

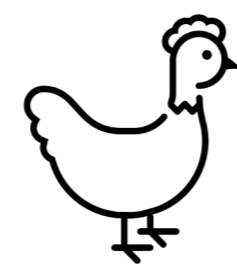
Investigating poultry trade patterns to improve disease surveillance: A cross-sectional study in Gujarat

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Introduction

Live bird trade is known to promote the spread of zoonotic pathogens. Although live bird shops (LBSs) are ubiquitous in India, poultry trading practices and their potential impact on disease risk are poorly understood. The objectives of this study were to:

- Characterise LBSs based on trading practices likely to increase infectious disease risk;
- Assess the connectivity between shops through the trade of live poultry.



Methods

A cross-sectional study was conducted in LBSs of Gujarat, selected through multi-stage cluster sampling.

Steps

- 1 8 cities (4 tribal and 4 non-tribal) were purposively selected in Gujarat;
- 2 Shops were identified within each city (random spatial sampling);
- 3 Data was collected about each shop regarding its characteristics, trading practices and supplying locations.



Figure 1. Example of live bird shop conditions and practices in Gujarat. Images are original.

Results

A total of 86 shops were recruited. Preliminary descriptive analysis suggests a high heterogeneity in the scale of operations. Features of the shops are described in *Table 1*.

Table 1. Features of Gujarat shops (n=86).

	N (%)		Median (min-max)
Length of time (days) open		Average number of workers	2 (1-11)
Everyday	85 (98.8%)	Average no. of sales	
Closes on Sundays	1 (1.2%)	Exotic broiler chickens sold	30 (5.5-800)
Type of shop		Desi chickens sold	3.5 (0-30)
Exotic Broiler	25 (29.1%)	Surplus management	
Desi	14 (16.3%)	Proportion of unsold EB chickens	0.21 (0.02-0.45)
Both species	47 (54.7%)	Proportion of unsold Desi chickens	0.44 (0-0.92)
No. of animal species sold		No. of days receiving supplies	7 (0-7) / 3 (0-7)
1 poultry species	34 (39.6%)	Origin of poultry	
2-3 different poultry species	37 (43.0%)	Other LBSs	0 (0-2) / 0 (0-2)
Several animal species	15 (17.4%)	Farmers	0 (0-2) / 0 (0-1)
Storage overnight		Brokers	0 (0-3) / 0 (0-1)
At the shop	81 (94.2%)	Other vendors	1 (0-7) / 1 (0-3)
At the vendors	8 (9.3%)	Total no. of suppliers	1 (0-7) / 1 (0-3)
		Length of time between supply and open time (hours)	12 (2-17)

Note: Some values include EB and Desi chickens, respectively. On the left, categorical variables. On the right, numerical variables.

The transport of chickens from farms to shops typically involves one (85.3%) or two intermediaries (10.3%). While each city obtained chickens only from one to four districts (out of the 33 districts of Gujarat), four districts supplied more than one city (*Figure 2*). India's tribal belt refers to contiguous areas of settlement of tribal population of India, especially comprised by rural communities where biosecurity levels are lower

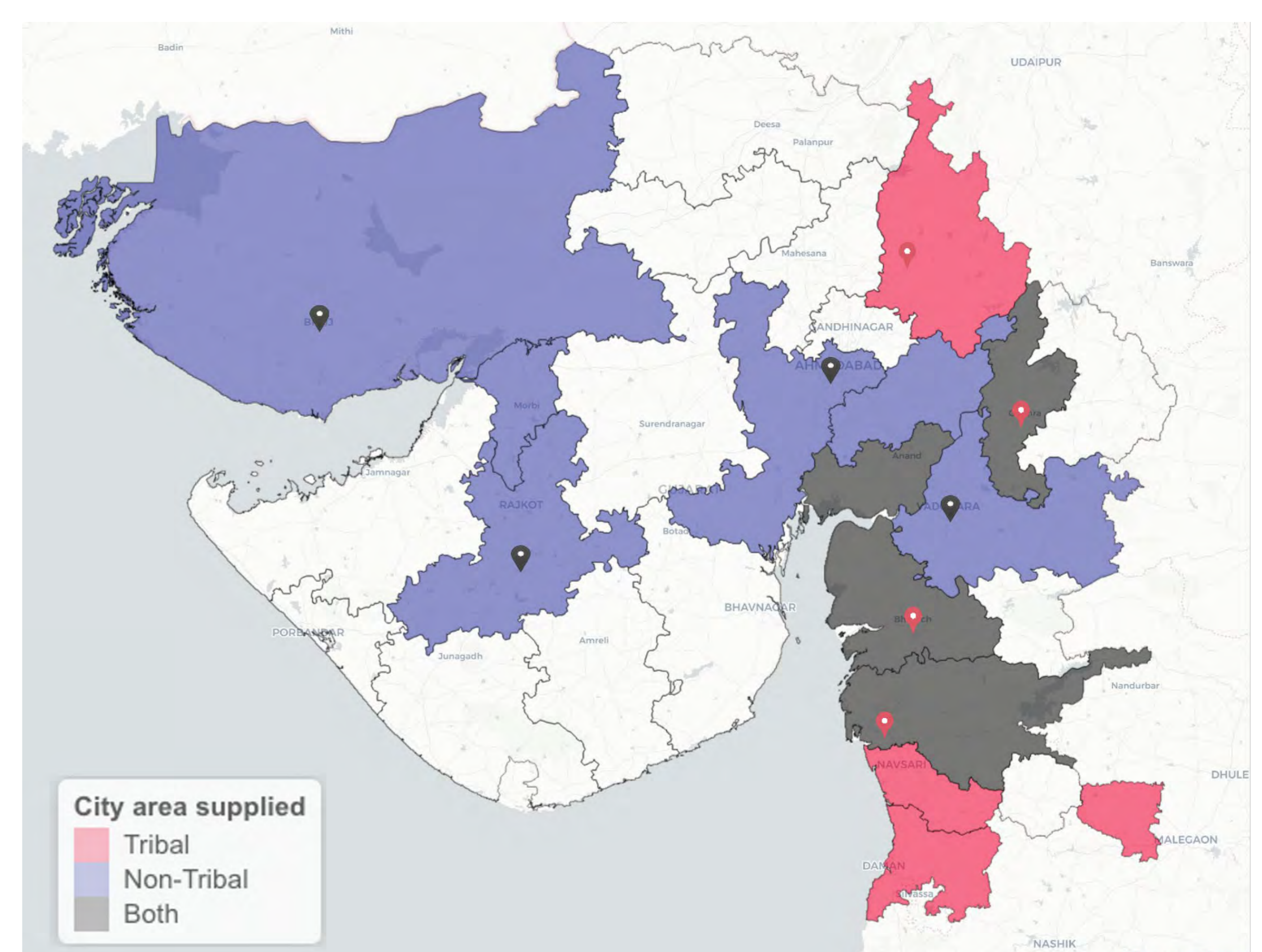
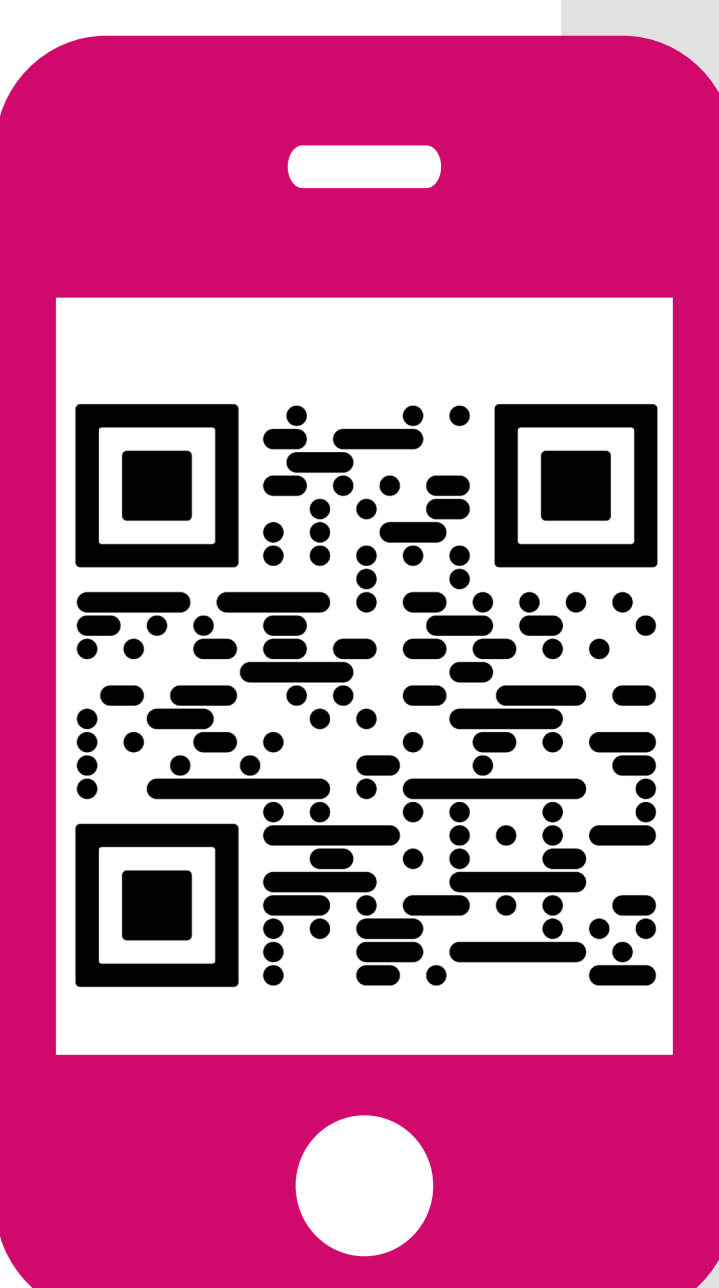


Figure 2: Catchment areas (or districts of origin) identified for the surveyed live poultry shops, including supplying tribal and non tribal cities. In the figure, pink pins (●) refer to tribal cities while black pins (●) represent non tribal cities, where live bird shops are located.

Discussion and Conclusion

- ❖ The described practices may promote pathogen amplification and persistence within LBSs in Gujarat.
- ❖ The network shaped by poultry movements connects distant poultry populations, increasing the risk of pathogen spread in the region.
- ❖ Some of the next steps include investigation of risk pathways for disease transmission and their geographical/socio-economic determinants.



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