Food safety along informal pork market chains in Vietnam: Experience from an integrated research team

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Outline

• Background

• ILRI work along the pig/pork value chain in Vietnam
  – Pig risk project
  – Scoping study on indigenous pig systems

• Interdisciplinary research experience

• Key messages
Pork is an **important component** of the Vietnamese diet
- More than 70% of consumed meat is pork
- More than 80% supplied by small scale sector
- Preference for chilled pork provided by traditional market chains (90%)

**Dominance of smallholders in pig production**, significant contribution to household (HH) income
Background - pigs in Vietnam

- Various challenges to increase production of smallholders from an animal health perspective
  - Lack of biosecurity, poor on-farm hygiene
  - Limited reproductive management
  - Very limited resources of farmers to change
  - Pig diseases are common, wide range of notifiable diseases are endemic
  - Limited surveillance and response capacity
WHO’s report: Global estimates of foodborne diseases

- First ever estimates of the global burden of foodborne diseases show **almost 1 in 10 people fall ill every year from eating contaminated food** and 420,000 die as a result.
- Children under 5 years of age are at particularly high risk.
- Africa and **Southeast Asia have the highest burden**.
- **Diarrhoeal diseases** are responsible for more than half of the global burden of foodborne diseases, with 230,000 deaths every year.
- Diarrhoea is often caused by norovirus, *Campylobacter*, non-typhoidal *Salmonella* and pathogenic *E. coli*.

Background – food safety Vietnam

• Majority of pork distributed through informal market chains
  – traditional processing, and retail practices (e.g. wet markets, temporally and/or permanent)
  – escape effective health and safety regulation (lack of regular inspection)
  – affordable, accessible, addressing local demands (e.g. fresh pork, meat pie, blood pudding)

• Approximately 30,000 small-scale pig slaughter units
  – Implementation of food safety law a challenge
  – Regular inspections focus on medium to large scale slaughterhouses
Background – food safety

• Increasing consumer concerns on animal diseases and food safety
• Risky consumption habits are common (raw pork sausage, blood pudding)
• Existing studies focus on assessment of hazards
• Investigating the related risk for consumers, impact and intervention studies are lacking

• Legal framework
  • Various ministries involved, MoH (VFA), MoA (Nafiqad)
  • Food safety law from 2010, 2016 revision expected
PH issues along the pork value chain – often neglected

### Pork related food-borne hazards

**Parasitic**
- Cysticercosis
- Trichinellosis
- Toxoplasmosis

**Bacterial e.g.**
- *Bacillus cereus*
- *Brucella suis*
- *Campylobacter* spp.
- *Salmonella* spp.
- *Streptococcus suis*
- Shiga toxin producing *E. coli*
- *Yersinia enterocolitica*

**Chemical**
- Antibiotic residues
- Aflatoxins
- Steroids/growth promoters
- Heavy metal

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**Source:** PigRISK Project proposal
ILRI value chain work related to food safety in Vietnam: Overview

• Pig risk project (2012–17)
  – ACIAR funded

• Cross-CGIAR Research Program (2014–15)
  Scoping study to evaluate the potential of indigenous pig systems

• Lab diagnostic review (related to pork)

• Evaluation of large-scale interventions related to food safety along the pork value chains (LIFSAP)
PigRISK project (2012-2017)

To assess impacts of pork-borne diseases on human health and the livestock and identify control points for risk management.

Key components:
Assessment (Qualitative/quantitative risk assessments) & intervention

Integrated approach
- Interdisciplinary team
  Vets, PH, Economist, Animal Science, Modeller
- Data collected along entire pork VC

Study provinces
Provinces in Vietnam
<table>
<thead>
<tr>
<th>Problem/Constraints</th>
<th>Hung Yen</th>
<th>Nghe An</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed quality</td>
<td>na*</td>
<td>1</td>
</tr>
<tr>
<td>High feed price</td>
<td>na*</td>
<td>2</td>
</tr>
<tr>
<td>Low quality of veterinary drugs</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Low pig price</td>
<td>na*</td>
<td>4</td>
</tr>
<tr>
<td>Lack of capital</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Lack of knowledge and skills in animal health management</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Lack of veterinary doctors/ para-vet</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Disease (including zoonoses)</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

*Farmers perceived that these constraints have never been addressed and cannot be solved by themselves. Therefore they consider these as given and did not rank them.
In general poor farm biosecurity/management:

- **Lack of biosecurity:**
  - disinfection matrasses, use of protective cloth or boots, visitor control

- **Management:**
  - Handling of sick and dead animals: e.g. selling/emergency slaughter
  - Piglet management, often no heat source for new-borns (cold season)
  - Limited access to drinking water (hot season)
  - Pig feed storage (e.g. signs of moisture, approx. 50%)

**High load of endo-parasites** (various), 76% at least one

- *Eimeria* (cǎu tròng), *Trichocephalus suis* (giun tóc), *Strongyloides* sp. (giun lươn), *Ascaris suum* (giun đũa), *Fasciolopsis buski* (sán lá ruột)
PigRisk: Selected key results on food safety

Sampling for biological hazards (*Salmonella* spp.):

- Overall **1275 samples** (farm, slaughterhouse, market) over 12 months
  - Increasing prevalence along chain. Final product, **meat for sale: 45%**
- Quantitative risk assessment completed
- Systems dynamic model (potential interventions ex-ante evaluated) completed

*Streptococcus suis* in slaughter pigs (N=147):

- Presence of *S. suis* type 2
- Potential risk behaviors “Tiet canh”,
  - common in slaughterhouse workers (43%)

Chemical hazards:

- **Presence of banned substances** (e.g. chloramphenicol and the growth promoter salbutamol in pig feed and sold pork)
Pig Risk - Best bet selection – Value chain approach
Placed at specific actor along value chain based on RA results

Feed

Water, Biosecurity ...

Water, floor slaughter ...

Hygienic management

Food handling and preparation sampling

Inputs & Services

Production

Slaughter Processing

Market

Consumers

From farm to fork

Randomized control trials: Pilot and RCT Feb 2016 onwards
Challenges:
• Lack of enforcement of regulations
• What are the incentives to change current practice
• No prime price for “safer” pork

We aim for:
• Feasible interventions towards “more hygienic” pork

Investment 100 – 200 USD

Source: Sinh, Handlos & Unger, 2014
Scoping study on indigenous pig systems (2014-2015)

Scoping study to evaluate the potential of integrated indigenous pig systems to improve livelihoods and safe pork consumption for poor ethnic minority smallholders in the Central Highlands of Vietnam.

**Integrated focus**

- **Components:**
  - Market access/opportunity study
  - VC study
  - Breeding component
  - Gender study
  - Food Safety
  - Economist, Vets, PH, breeding, crop/livestock system experts
Free range versus pen use, among HH with indigenous pigs (N=262)

Knowledge of targeted zoonotic parasitoses, (N=262)

Among those 10% none of them aware about mode of transmission from pig to human
Interdisciplinary research experience

- Research teams
  - Universities
  (Economic Fac, Vet Fac, PH, Animal Science)

- Implementers
  - MARD, DARD facilitated by research teams

- VC approach
  - Various actors involved
  - Focus on key actors and end users
  (consumers)
Actors & groups involved for actual ILRI food safety studies

- Pork borne diseases (Biological & chemical hazards)
  - Pig farmers (different types), Local pigs & crosses
    - Small holder and cooperatives
    - Ethnic minorities
  - Public health authorities
  - Local & central Health centers & hospitals
  - Vet officers & Vet stations
  - Traders
  - Butchers, Slaughter houses
  - Input supplier: Feed suppliers, breeders
  - Government Authorities (various levels)
  - Research institutes
  - Donors
  - Consumers
  - Retailers

Input supplier: Feed suppliers, breeders
What worked well and why

• Research teams
  – Across discipline spirit from the start of project
    • Most of partners already involved in proposal development
    • 1 partner joint later, some challenges
    • Existing partnership build up on previous projects
    • 1 partner championed in interdisciplinary research (CENPHER/HSPH)
    • Teams accept and understand the need of other teams expertise

• Link between researcher and implementer
  – Research team strongly connected to implementers
    • Via authorities (MARD, DARD) good relation to provincial/district/commune level
    • ILRI couldn't facilitate this
What worked well and why

• Research tools
  – Qualitative and quantitative tools well perceived and used by teams
    • Econ team – experienced in qualitative data collection – has the lead here
    • PH/Vet stronger in bio-metric
    • Recognition of usefulness of combined tools:
      – Meat sellers
        » Use of clothes to “dry” the pork based on consumer demand
        » Gloves, mask – consumer concerns that the seller has a health problem

• Policy level
  – Research teams well connected to policy makers
    • High ranked policy meetings/discussions organized
    • Food safety taskforce since 2012, well recognized
    • Government recognizes role and importance of small scale sector based on research done
Challenges

• Data analysis
  – Teams strong in their own field
    • Econ. team, e.g. pig productivity, willingness to pay
    • PH team, e.g. disease impact, risk assessment
  – Cross cutting analysis and conceptualization of cross-sectoral issues a challenge

• Publications
  – Reasonable number of sector specific papers and presentations (2014: 24; 2015: 35)
  – Across discipline papers remains a constant challenge
Challenges

• Time commitment
  – E.g. Vet Team (VNUA)
    • Approximately 3000 students & 80 staff (teaching/research)
    • High staff turnover (MSc, PhD)

• Recognition of current food safety challenges
  – MOH sometimes critical on value of ongoing research and presented hazards
    • “Biased, not representative”
    • Impact studies missing
    • Risk communication

• What can be changed?
  – How to find an appropriate interventions in an resource poor context
  – Requires strong involvement of targeted groups and consideration of all options
Potential solution to address stated challenges

– Joint team session (monthly/bi-monthly)
– Intensive mentoring by ILRI team (Economist, Vet, PH)
  • Volunteer, Vet with PH background
  • 1 day/week work with each team
    – Cross cutting data analysis & publications
– Partners approached by other food safety initiatives (WB) to support their work
– Success of interventions (?)
– Awarded publications as an incentives
  • ICAE, Milan, Aug 2015
  • Safe Pork, Porto, Sep 2015
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VC actors and groups

better lives through livestock

ilri.org

HP2, healthy pigs, healthy people