Animal health and food safety in smallholder pig value chains in Vietnam

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Some definitions

Value chains are the linked groups of people and processes by which a commodity is supplied to the final consumer.

Understanding the flow of materials (pigs & pork) through a value chain is important in understanding how risk of disease spread may be produced in the chain, while understanding the flow and distribution of incentives is key to understanding how to manage those risks.

Value chain analysis is also critical to provide information on feasibility of a selected control measure and their potential impact on the people involved in the value chain
  • E.g. traders might be different affected than producers

Particular attention needs to be paid to the behaviour and motivations of people involved.

Modified after FAO, Animal Production & Helath,2012
Traditional approach was by specific actor
WHOLE value chain approach

From focus on production by poor livestock keepers …
Working in 9 target value chains
under ILRI’s CRP 3.7. Livestock and Fish
Program time scope: 8-12 years
Pic value chain in Vietnam - some key facts

- Pork is an **important component** of the Vietnamese diet

- **Dominance of smallholders in pig production**, significant contribution to household (HH) income (accounts for 14% of rural HH income)

- Projections show that even with no growth from smallholders, large farms will likely account for only 12% of the national pork market share

- **Enabling policy environment**: willingness of policymakers and development partners to engage in **R4D initiatives targeting smallholders**¹

  ¹ Combines very small scale and small scale farms
Relative shares of meat types in livestock production, Vietnam, 2002-2012

Pork is a significant component of the Vietnamese diet

Demand for pork

• Strong preference for fresh, un-chilled pork; which provides natural protection from imports, imported pork is frozen pork.

• Future increases in consumer incomes are expected to lead to increased demand for pork and other meat products

• Also notified increasing demand for local (breed) pork (e.g. big urban centers have potential for niche product due to prime price)

ILRI 2015, Daklak
179,000 versus 95,000 VND/kg
(local versus “exotic” pork)
Pic value chain in Vietnam - some key facts

There is **comparative advantage of small holder** pig systems:

- Generate efficiency gains from **low-cost locally-sourced feeding** options
- **Strong demand for fresh** (not frozen) pork that smallholders can **supply through preferred outlets by consumers** (local markets)
- Most of pork sold in wet markets which are rather informal
Preferred market outlets for fresh pork by consumers

Traditional market outlets remain the most preferred purchase outlets for fresh pork by Vietnamese consumers.
Characteristics of informal markets

• Markets where many actors are not licensed (e.g. street foods, backyard poultry, pastoralist systems);

• Markets where traditional processing, products, and retail practices predominate (e.g. wet markets, traditional food processing);

• Affordable, accessible, addressing local demands …

• Markets which escape effective health and safety regulation (most domestic food markets in developing countries).
Assessing food safety in informal markets

• Risk based approach
  – Risk pathway
  – Qualitative & quantitative

• Mixed methods
  – Biological sampling
  – Household/individual questionnaires
  – Check lists
  – Participatory appraisals including PE
Activities along the pig value chain in Vietnam

**Food safety/animal health:** PigRISK project (2012-2017)

**Breed/Genetics:**
Scoping study and breed and genetic resources (central highlands)
An animal genetic resource study

**Feed:** Feed technology review

**Pig sector review:** background, trends, policies

**Indigenous pig system:** Scoping study to evaluate the potential of indigenous pig systems (2015) (market, breed, food safety)

**Supporting activities:**
Systems dynamic (SD) model (2015)
Gender integrated pro poor VCA (2015)
Evaluation of used interventions (LIFSAP) (2015)
Reducing disease risks and improving food safety in smallholder pig value chains in Vietnam (PigRISK)

Key components: Assessment – Intervention – Dissemination

Expertise: Animal Health, Public health & Livestock Economics

Key tools: Quantitative/qualitative risk assessment, economic assessment, VC analysis, participatory tools (e.g. PE)
To assess impacts of pork-borne diseases on human health and the livestock sector and identify critical points/opportunities for risk management.

Data collected

  Input suppliers, Producer, Slaughterhouse, Trader, Market, Consumers
PigRisk: Assessment phase

- Literature review
- **Rapid Integrated VC assessment** (various actors)
- **Basle lines** (>400 HH with pigs) in 2 provinces (various actors)
- **Risk assessments** microbiological (farm, slaughterhouse, market) & chemical (feed & pork, liver, kidney) hazards
- **Longitudinal** surveys (10 -12 months):
  - Households with pigs (Animal health and production survey)
  - Local vet stations & consumer
- **Cost of illness due to diarrhea** diseases (hospital cases)
- Biological **sampling on-farm** (fecal)
- **Strep. suis** (slaughterhouse)
- **Cross-contamination** study
PigRISK: Value chain mapping

- Producer
  - Collector: 41.6%
  - Slaughter-house: 55.8%
- Collector
  - Processor: 100%
  - Other provinces: 2.6%
- Slaughter-house
  - Retailer: 64.8%
- Retailer
  - Other provinces: 31.2%
### PigRisk: Selected results

#### Demographic of VC actors

<table>
<thead>
<tr>
<th></th>
<th>Farmer (n=400)</th>
<th>Slaughterhouse (n=51)</th>
<th>Processor</th>
<th>Retailer (n=74)</th>
<th>Consumer (hh leader) (n=416)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>48.6</td>
<td>51.0</td>
<td>36.4</td>
<td>6.8</td>
<td>80.1</td>
</tr>
<tr>
<td>Female</td>
<td>51.4</td>
<td>49.0</td>
<td>63.6</td>
<td>93.2</td>
<td>19.9</td>
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<tr>
<td><strong>2. Average age</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>46.9</td>
<td>47.1</td>
<td>47.9</td>
<td>47.1</td>
<td>48.5</td>
</tr>
<tr>
<td><strong>3. Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None &amp; Primary school</td>
<td>3.8</td>
<td>3.9</td>
<td>0</td>
<td>2.7</td>
<td>6.0</td>
</tr>
<tr>
<td>Secondary &amp; high school</td>
<td>89.9</td>
<td>96.1</td>
<td>100</td>
<td>97.3</td>
<td>71.4</td>
</tr>
<tr>
<td>Other (higher)</td>
<td>6.2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22.6</td>
</tr>
<tr>
<td></td>
<td>Hung Yen</td>
<td>Nghe An</td>
<td>All</td>
<td></td>
<td></td>
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<tr>
<td>--------------------------------</td>
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<tr>
<td>Pig herd size (latest cycle)</td>
<td>16.4</td>
<td>9.5</td>
<td>13.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average weight/pig (kg)</td>
<td>107.0</td>
<td>60.8</td>
<td>87.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time cycle (day)</td>
<td>146.0</td>
<td>99.4</td>
<td>126.3</td>
<td></td>
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</tr>
</tbody>
</table>
# Results from RIA – production constraints

Ranking of pig production constraints, as perceived by farmers by region

<table>
<thead>
<tr>
<th>Problem/Constraints</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hung Yen</td>
</tr>
<tr>
<td>Feed quality</td>
<td>na*</td>
</tr>
<tr>
<td>High feed price</td>
<td>na*</td>
</tr>
<tr>
<td>Low quality of veterinary drugs</td>
<td>3</td>
</tr>
<tr>
<td>Low pig price</td>
<td>na*</td>
</tr>
<tr>
<td>Lack of capital</td>
<td>1</td>
</tr>
<tr>
<td>Lack of knowledge and skills in animal health management</td>
<td>2</td>
</tr>
<tr>
<td>Lack of veterinary doctors/para-vet</td>
<td>4</td>
</tr>
<tr>
<td>Disease</td>
<td>5</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 management:

- Majority of farmers don’t use disinfection matrasses
- Rare use protective clothing or boots by farmers
- Visitors are usually able to access the pig area without restrictions
- Risky practices when handling of sick and dead animals: e.g. selling or emergency slaughter for consumption
- Piglet management, often no heat source for new-borns
- Limited access to water
- Pig feed storage (e.g. signs of moisture, approx. 50%)

Endo-parasitic prevalence indicates a problem (poster in Lana room):
- High load of endo parasites (various)
PigRisk: Food safety

Risk assessment (RA):

- Salmonella risk pathways developed for producers, slaughterhouse and consumers
- Quantitative RA (risk for consumer) on-going
Sampling for biological hazards (Salmonella spp.)(will be presented this afternoon)

- Overall **1,275 samples** (farm, Slaughterhouse, market)
  - Farm: drinking water **19.4%**  floor swabs: 36.1% (Salmonella spp.)
  - Slaughterhouse e.g. water 20.0%
  - Market e.g. meat for sell): **44.7%**

Chemical hazards (will be presented this afternoon):

- **Presence of banned substances** (e.g. chloramphenicol and the growth promoter salbutamol in pig feed and sold pork)

**Streptococcus suis** in slaughter pigs:
  S. suis type 2 very low prevalence.

**Potential risk behaviors** such as the consumption of “Tiet canh”– a raw pig blood dish was common in slaughterhouse workers (43.1%)
Moving from assessment to interventions

To develop and test incentive-based innovations to improve management of human and animal health risks in smallholder pig value chains.
Best bet selection – VC approach
Placed at specific actor along VC based on RA results

Inputs & Services
- Feed
- Water, Biosecurity ...
- Water, floor slaughter ...

Production
- Hygienic management

Slaughter Processing
- Food handling and preparation sampling

Market

Consumers

From stable to fork
Best bet selection – stepwise approach

First list of interventions and potential entry points for interventions identified from survey results and risk assessment

  e. g. on-farm (e.g. water supply), biosecurity & parasite control
  Slaughterhouse (e.g. use of table instead of floor slaughter)

Validation process:

  ➢ Literature review on potential interventions (what worked & what not)
  ➢ LIFSAP GAHP experiences (World Bank funded project aiming for improved pig farms, slaughterhouses and markets), 29 criteria, some unpractical
    - e.g. Separate from residential areas, keep only same age classes, quarantine
    - Review & reduce to 5-10 most feasible based on producer feedback
  ➢ Stakeholder and targeted actor consultation
Validation process (cont): Use of a systems dynamic model

A major gap in VC analysis: understanding the impact of VC interventions

SD model is a tool to simulate and evaluate ex-ante between different intervention options and how interventions could improve system performance and stakeholder profitability.

- Salmonella at slaughterhouse: Introduce slaughter metal grits to avoid slaughter on the ground
- Salmonella at farm: Introduce water treatment
- Morbidity on farm: regular vaccination, biosecurity, deworming
Best bet selection - further criteria

- **Expected time for change** (to implement an interventions)
  - Days – weeks – months

- **Expected reduction** of hazard (e.g. Salmonella/diseases prevalence) and uncertainty (validated from literature or expert opinion)

- **Indirect positive effects** (e.g. weight gain) and uncertainty

- Is the desired **effect measurable**
  - hazard prevalence
  - Weigh gain over time (how to attribute to the intervention)
  - Reduced mortality

- Experiences from other VC work of ILRI (e.g. Pig Uganda)
Best bet selection – further criteria

- **KAP of targeted group** (would require survey, e.g. FGD or other participatory approaches)
- **Policy environment** (supporting or not)
- Expected investment cost
  - Fixed and over time to maintain
- **Expected adaptation rate**
  - At the start & after 6 months

Overall SCORING ➔ Final selection ➔ Implementation & test ➔ Randomised control trials
A controlled trial is a study in which participants are assigned to a study group.

In a randomized controlled trial, participants are assigned to treatment conditions at random (i.e., equal probability of being assigned to any group).

Procedures are controlled to ensure that all participants in all study groups are treated the same except for the factor that is unique to their group which is the intervention received.
Quarterly follow-up to capture related variations
PIG SLAUGHTER-HOUSE

Source: Sinh, Handlos & Unger, 2014
Reality check requires also understanding of consumer perception: e.g. preference for “dry- looking” pork (Sinh, 2013)

Source: Sinh & Unger, 2014
Outlook 2015-2017

PigRISK:
Best bet implementation and evaluation
Dissemination & communication
Safe Food Fair Food Asia, SFFF Asia (Bangladesh, India, Vietnam):
   Proposal submitted to GIZ based on a successful model used in Africa (CMU and FU Berlin as capacity providing partners)
Other areas:
Feed  Evaluation of non-traditional feeds e.g. by-products of agro-industries
Breed  Conversation of local breed and potential of local breeds
Special thanks to the PigRisk and its partners and the ACIAR

better lives through livestock

ilri.org