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ILRI project brief

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Assessment of the economic impact of priority animal diseases and the cost-effectiveness of their control strategies in India

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Objectives:

- Development of an integrated epidemiological-economic framework through participatory system dynamics modeling that can be used to quantify economic and non-economic impacts of animal diseases and their control strategies under different scenarios.
- Application of the framework to assess the impacts of peste des petits ruminants (PPR) in different regional settings.
- Understanding of social and gendered underpinnings associated with animal disease control and management strategies.
- Application of the framework to other diseases.
- Institutionalization of epidemiological-economic approaches to inform policymaking and decision-making.

Project mandate

Assessment of the economic impact of animal diseases is critical for informed decisions on appropriate interventions to mitigate disease burdens on various stakeholders. The 'Assessment of economic impact of priority animal diseases and their control project in India' project is assessing the economic impact of three priority animal diseases in India: peste des petits ruminants (PPR), hemorrhagic septicemia (HS) and brucellosis. Initially, between 2019

and 2020, the economic impact of PPR and the financial loss to farmers and different value chain actors (traders and retailers) in the event of disease in sheep and goats were evaluated.

About the disease

PPR is an acute contagious disease affecting goats and sheep in the Indian subcontinent. PPR is characterized by high fever, anorexia, necrosis and ulceration of mucous membranes, inflammation of gastrointestinal tract leading to diarrhoea, ocular and nasal purulent discharge, pneumonia, and high mortality. The disease may affect up to 100% of animals in the flock in an outbreak, with deaths between 20% to 90%. The World Organisation for Animal Health (OIE) has identified PPR as a notifiable and economically important transboundary viral disease of sheep and goats associated with high morbidity and mortality. Presently, PPR outbreaks are reported regularly, and the disease is considered to be endemic throughout India.

Brief project progress report

ICAR-NIVEDI, Bangalore

To assess the impact of PPR, the India Council of Agricultural Research–National Institute of Veterinary Epidemiology and Disease Informatics (ICAR-NIVEDI) surveyed two districts, each in Andhra Pradesh and Karnataka. Based upon the sampling plan and sampling design, Anantapur and Prakasham districts from Andhra Pradesh and Bellary, and Mandya districts from Karnataka, were selected (based on sheep and goat population density (km2). Further, the value chain actors (farmers, traders, and retailers) associated with sheep and goats production were also surveyed. A multi-stage random sampling technique was followed to conduct the primary survey. A total of 158 farmers (shepherds) were sampled in Anantapur and 109 in Parkas districts of Andhra Pradesh were surveyed. Similarly, 160 sample farmers (shepherds) in Bellary and 138 sample framers (shepherds) in Mandya districts of Karnataka were surveyed. Besides farm-level data, 7 traders and 8 retailers from Ananthapur District and 10 traders and 13 retailers from Prakasam District of Andhra Pradesh, and 13 traders and 15 retailers from Mandya, and 7 traders and 9 retailers from Bellary District of Karnataka were also surveyed.

The pooled results revealed that in Andhra Pradesh, the estimated mortality loss due to PPR in sheep and goats was INR. 3,463.30, INR. 5,295.50 and INR. 7,170.40 per animal in <6 months, 6-12 months, and >1-year age group animals, respectively. The estimated average weight loss in the morbid sheep and goats caused a financial loss of INR. 7,335.5 and INR. 398.6 per farm and animal, respectively. The estimated average treatment cost incurred by the farmers to control PPR was INR. 1,150.8 and Rs. 66.2, whereas the opportunity cost of labour to nurse the infected animals was INR. 1,207.2 and INR. 83.1, per farm and animal, respectively. Similarly, the average distress sale loss was Rs. 17,075.0 and Rs. 5,253.8 per farm and animal, respectively.

ICAR-IVRI, Izatnagar

ICAR-Indian Veterinary Research Institute

(IVRI), as per approved sampling protocol, surveyed two districts in Uttar Pradesh–Bareilly, and Sitapur (based on sheep and goat population density per sq km). Apart from the farmers, value chain actors (traders and retailers) associated with sheep and goats were also surveyed. A multi-stage random sampling technique was followed to conduct the primary survey. A total of 164 and 173 sample farmers (shepherds) were surveyed from the Bareilly and Sitapur districts of the state, respectively. Besides farm-level data, 11 traders and 6 retailers from Bareilly District, and 12 traders and 13 retailers from Sitapur District of Uttar Pradesh were also surveyed.

The pooled results revealed that in the Bareilly District, the estimated mortality loss due to PPR in sheep and goats was INR. 900.00, INR. 3,129.33 and INR. 5,855.56 per animal in <6 months, 6–12 months, and >1-year age group animals, respectively. The estimated average treatment cost incurred by the farmers to control PPR was INR. 3,236.00 and INR. 593.00 per farm and animal, respectively. The opportunity cost of labour to nurse the infected animals was INR. 48.75 and INR. 15.17 per farm and animal, respectively. As the incidence rate in the district was low and the case fatality rate (CFR) was 100%, the average body weight loss could not be estimated. Incidence of distress sale loss on account of the disease was also not observed in the district. Similarly, in the Sitapur District of Uttar Pradesh, the estimated mortality loss due to PPR in sheep and goats was INR. 873.23, INR. 4,070.07 and INR. 7,276.26 per animal in <6 months, 6–12 months, and >1-year age group animals, respectively. The estimated average treatment cost incurred by the farmers to control PPR was INR. 660.00 and INR. 94.27 per farm and animal, respectively. The opportunity cost of labour to nurse the infected animals was INR. 56.52 and INR. 9.80 per farm and animal, respectively. The average distress sale loss was Rs. 10,294.83 and Rs. 5,325.09 per farm and animal, respectively. As CFR was 100%, the body weight loss could not be estimated.

Ongoing work

System dynamic modeling on sheep and goat PPR value chains, using Stella Architect, for surveyed states is in progress. The objective is to analyse quantitatively the impact of different intervention scenarios made in different actors nodes and on the overall value chain.

Project investigators

Role	ILRI	ICAR-NIVEDI	ICAR-IVRI
Principal investigator	Sirak Bahta Senior agricultural economist Policies, Institutions and Livelihoods Program	G. Govindaraj Senior scientist ICAR-NIVEDI, Bengaluru	D. Bardhan Principle scientist
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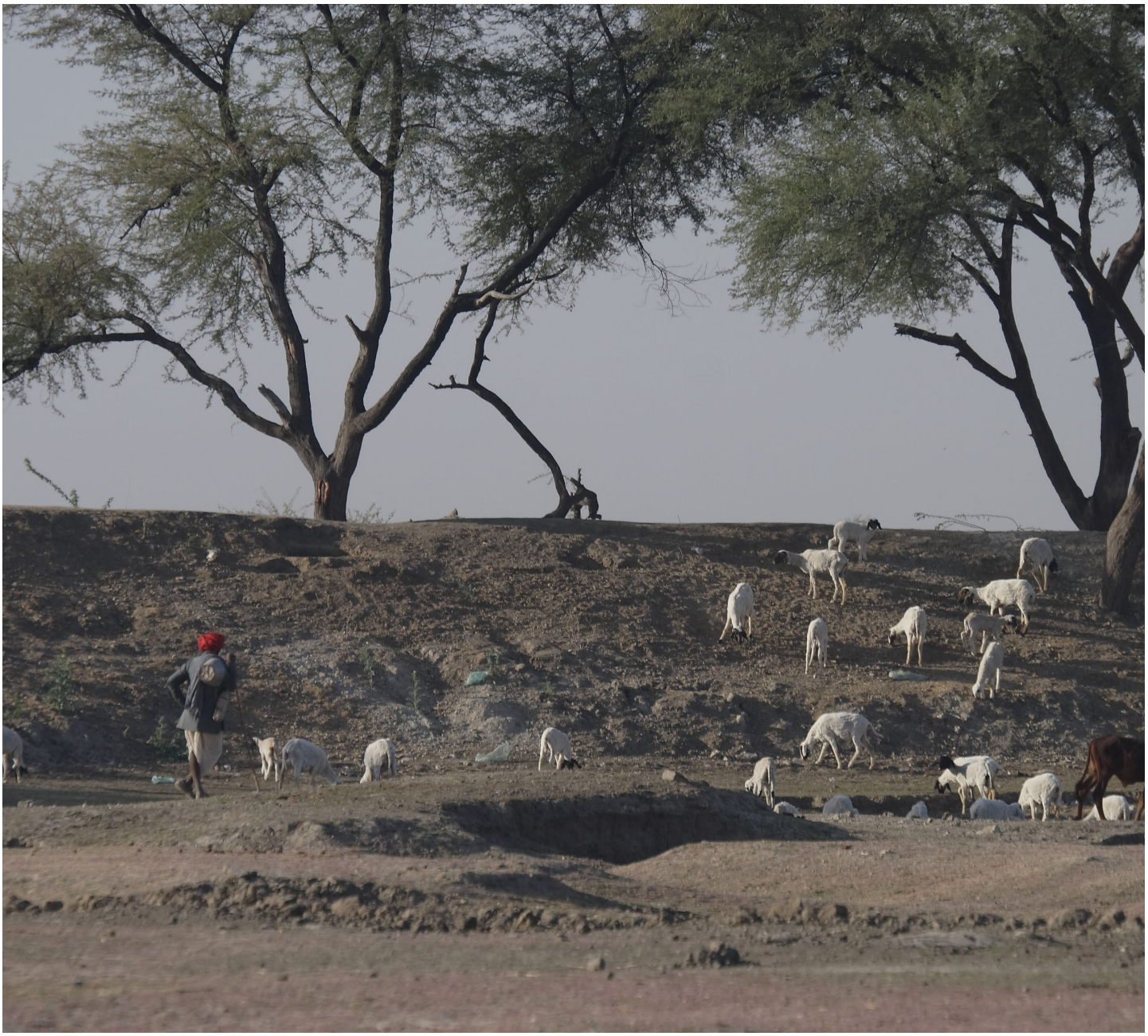

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