

Weaving Ecology, Health, and Human-Nature Coexistence

Through Convergence of Governance for One Health and Climate Resilient Zoonoses Management in Goa

Pradip Sarmokadam^{1,3}, Stefanie Preuss², Michelle Fernandes^{3*}, Balaji Sivaraman², Roshan Puranik², Lalita Baragi³, Apurva Sawant³, Rupesh Velip³, and Saloni Kakodkar³

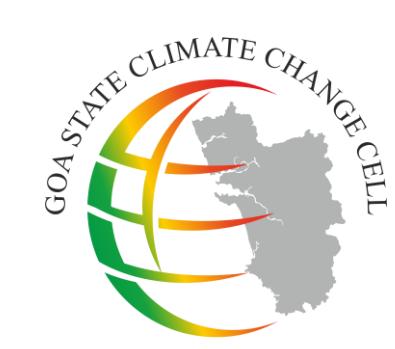
¹ Goa State Biodiversity Board, Department of Environment and Climate Change, Goa

² Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

³ Goa State Climate Change Cell of the Goa State Biodiversity Board, Department of Environment and Climate Change, Goa, *Corresponding author



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Zusammenarbeit (GIZ) GmbH



Aim: This project aims to support community empowerment and ecosystem-based strategies to prevent the transmission of Kyasanur Forest Disease (KFD), a tick-borne zoonosis affecting forest-fringe communities of the Western Ghats and specific monkey species.

Background: The Government of India's One Health initiative embodies India's timeless philosophy that human, animal, and environmental well-being are interdependent elements of a single system. One Health calls for an integrated approach that reconnects contemporary lifestyles with traditional practices to enable beneficial coexistence of humans and nature. As the ancient Sanskrit proverb wisely states, **यत् पिंडे तद् ब्रह्माण्डे** (Yat pinde tad brahmāṇḍe) — “The microcosm reflects the macrocosm.” This perspective reminds us that human health cannot be viewed in isolation but must be understood in relation to the balance and vitality of the surrounding natural world. Guided by this vision, and in response to climate change and emerging zoonoses, the State of Goa is implementing the Indo-German Project on ‘One Health and Agroecology’ under the Ministry of Environment, Forest, and Climate Change (MoEFCC).

यत् पिंडे तद् ब्रह्माण्डे

— “The microcosm reflects the macrocosm.”

Approach: The project advances ecosystem-based strategies and empowers forest-fringe communities to manage KFD and related risks, **integrates traditional ecological knowledge with modern monitoring**, strengthens governance convergence across departments, builds long-term institutional and academic One Health capacity, and develops a **replicable model for ecosystem-based zoonoses resilience**. The Goa State Biodiversity Board (GSBB) under the Department of Environment and Climate Change, is the State Nodal Agency, facilitating multi-departmental coordination with the aim of convergence of governance across Health Services, Animal Husbandry and Veterinary Services, Forest, Environment, Agriculture and Panchayati Raj institutions. This convergence would result in non-duplication of action, expenses and resources thereby streamlining zoonoses management in Goa.

Intervention Focus Areas / Methodology

Joint Decision-Making



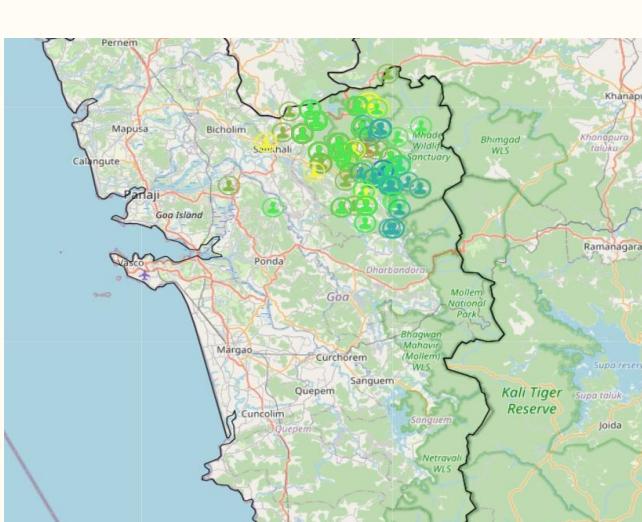
Empowerment of local communities



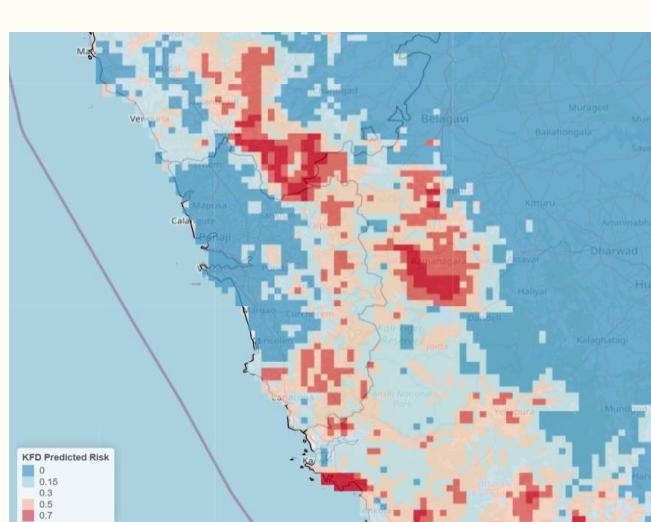
Long-term capacity building



Spot Maps created to demonstrate the spread of KFD in Goa over the past years and to identify high-risk areas.



Spot Map of Goa showing the locations of KFD cases from 2015-2024.



Spot Map of Goa showing the risk prediction, i.e. areas that are vulnerable for KFD cases in the future.

- State-level One Health Working Group and Zoonoses Committee
- 12 Village Panchayat-level One Health Groups constituted in Sattari taluka
- Peer-learning exchange visit – Karnataka
- Feasibility Study on **Disease Data Exchange**

- **Training & awareness** programs on One Health, KFD prevention and tick-bite risk reduction
- Documentation of **traditional tick repellent practices** and local ecological knowledge
- Integration into:
 - State Biodiversity Strategy and Action Plan (**Zoonoses chapter**)
 - People's Biodiversity Registers (PBR) (**Zoonotic-risk indicators**)

- Integration of One Health modules into Goa University & Forest Training School curricula
- **Studies** on: The impact of environmental conditions on the spread of KFD; Traditional tick repellent practices; Tick-host dynamics including the influence of human-wildlife interactions, e.g. due to monkey movements induced by land-use change
- Investigation of **tick-repelling plants** such as marigolds (*Tagetes spp.*), and lemongrass (*Cymbopogon flexuosus*).
- Investigation of suitable **deterrent measures** to limit monkey movement into human habitation zones, supporting co-existence and reducing disease risk, such as **bio-fencing** using living plants or physical barriers like fences.
- Removing **invasive species** to restore ecological balance and lower tick risk.
- Encouraging backyard rearing of **chickens**, which contributes to tick control.



Tick spotted on *Chromolaena odorata* in Valpoi forest, Goa.

आरोग्यं धनं संपदा

— “Health is the richest form of wealth, the root of all flourishing.”

The well-being of people, animals, and the environment — is the foundation of collective prosperity.

Specific Outcomes:

- **One Health governance operationalised in Goa** through reactivated State-level coordination mechanisms and interdepartmental collaboration.
- **Community-level One Health action established in KFD-prone areas**, with 12 Village Panchayat One Health Groups formed in Sattari Taluka.
- **Evidence-based KFD risk management strengthened**, with development of multi-year spot maps and cross-sectoral capacity building.
- **Traditional, Natural and eco-friendly practices** within the One Health and Agroecology framework for sustainable, long-term KFD prevention strategies.

Acknowledgements:

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References:

Kotecha, R., & Pandey, D. N. (2025). *Rediscovery of Vrikshayurveda: A nature-based vision for sustainability. Journal of Ayurveda and Integrative Medicine.*
Pattnaik, P. (2006). Kyasanur Forest disease: An epidemiological view in India. *Reviews in Medical Virology.*
Singh, S. K., et al. (2015). Kyasanur Forest disease virus: Epidemiology, disease ecology and future directions. *Expert Review of Anti-infective Therapy.*



One Health and Agroecology Project