

# Investigating Poultry Trade Patterns To Improve Disease Surveillance: A Cross-sectional Study In Gujarat



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## Key message

Building and analyzing the network of poultry movements to identify high-risk premises and offer new insights on disease transmission dynamics, making it possible to develop more effective strategies for disease control.

## 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.
- There are several pathogens that can have a great impact in poultry production systems with consequences on animal and/or human health.
- A risk-based surveillance can be a more effective approach if there is ready access to information about the population and distribution of risk factors.

## Objectives:

- Characterize LBS 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.
- 8 cities were purposively selected in Gujarat
- A total of 86 Shops were identified in selected cities of Gujarat (random spatial sampling)
- Data was collected in each shop regarding its characteristics, trading practices and supplying locations.

## Results

- Analysis suggests a high heterogeneity in the scale of operations in LBSs.

Table 1. Features of the live bird shops in Gujarat (n=86)

Characteristics	N (%)	Characteristics	Median (min-max)
<b>Length of time (days) open</b>		<b>Average number of workers</b>	2 (1-11)
Everyday	85 (98.8%)	<b>Average no. of sales</b>	
Closes on Sundays	1 (1.2%)	Exotic broiler chickens sold	30 (5.5-800)
<b>Types of Shop</b>		Desi chickens sold	3.5 (0-30)
Exotic Broiler	25 (29.1 %)	<b>Surplus management</b>	
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)
<b>No. of animal species sold</b>		<b>No. of days receiving supplies</b>	7 (0-7) / 3 (0-7)
1 poultry species	34 (39.6%)	<b>Origin of poultry</b>	
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)
<b>Storage overnight</b>		Brokers	0 (0-3) / 0 (0-1)
At the shop	81 (94.2%)	Other vendors	1 (0-7) / 1 (0-3)
At the vendors	5 (5.8%)	<b>Total no. of suppliers</b>	1 (0-7) / 1 (0-3)
		<b>Length of time between supply and open time (hours)</b>	12 (2-17)

- The transport of chickens from farms to shops typically involves one (85.3%) or two intermediaries (10.3%).

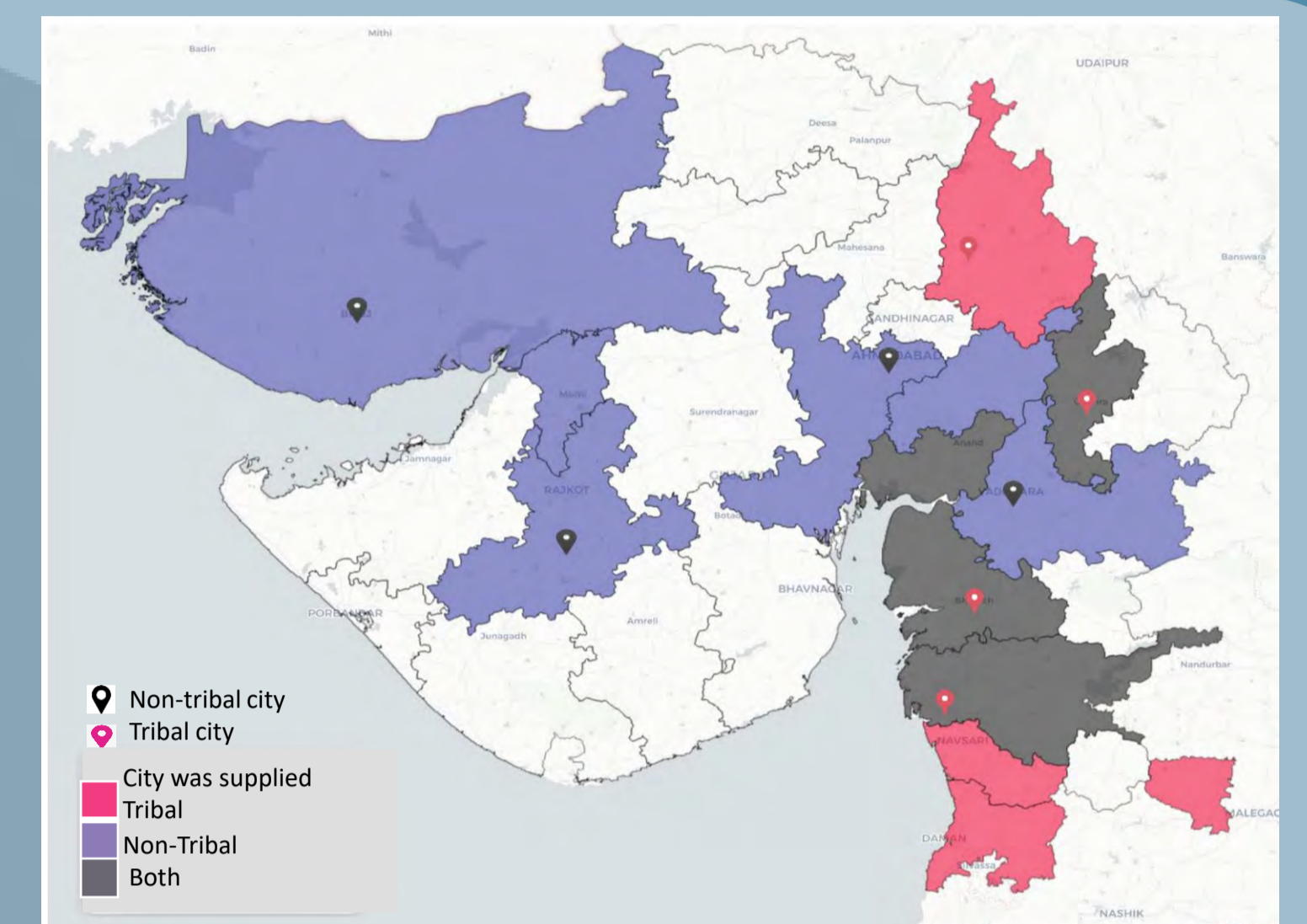


Figure 1: Catchment areas

- Each city obtained chickens from one to four districts (out of the 33 districts of Gujarat), four districts supplied more than one city.

- Shop's management and trading practices were identified as having a possible influence on pathogen introduction into LBSs (Release or introduction assessment) or transmission within LBSs, either to other birds (Animal exposure assessment) or to humans (Human exposure assessment).

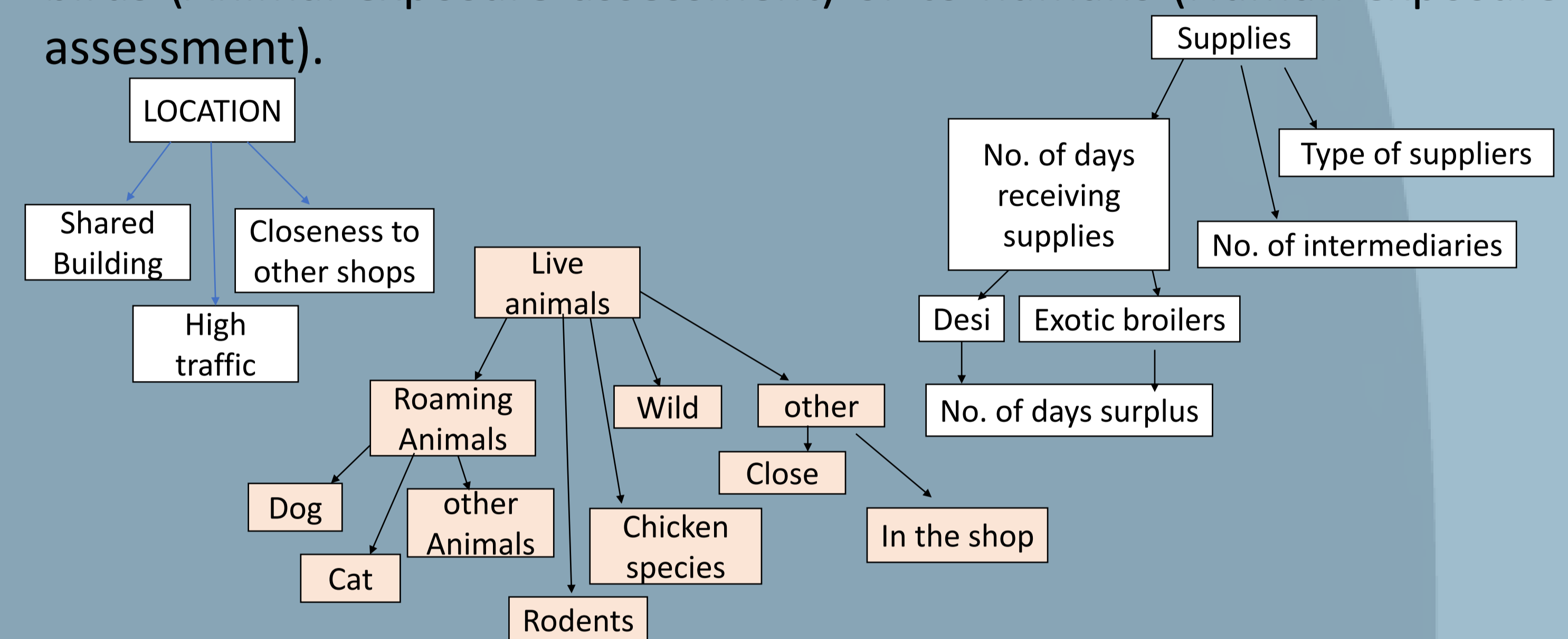


Figure 2 Variables linked to the release pathways of a pathogen into the LBSs

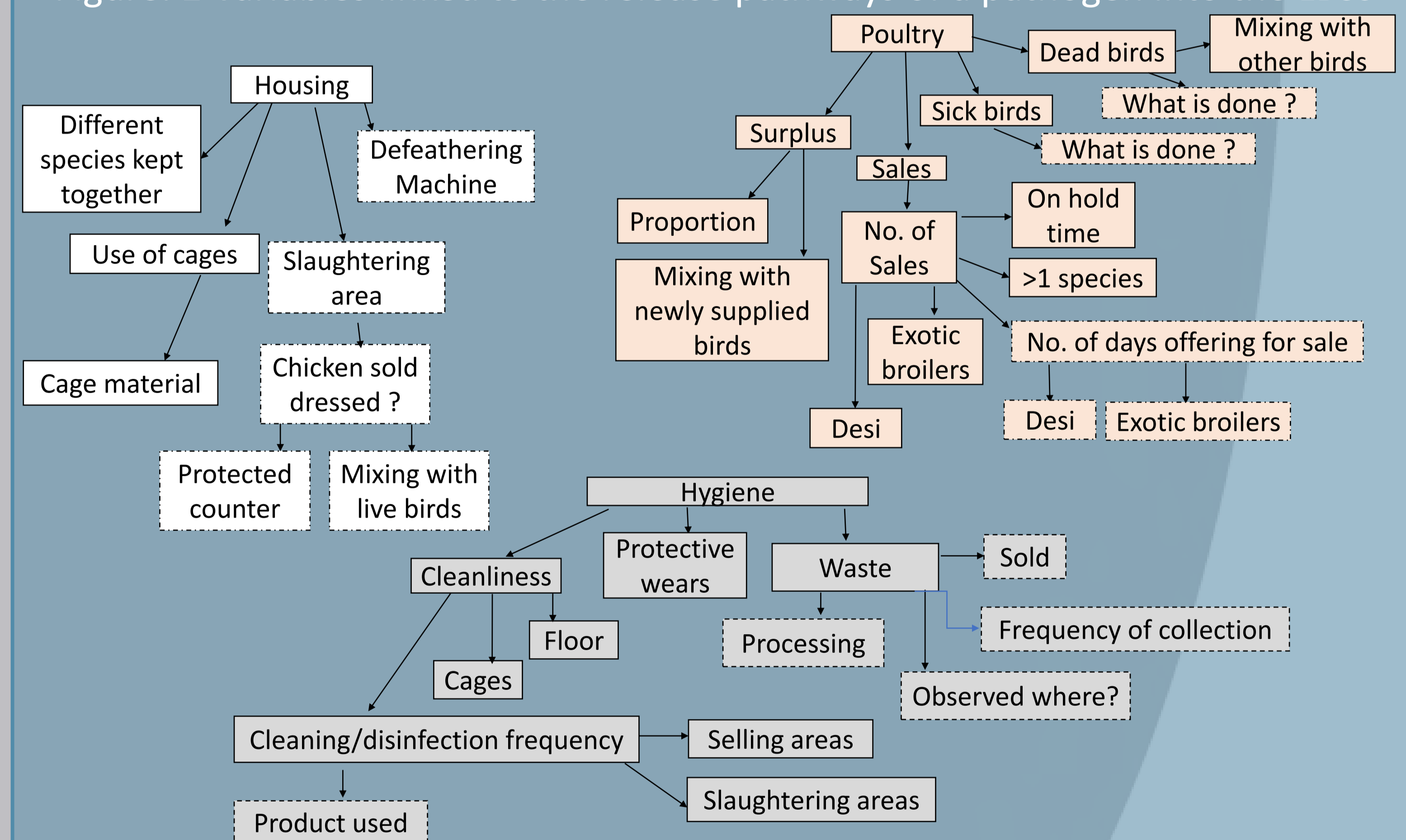


Figure 3 Variables linked to the exposure pathways for a pathogen within LBSs (Legend: continuous line – Animal exposure; intermittent dashed lines - Human exposure; dashed lines – Animal and Human exposure)

## Discussion and conclusions

- The present practices may promote pathogen amplification and persistence within LBSs in Gujarat.
- Network shaped by poultry movements connect distant poultry populations, increasing the risk of pathogen spread in the region.
- One of the next steps include Investigation of risk pathways for disease transmission and their geographical/socio-economical determinants.

