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A Comprehensive Review of Indian Stray Dogs

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Abstract

Indian stray dog (*Canis lupus familiaris*) population is a component of India's free-roaming dog population, influencing public health, urban ecological processes, and social dynamics. This review critically assesses their ecological roles, behavioural adaptations, health concerns, and human interactions, along with socio-cultural perceptions and policy issues. The focus is on the complexities of stray dog population management in India, the research gaps, and proposing evidence-based solutions to sustainable management that balance public safety, animal welfare, and ecological balance.

Keywords: Stray dog (*Canis lupus familiaris*), Socio-cultural dynamics, population management, public safety, ecological balance.

Introduction

Indian stray dogs, popularly referred to as "desi dogs" or "pariah dogs," are a common sight in urban and rural areas. Estimated to be between 60-65 million (2021–2023), they have multifaceted roles in ecosystems and human societies (Bril et al., 2024). Though they are ecologically and culturally important, the lack of a national standardized census, few longitudinal studies, and disjointed policy frameworks hinder effective management strategies. This review integrates existing knowledge on stray dog populations, highlighting their ecological value, health concerns, and intricate socio-cultural dynamics, and mapping avenues for policy enhancement and public health interventions.

Ecological Significance

Stray dogs have a bifunctional contribution to make to urban ecosystems (Araújo et al., 2024). They have a scavenging role in waste disposal that is useful but pose ecological problems in their competition with indigenous fauna and the risk of transmission of zoonotic disease. Their interactions with urban wildlife may alter predator-prey dynamics and affect biodiversity. However, few data exist on their ecological contribution in various environments. Measurement of their effect on urban nutrient cycling, their effect on indigenous wildlife, and the ecological value of population management practices are all areas to be explored by future studies (Sharma et al., 2018).

Behavioural Ecology

Stray dogs are highly behaviourally flexible and can adapt to varied urban and rural habitats (Boitani et al., 2007). Social organization, cognitive problem-solving capacity, and human interactions are crucial for their survival. Pack dynamics, territoriality, and adaptive strategies to urbanization must be investigated in greater depth. Long-term behavioural studies can potentially elucidate the effects of urban stressors on social cohesion, foraging behaviour, and conflict behaviour and hence can go a long way in the development of more effective management policies.

Importance of Stray dogs

Feral dogs make significant contributions to urban ecosystems and social life of communities in addition to their ecological contributions (Instone et al., 2014). They offer companionship and assist in disorganized waste management by scavenging in most communities. They are culturally positioned in a place of respect in certain societies and influence public perception of their welfare. There is limited comprehensive examination of their socio-economic contributions and psychological effects on urban communities. Research on their impact on community cohesion, mental health, and urban waste management could advance more advanced management policies (Fig 1).

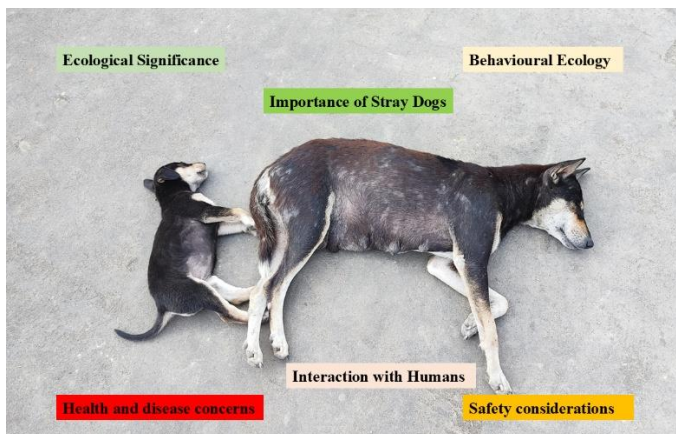


Figure 1: Stray dog with her baby.

Health and disease concern

Stray dogs serve as reservoirs of various zoonotic infections, of which rabies is a significant public health issue in India (Sharma et al., 2017). While vaccination drives have been initiated, gaps in cover persist, and thousands of lives are lost annually. Other infectious diseases common in such populations are canine distemper, parvovirus, leptospirosis, and parasitic infections such as mange and helminthiasis. Emergence of antimicrobial resistance (AMR) in stray dog populations, propelled by the random use of antibiotics, is an increasingly growing public health issue. Incorporation of stray dogs in national AMR surveillance programs and strengthening vaccination and deworming drives are major steps toward controlling such health risks (Gupta et al., 2023) (Fig 2).



Figure 2: Stray dogs.

Canine diseases

According to the Ministry of Health and Family Welfare, Government of India. (2020), Rabies is still the most serious zoonotic threat, and the main reservoir is stray dogs. Vaccination gaps and irregular post-exposure prophylaxis maintain transmission. Parvovirus and canine distemper epidemics kill stray dog populations (Kasondra et al., 2023), breaking herd immunity and making them susceptible to secondary infection. Leptospirosis, which is intensified during monsoons, infects humans and animals. The emergence of AMR further weakens disease control. Disease control depends on national surveillance reports, special vaccination drives, and antibiotic regulation.

Human-Stray dog interaction

Human-stray dog interaction in India is conditioned by cultural respect, sympathy, and occasionally conflict. Though numerous communities are actively concerned about stray dogs, dog bites, nuisance by barking, and feelings of threat to safety create negative attitudes. An understanding of these socio-cultural forces is important in planning management strategies through community participation. Ethnographic studies, programs based on community participation, and evaluation of grassroots interventions can provide for coexistence and, simultaneously, resolve issues of public safety (Patel et al., 2022) (Fig 3).



Figure 3: Human -Stray dog interaction.

Safety considerations

Human safety takes precedence in the control of stray dogs. Education of the public in safe behaviour when interacting with stray dogs, detection of aggression cues, and promotion of sterilization and vaccination are key steps in reducing conflict. Incorporation of feeding and shelter sites into urban planning can reduce risks. Psychological impact evaluation of dog attack on children and the vulnerable, in combination with creative urban design, can enhance public safety and promote harmonious coexistence (Singh et al., 2019) (Table 1).

Table 1: Stray dogs associated diseases (WHO, 2021).

Disease	Primary Impact	Transmission	Human Risk	Management Strategies
Rabies	Neurological damage, fatal if untreated	Saliva (bites/scratches)	Very High	Mass vaccination, post-exposure prophylaxis
Canine Distemper	Respiratory, gastrointestinal, neurological issues	Direct contact	Low	Vaccination, outbreak control
Parvovirus	Severe gastrointestinal distress, high mortality	Fecal-oral route	None	Vaccination, sanitation
Leptospirosis	Kidney/liver failure, zoonotic potential	Urine-contaminated water	Moderate	Vaccination, rodent control, hygiene
Antimicrobial Resistance (AMR)	Reduced treatment efficacy, public health threat	Environmental spread	Emerging Risk	Controlled antibiotic use, surveillance

Population management strategies

The Animal Birth Control (ABC) program remains India's most widespread method of controlling stray dogs. While substantial effectiveness is locally witnessed, overall performance is undermined by irregular use, uneven allocation of funds, and the absence of community involvement. Alternative strategies like community-based management and non-surgical sterilization offer possible channels. Comprehensive analyses of ABC schemes, studies into new sterilization types, and adaptive management techniques are needed for sustainable population regulation (PFA, 2021) (Fig 4).



Figure 4: Puppies.

Ethical and cultural perspective

Ethical considerations and cultural values are key drivers of stray dog management policy (Taylor et al., 2017). In India, where animals also have symbolic and religious significance, humane approaches prevail. Cultural considerations need to be balanced against public health requirements by policy approaches that address both animal welfare and community safety. Ethical evaluation of current practice, along with cross-cultural analysis, can inform more humane and effective management practices.

Conclusion and Policy Recommendations

Successful management of India's street dog populations requires an interdisciplinary strategy that combines ecological science, public health, cultural studies, and urban planning. Policymakers must give top priority to coordinated vaccination and sterilization programs, enhance community education programs, and support targeted research to fill critical knowledge gaps. International experience indicates that community-based, humane approaches produce the most sustainable results. Joint action by government agencies, non-governmental organizations, and local communities is required to facilitate coexistence while protecting public health and animal welfare.

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