Funding Agency

NMHS



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