Improving livestock value chains: The example of Vietnam (pigs)

Fred Unger, Lucy Lapar, Hung Nguyen-Viet and Delia Grace

Global Health Initiative 2015
Chiang Mai, Thailand, 11 February 2015
Research conference: Emerging diseases at convergence of animal, human and environmental health
Value chains are the linked groups of people and processes by which a commodity is supplied to the final consumer. Value chain covers more than the production process; it implies also a flow of information and incentives between the people involved. Money is sent from the consumer to the different people in the chains.

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.
Traditional approach was piecemeal

Past ILRI research has focused specific aspects of given value chains, commodities and country.

...in Country A

...in Country B

...in Country C

...in Country D
WHOLE value chain approach

From focus on production by poor livestock keepers ...

To designing agri-food systems that improve access to nutritionally animal-source foods
Working in 9 target value chains  
under ILRI’s CRP 3.7. Livestock and Fish  
Program time scope: 8-12 years
Pig Value Chain in Vietnam

Why pigs in Vietnam
Why pigs in Vietnam

- Pork is a significant component of the Vietnamese diet
- Strong demand for fresh pork that smallholders can supply through most preferred outlets by consumers (temporary and permanent markets)
- Dominance of smallholders in pig production, importance in employment generation, significant contribution to 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 Vietnam pork market share
- Smallholder pig systems can generate efficiency gains from low-cost locally-sourced feeding options
- Enabling policy environment: willingness of policymakers, development partners, and stakeholders to engage in R4D initiatives
Relative shares of meat types in livestock production, Vietnam, 2002-2012

Pork is a significant component of the Vietnamese diet

## Pig production holdings in Vietnam, by scale

<table>
<thead>
<tr>
<th>Holding type</th>
<th>Herd size</th>
<th>% of national herd (1999)</th>
<th>% of national herd (2006)</th>
<th>Breed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallholders or backyard</td>
<td>1–10 pigs</td>
<td>80</td>
<td>64</td>
<td>North: mostly local South: mostly cross with exotic</td>
</tr>
<tr>
<td>Small-medium</td>
<td>5–20 sows or 30–100 fattening</td>
<td>10</td>
<td>20</td>
<td>Cross and exotic</td>
</tr>
<tr>
<td>Medium</td>
<td>20–500 sows or 100–4000 fattening</td>
<td>5</td>
<td>10</td>
<td>Exotic</td>
</tr>
<tr>
<td>Large</td>
<td>&gt;500 sows or &gt;4000 fattening</td>
<td>5</td>
<td>6</td>
<td>Exotic</td>
</tr>
</tbody>
</table>

**Dominance of small/medium scale, significant contribution to HH income**

Source: Kinh & Hai 2008.
Preferred market outlets for fresh pork by consumers

Traditional market outlets remain the most preferred purchase outlets for fresh pork by Vietnamese consumers.
Pig Genetics

- Institutions, agents involved
  Public (MARD, research Institutes, universities), private & NGOs
- Composition of pig herd by type and breed in Vietnam in 2010

Reproduction issues:
- Small numbers of boars in existing AI facilities
- Quality issues of semen
- Limited accessibility to AI sources of pig producers
- Lack of pig farmers’ knowledge on AI
- Less educated AI technicians
### Average ranking of major concerns about meat safety by consumers

<table>
<thead>
<tr>
<th>Concern</th>
<th>HN</th>
<th>HCMC</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diseases of livestock</td>
<td>1.2</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Hormone used in animals</td>
<td>2.8</td>
<td>3.0</td>
<td>2.9</td>
</tr>
<tr>
<td>Antibiotic use</td>
<td>3.0</td>
<td>2.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Hygiene in market outlet (including meat seller)</td>
<td>3.8</td>
<td>2.6</td>
<td>3.2</td>
</tr>
<tr>
<td>Hygiene in slaughtering</td>
<td>3.9</td>
<td>2.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Concentrate feeding of animals</td>
<td>3.7</td>
<td>4.1</td>
<td>3.8</td>
</tr>
<tr>
<td>Other</td>
<td>3.5</td>
<td>3.1</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Animal diseases tops the list of major concerns of urban consumers about meat safety.
Demand for pork

- Strong **preference for fresh, un-chilled pork**; Note, that imported pork is frozen pork, natural protection from imports.
- Increased **preference for lean pork**
- Also **increasing demand for local pork** (e.g. HCMC, potential for niche a product due to prime price)
- Future **increases in consumer incomes are expected to lead to increased demand for pork** and other meat products
Activities along the pig value chain in Vietnam

Pig sector review: background, trends, policies
Breed/Genetics:
Scoping study and breed and genetic resources (central highlands)
Feed: Feed technology review
Food safety/animal health:
On-going pig risk project (2012-2017): focus on animal and food safety
Indigenous pig system: Scoping study to evaluate the potential of integrated indigenous pig systems (cross CRP)

Supporting activities:
Participatory videoing: document interventions and their uptake
Lab diagnostic review: available tests, vaccines etc.
SD model: ex-ante used tool to evaluate effect of potential interventions
Reducing disease risks and improving food safety in smallholder pig value chains in Vietnam

PIG RISK

Builds on previous projects in Vietnam

(e.g. Improving competitiveness of pig producers)
Improve the livelihoods of rural and urban poor in Vietnam through improved opportunities and incomes from pig value chains as a result of reduced risks associated with pork-borne diseases.
Objectives

1. **Assess impacts of pork-borne diseases** on human and livestock and identify critical points/opportunities for risk management (Year 1-2)

*Producer, SH, market, traders, hospitals, consumers*

2. **Develop & test incentive-based innovations** to improve management of human & animal health risks in smallholder pig VC (Year 3-4)

*Identify best bets ➔ validate ➔ apply ➔ evaluate/adjust ➔ re-apply ➔ scaling out*

3. **Communicate the lessons and tools** learned to sustainably improve capacity to assess and manage risks in the smallholder pig chain

*Stakeholder consultations, round table, policy briefs*

**Work through partners:** *Universities, MARD, research institutions, NGO’s,*

**Various expertise:** *Vets, human health, environment, socio econ, social science*
Assessment

Interventions (best bets)

Communication/ dissemination/ capacity building
Assessment (Year 1-3)

- **Literature review** (animal Health and public health)
- **PRA** (producer, SH owner/worker, retailer, trader, consumer, input suppliers)
- **Desk study**, cost of illness (hospital cases)
- **Basle lines** (400 HH with pigs) in 2 provinces
- **Longitudinal surveys:**
  - Farm/slaughter house and markets (12months/4 sampling rounds for biological samples) (microbiological risk assessment)
  - HH with pigs (fortnightly visits for 1 year)
  - Local vet stations (monthly reports)
  - Consumer (monthly)
- **Biological/chemical hazards** (Salmonella, E-coli, Strep suis/ Difterex)
- Biological **sampling on-farm** (fecal, serum, oral fluid)
### Assessment: Results from RPA- Animal Health

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

<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</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.*
## Assessment: Results across different survey tools

**Pig diseases, as perceived by farmers or from reviews**

<table>
<thead>
<tr>
<th>Literature review</th>
<th>PRA</th>
<th>BLS</th>
<th>Longitudinal survey</th>
<th>Serological survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMD</td>
<td>FMD</td>
<td>FMD</td>
<td></td>
<td>on-going</td>
</tr>
<tr>
<td>PRRS</td>
<td>PRRS</td>
<td>PRRS</td>
<td>PRRS</td>
<td></td>
</tr>
<tr>
<td>CSF</td>
<td>CSF</td>
<td>CSF</td>
<td>CSF</td>
<td></td>
</tr>
<tr>
<td>Pastorellosis</td>
<td>Pastorellosis</td>
<td>Pastorellosis</td>
<td>Pastorellosis</td>
<td></td>
</tr>
<tr>
<td>Paratyphoid suum</td>
<td>Edema disease</td>
<td>Edema disease</td>
<td>Edema disease</td>
<td></td>
</tr>
<tr>
<td>Edema disease</td>
<td>Edema disease</td>
<td>Edema disease</td>
<td>Edema disease</td>
<td></td>
</tr>
<tr>
<td>Erysipellos</td>
<td>Salmonellosis</td>
<td>Salmonellosis</td>
<td>Salmonellosis</td>
<td></td>
</tr>
<tr>
<td>Porcine High Fever Disease (PHFD)</td>
<td>Salmonellosis</td>
<td>Salmonellosis</td>
<td>Salmonellosis</td>
<td></td>
</tr>
</tbody>
</table>
Preliminary result: Animal health – farm management

Good animal husbandry practice deficits observed:

✓ Rare use of disinfection matrasses
✓ Farmers usually don’t wear protective clothing or boots
✓ Visitors are often able to access the pig area
✓ Risky practices when handling of sick and dead animals: e.g. selling or home consumption
✓ Pig feed storage (e.g. signs of moisture)

Endo-parasitic prevalence indicates a problem:

✓ 2/3 of fecal samples are positive for at least one type of pig parasite (e.g. Eimeria, Strongyloides, Trichocephalus suis, A. suum, Fasciolopsis buski)
## Food safety sampling scheme (SH and market stools)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hung Yen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Van Giang</td>
<td>C 1</td>
<td>23</td>
<td>69 (65)</td>
<td>69 (59)</td>
<td>69 (59)</td>
</tr>
<tr>
<td></td>
<td>C 2</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 3</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khoai Chau</td>
<td>C 1</td>
<td>23</td>
<td>58 (45)</td>
<td>58 (56)</td>
<td>58 (58)</td>
</tr>
<tr>
<td></td>
<td>C 2</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 3</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tien Lu</td>
<td>C 1</td>
<td>23</td>
<td>58 (50)</td>
<td>58 (49)</td>
<td>58 (44)</td>
</tr>
<tr>
<td></td>
<td>C 2</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 3</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dien Chau</td>
<td>C 1</td>
<td>23</td>
<td>58 (49)</td>
<td>58 (51)</td>
<td>58 (50)</td>
</tr>
<tr>
<td></td>
<td>C 2</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 3</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hung Nguyen</td>
<td>C 1</td>
<td>23</td>
<td>58 (50)</td>
<td>58 (51)</td>
<td>58 (55)</td>
</tr>
<tr>
<td></td>
<td>C 2</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 3</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do Luong</td>
<td>C 1</td>
<td>23</td>
<td>58 (51)</td>
<td>58 (57)</td>
<td>58 (50)</td>
</tr>
<tr>
<td></td>
<td>C 2</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C 3</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>359 (310)</strong></td>
<td><strong>359 (323)</strong></td>
<td><strong>359 (316)</strong></td>
<td><strong>359</strong></td>
</tr>
</tbody>
</table>

**Biological hazards:** Salmonella, E-coli, coliforms, Strep. suis
INTERVENTION - Best bets

Evidence driven based on assessment and available literature

Consideration for the selection process

• Defining the targeted parameter (e.g. reduced salmonella contamination, endoparasites, weight gain ... )
• Is the expected effect measurable (more difficult for producer interventions or interventions along the entire chain)
• How we can monitor the implementation of the intervention
• Literature screening for potential interventions, including RA, successes and failures
• Projected investment costs for an intervention
• Expected compliance of actors & feasibility of intervention (pro & cons)
Best bets - Selection process cont.

• Is the expected effect **focusing on a specific actor** (e.g. producer) or across-actor along the **entire chain** (e.g. reduced health risk of consumer)

• **Externalities:** **policy environment**

• **LIFSAP GAHP experiences** (29 criteria !), some unpractical e.g.
  – Separate from residential areas
  – Only same age classes
  – Quarantine

Review & reduce to 5-10 most feasible based on producer feedback

• Potential for **scaling out**

**Validation of selected best bets**

• SD model : ex-ante assessment of effects of bets bet

• Wide stakeholder consultations, including government

• Feedback of targeted actors
Disease Risks and Food Safety

Addresses

- PIG FARMS
  - HH WITH PIGS
  - DRUG SUPPLIER
  - LOCAL VET
  - FEED/BREED SUPPLIER

- PIG SLAUGHTERHOUSE
  - LOCAL VET
  - TRADER/BUTCHER
  - WORKERS
  - SLAUGHTERHOUSE OWNER

- PORK MARKETS
  - TRADER/RETAILER
  - MARKET MANAGER
  - LOCAL VET
  - HEALTH/TRADE SECTOR

- HOUSEHOLDS
  - CONSUMERS
  - UNIONS/GROUPS
  - LOCAL VET
  - HEALTH SECTOR

Bets

1. Information – Knowledge targeting behavior change
2. Biosecurity
3. Waste and farm management
4. SH hygiene practice + C&D
5. Shop hygiene practice + C&D
6. HH: handling, preparation, habits
PIG FARMS

Source: Sinh & Unger, 2014
Consumer preference for “dry-looking” pork (Sinh, 2013)

Source: Sinh & Unger, 2014
Outlook 2015-2018 ...  

Pig risk:  
Best bet implementation and evaluation  
Dissemination & communication

General VC activities (based on recent stakeholder consultations):  
Feed  Capacity building on feeding of different breeds & types  
Evaluation of non-traditional feeds e.g. by-products of agro-industries  
Breed  Review of breeding and breeding management  
Improving of quality of breeding boars and AI services  
Conversation of local breed  
Explore options for a traceability system
Acknowledgement:
Vietnam University of Agriculture, Faculty of Vet Med
Vietnam University of Agriculture, Faculty of Economics
Hanoi School of Public Health

CGIAR Research Program on Livestock and Fish

livestockfish.cgiar.org