Biosecurity practices in small-scale pig farms in Hung Yen and Nghe An, Vietnam

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Pig production in Vietnam

- Pig population > 27 million heads, distributed over 6 regions
INTRODUCTION

Source: GSO

Pig population by regions

- Mekong River Delta
- South East
- Central Highland
- North Central and Central Coast Areas
- Northern Midland and Mountainous Areas
- Red River Delta

Source: GSO
Pig production in Vietnam

- Pork represents >70% of meat consumption
The pig production system

Smallholder or backyard
(1-10 pigs/household)

Small-medium scale
(5-20 sows or 30-100 fattening)

Medium scale
(20-500 sows or 100-4000 fattening)

Large scale
(>500 sows or >4000 fattening)

account for 85% of pig production in Vietnam (GSO, 2012)
Pig diseases

- **Smallholder pig farms**
  - Open system
  - Lack of technologies, control measures
  - Vaccination is done in term of disease control and prevention
  - Do not concern carefully about biosecurity e.g. cleaning and disinfection of farms, equipment and livestock transport vehicles

- **Pig diseases has been reported in Vietnam (OIE, 2010)**
  - Classical swine fever (CSF)
  - Food and mouth disease (FMD)
  - Porcine reproductive/respiratory syndrome (PRRS)
  - Zoonoses: Leptospirosis, salmonellosis, porcine cysticercosis, Trichinella
The role of biosecurity at farm level
- Reduce the risk of diseases in pig farms
- Prevent disease transmission between animals on farms or from farm to farm

Biosecurity
- Measures taken to keep disease out of livestock herd and to limit the spread of disease within the herd
  - Isolation of new animals to the farm, isolation of sick animals
  - Regulation on animal movement and visitor's record
  - Pest control
  - Procedures for cleaning and disinfection equipment and facilities
  - Personal biosecurity (hand washing, the use of protective clothing & boots)

Farmers have responsibility for application of farm biosecurity
INTRODUCTION

- Biosecurity assessment in Vietnam
  - Studies in the smallholder farms are lacking in particular over time

- The need of assessment on biosecurity practices in pig smallholders
  - To generate a detailed description and profiles of biosecurity practices among pig farms.
  - Recommendations for pig farmers to be developed to reduce the risk of diseases in their animals
OBJECTIVES

- To assess biosecurity practices and applied farm management over time
- To identify potential intervention options for disease control
STUDY DESIGN

- Longitudinal survey
  - Over a period of 10 months: March - December 2014
  - Study area: Hung Yen and Nghe An provinces
STUDY DESIGN

- Involved total 60 pig farms in 2 provinces (regions)
- Thirty farms were selected randomly (10 per commune) as a subsample from a larger sampling frame in each provinces (N=416)
On-farm data collection

- Selected farms were visited in fortnightly intervals
- Checklist and observations
  - Information on farm management
  - Biosecurity measures
  - Disease occurrence
  - Working and feed storage conditions

Data analysis

- R software
- Differences in farm management and biosecurity measures between the two provinces were identified using Chi-square test
RESULTS - Farm biosecurity measures

Figure 1. Overall applied farm biosecurity measures in two provinces
## RESULTS - Farm biosecurity measures

### Table 1. Selected farm biosecurity measures by province

<table>
<thead>
<tr>
<th>Items</th>
<th>Hung Yen (% of visits)</th>
<th>Nghe An (% of visits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Different (age) groups of animals in separate enclosures, without contact</td>
<td>97.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>88.6&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Visitors are able to access the farm</td>
<td>61.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>82.2&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Disinfection mattresses are applied and used</td>
<td>43.2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>45.0&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Workers wear protective clothing and boots</td>
<td>7.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>23.9&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Note: <sup>a</sup>, <sup>b</sup>: Values followed by different letter within row are significantly different (p<0.05)
RESULTS - Farm management

Figure 2. Farm management information for selected farm management parameters
## RESULTS - Farm management

### Table 2. Selected farm management practices by province

<table>
<thead>
<tr>
<th>Items</th>
<th>Hung Yen (% of visits)</th>
<th>Nghe An (% of visits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Litter provided to piglets</td>
<td>7.6&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.6&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Heat source provided for new borne piglets</td>
<td>33.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>14.2&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Piglets have separate area to escape and rest</td>
<td>56.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>17.8&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Equipment is clean and in good condition</td>
<td>88.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>66.3&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Floors and surfaces clean with no visible waste</td>
<td>91.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>65.1&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Enclosed feeding area</td>
<td>97.4&lt;sup&gt;a&lt;/sup&gt;</td>
<td>97.6&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Feed left overs visible in feeding area</td>
<td>25.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>38.4&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Water available at all times and in all barns</td>
<td>74.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>28.0&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Automatic water system</td>
<td>16.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.3&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*Note: a, b: Values followed by different letter within row are significantly different (p<0.05)*
RESULTS - Farm management

Figure 3. Comparison of selected farm management by province
RESULTS - Feed storage conditions

Figure 5. Feed storage conditions
RESULTS - Feed storage conditions

Table 3. Feed storage conditions by province

<table>
<thead>
<tr>
<th>Items</th>
<th>Hung Yen (% of visits)</th>
<th>Nghe An (% of visits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs of rodents or pests</td>
<td>17.2(^b)</td>
<td>79.8(^a)</td>
</tr>
<tr>
<td>Feed is stored inside</td>
<td>67.9(^b)</td>
<td>94.6(^a)</td>
</tr>
<tr>
<td>Feed is adequately covered and stored</td>
<td>85.2(^b)</td>
<td>74.3(^a)</td>
</tr>
<tr>
<td>Feed has visible signs of moisture</td>
<td>56.3(^b)</td>
<td>46.3(^a)</td>
</tr>
</tbody>
</table>

Note: \(a, b\): Values followed by different letter within row are significantly different (\(p<0.05\))
The result of survey indicated a low level of farm management and biosecurity practices in the study area.

Several key findings highlighted, include:

- Visitor control was not applied in the majority of farms
- Disinfection mattresses were not often installed and maintained
- Workers usually did not wear protective clothes and boots during working time
- Piglets were not provided with litter and heat sources during cold period
- Only approximately half of farms provided permanent water access to their pigs
- Feed was not appropriately covered and stored at all time of visits with clear signs of rodents
- General farm management and biosecurity was found better in farms studied in Hung Yen provinces than in Nghe An
CONCLUSIONS

Further analysis...

- Triangulation with animal health data collected from community vets over the same time period
- Analysis of possible association between management and economic data collected by team
- Identification of potential best bets for future intervention
- Link the identified gaps in farm management and biosecurity practices with potential best bets in the upcoming intervention phase
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