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Pilot study for the implementation of a traceability scheme for small holder poultry farms in Northern Viet Nam

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Background and study objectives

Movement of live poultry via trade is a known risk factor for the introduction, spread and establishment of infectious pathogens. Movement tracing is an important component of disease control efforts by allowing biocontainment to be efficiently and timely put in place in the event of a disease outbreak. Furthermore, farmers are likely to receive financial benefits through consumers being prepared to pay a premium for a traceable product of higher food quality and safety. In the context of the poultry production sector, traceability schemes are considered to pose significant challenges with respect to its practicality and sustainability.

In Viet Nam, affected by HPAI H5N1, smallholder poultry producers (less than 2,000 heads) generally trade live birds in custom-made baskets. A pilot study was implemented in three provinces of Northern Viet Nam (Ha Noi, Ha Tay and Ha Nam) to identify poultry marketing practices and to assess the feasibility of establishing a formal tracing system for domestic poultry in the context of smallholder poultry value chains.

Material & Methods

Study area

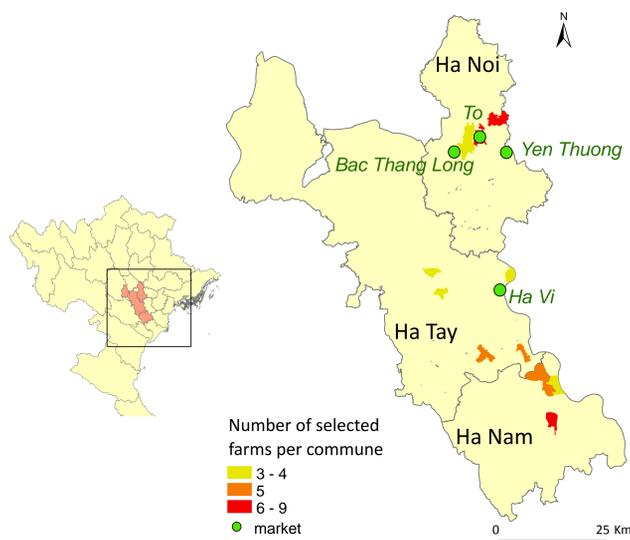


Figure 1: Locations of farms, number of farms per commune and location of the 4 poultry markets in the provinces of Hanoi, Ha Tay and Ha Nam (Vietnam)

Data collection

1. Farms: Baseline survey on farm practices and trade habits

2. Four-month longitudinal study:

POULTRY FARMS (68)

Veterinarians

- Check if poultry to be sold are healthy
- Attach plastic tag to each birds' leg
- Place healthy poultry in baskets
- Place **RFID* tag** on basket and enter: Basket weight, date, farm id code



Poultry traders

- Collect the basket and go to market



MARKETS (4)

Market inspectors

- Record basket arrival: Market, date, basket weight, basket visual inspection (individual bird tags)



Case definition: A basket arriving at the market representing completely traceable poultry was defined as having the same weight as when released at farm gate allowing a variation of +/- 10%; and all poultry in basket having a plastic tag.

* RFID: Radio Frequency Identification

Selection of markets & farms

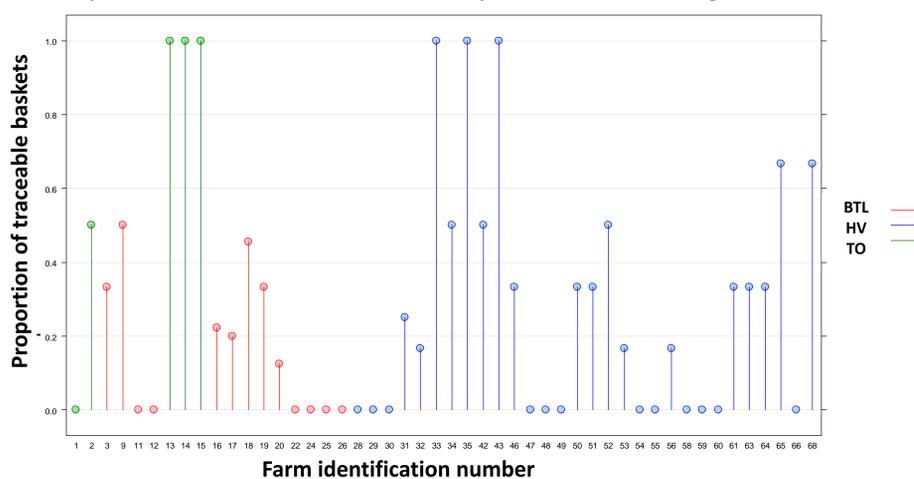
The 4 live bird markets of Bac Thang Long (BTL), To, Ha Vi (HV) and Yen Thuong (Fig. 1) were selected as identified with increased activity in supplying Ha Noi [1]. The objective of the study was to estimate what proportion of poultry baskets released from poultry flocks would be traceable. The number of farms to be enrolled in the study was estimated on the assumption that 15% of baskets (precision 3%) would be traceable. Farm selection followed a cluster random sampling based on a sample frame listing all farms within communes which were identified as belonging to the catchment areas of our markets [1]. A total of 68 farms were selected from the 3 provinces of the study.

Statistical analysis

- **Descriptive statistics:** number of traceable baskets per farm.
- **Regression model:**
 - Data aggregated by farm
 - Outcome: count of traceable baskets by farm arriving at a market
 - Explanatory variables: farm size, farm production type, number of traders, selected trader, type of trader, distance to market, market of arrival.
 - Generalized Linear Mixed Model with market as random effect, using a Poisson distribution, a log link; and the log number of baskets released by farm as an offset.
- **Model comparison and selection:** Akaike Information Criterion (AIC) [2]

Results

Proportion of traceable baskets released by each farm and arriving in the 3 markets



- 316 baskets released from 64 farms and 117 baskets arrived at a market (from 48 farms): 57.3% traceable, 42.7% not traceable.
- 5 farms out of 48 were 100% traceable; 19 farms had none traceable baskets.
- Over 50% of farms sold to only one trader.
- 32.3% of farms sold only to selected traders.
- Yen Thuong market did not record any basket arriving.

The model with the best AIC included "selected trader" and "distance to market" as explanatory variables. Farms operating with selected traders are 2.69 as likely (95% CI [1.59 – 4.53], p -value < 0.001) to release a basket with traceable content to the market than a farm changing traders. This chance was decreased by a factor of 0.97 (95% CI [0.95 – 0.99], p -value = 0.033) for each kilometer separating the farm from its market of arrival.

Outlook & Discussion

The results from this pilot study demonstrate the feasibility of a poultry traceability scheme, in that without introduction of specific incentives about 20-35% of poultry were effectively traceable.

Trading habits at the farm gate are important to consider to improve poultry traceability. Advising small holder farmers to strictly operate through known selected traders should be the first recommendation for setting up successful tracing system.

Acknowledgments:

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References

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[2] Akaike, H., 1974, A new look at statistical model identification. IEEE Transactions on Automatic Control AU, 716-722