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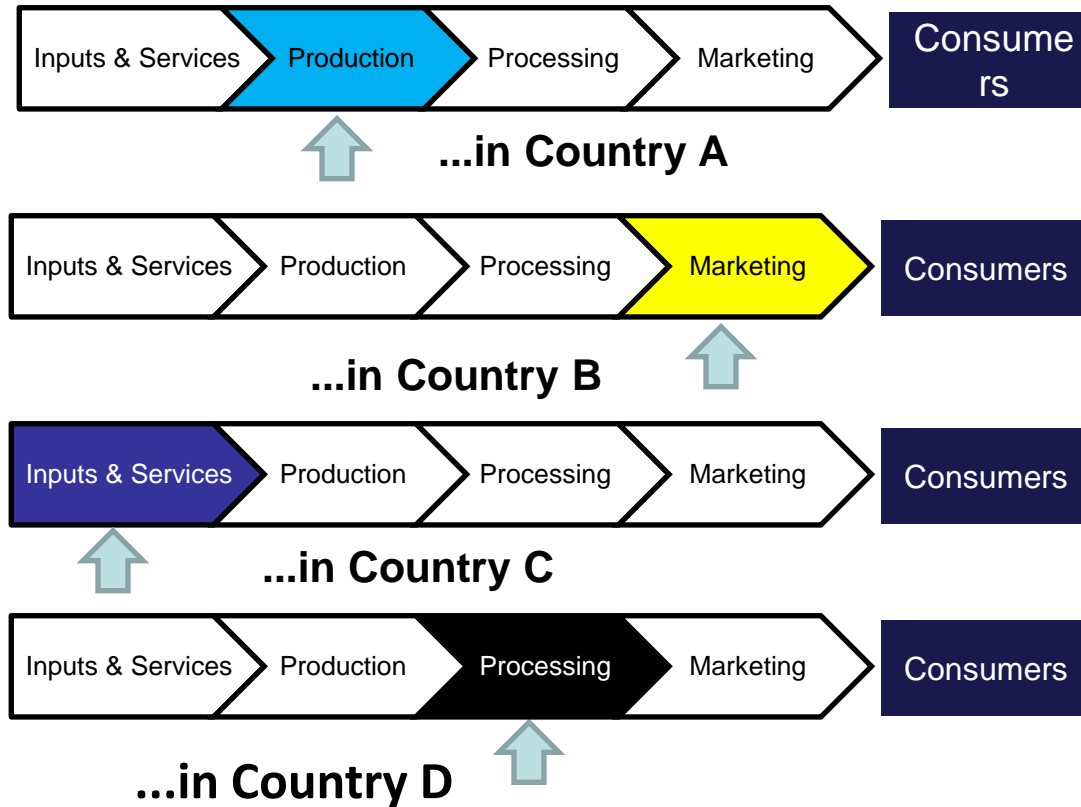
Understanding the flow of materials (pigs & pork) through a value chain is **important** in **understanding how risk of disease spread** may be produced in the chain, while understanding the **flow and distribution of incentives is key** to **understanding how to manage** those **risks.**

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
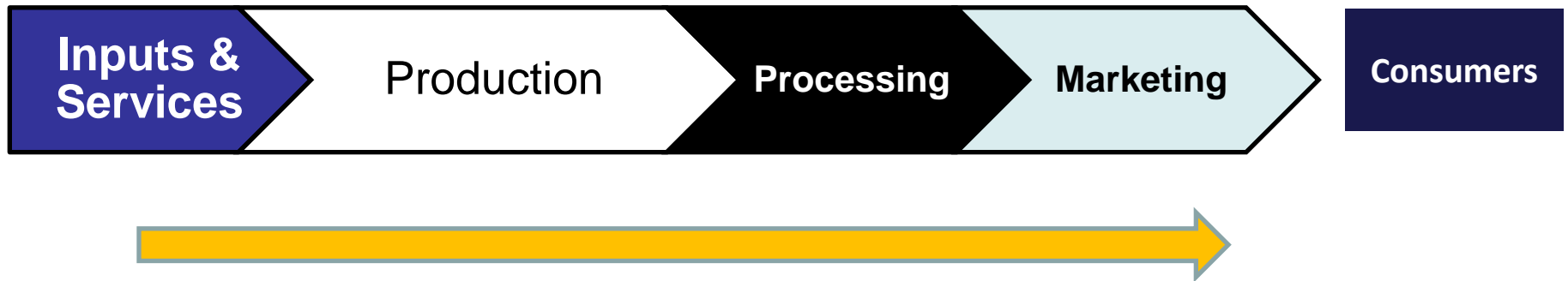- E.g. traders might be different affected than producers

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

| Inputs & Services | Production | Processing | Marketing | Consumers |

...in Country A

| Inputs & Services | Production | Processing | Marketing | Consumers |

...in Country B

| Inputs & Services | Production | Processing | Marketing | Consumers |

...in Country C

| Inputs & Services | Production | Processing | Marketing | Consumers |

...in Country D

WHOLE value chain approach

From focus on production by poor livestock keepers …

| Inputs & Services | Production | Processing | Marketing | Consumers |

Working in 9 target value chains
under ILRI's CRP 3.7. Livestock and Fish
## Program time scope: 8-12 years
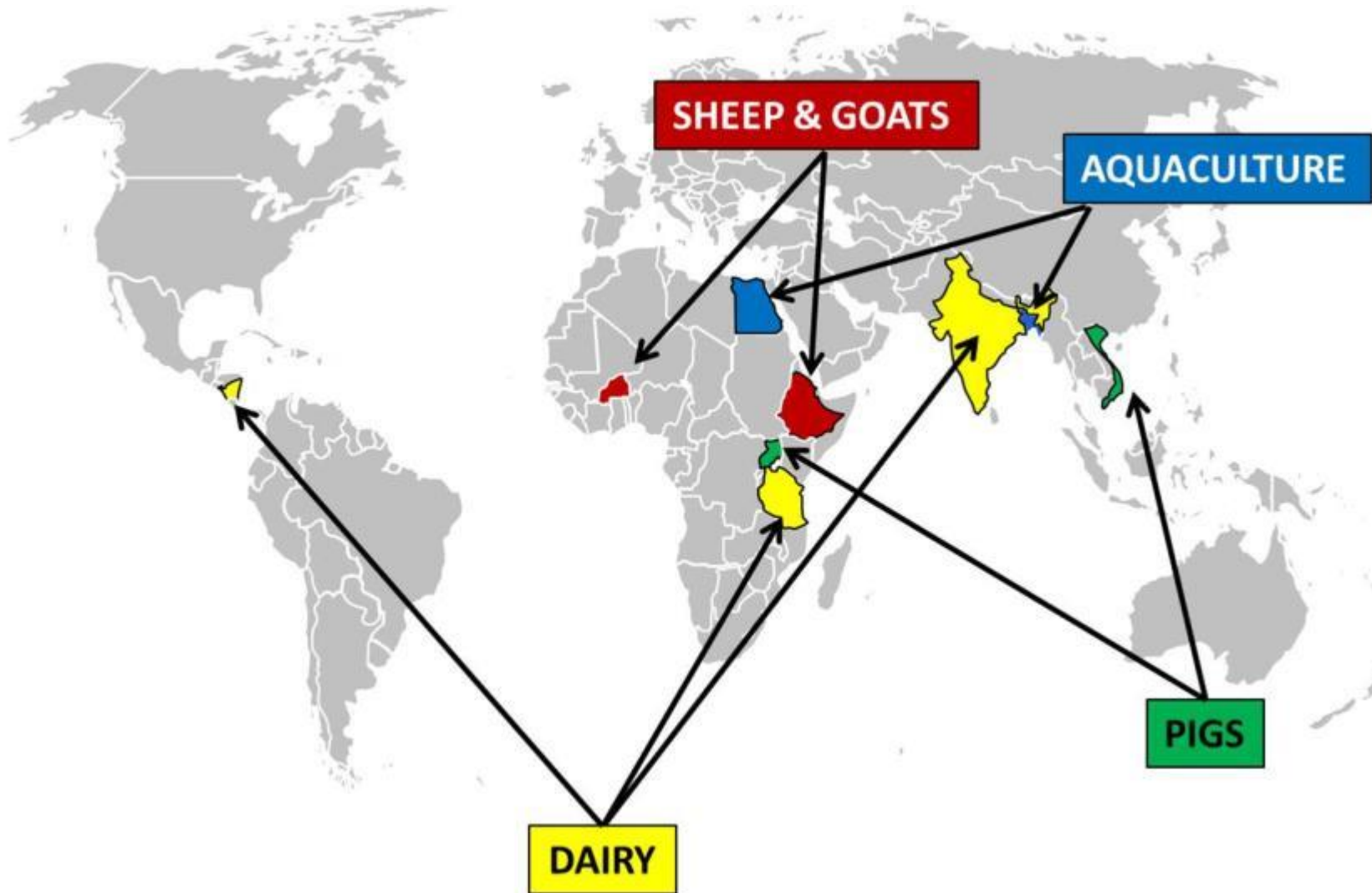
Pic value chain in Vietnam - some key facts

- 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
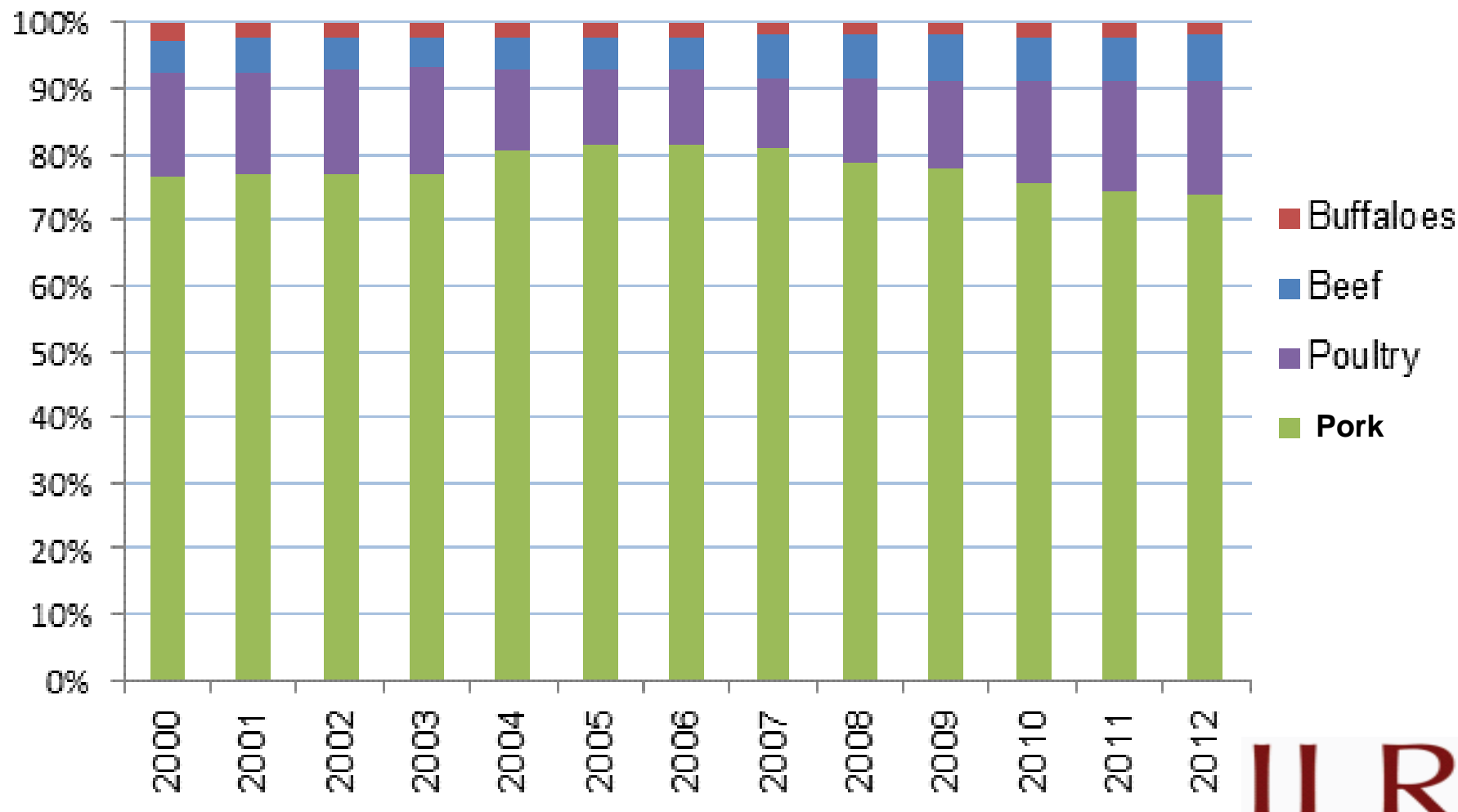
Pork is a significant component of the Vietnamese diet

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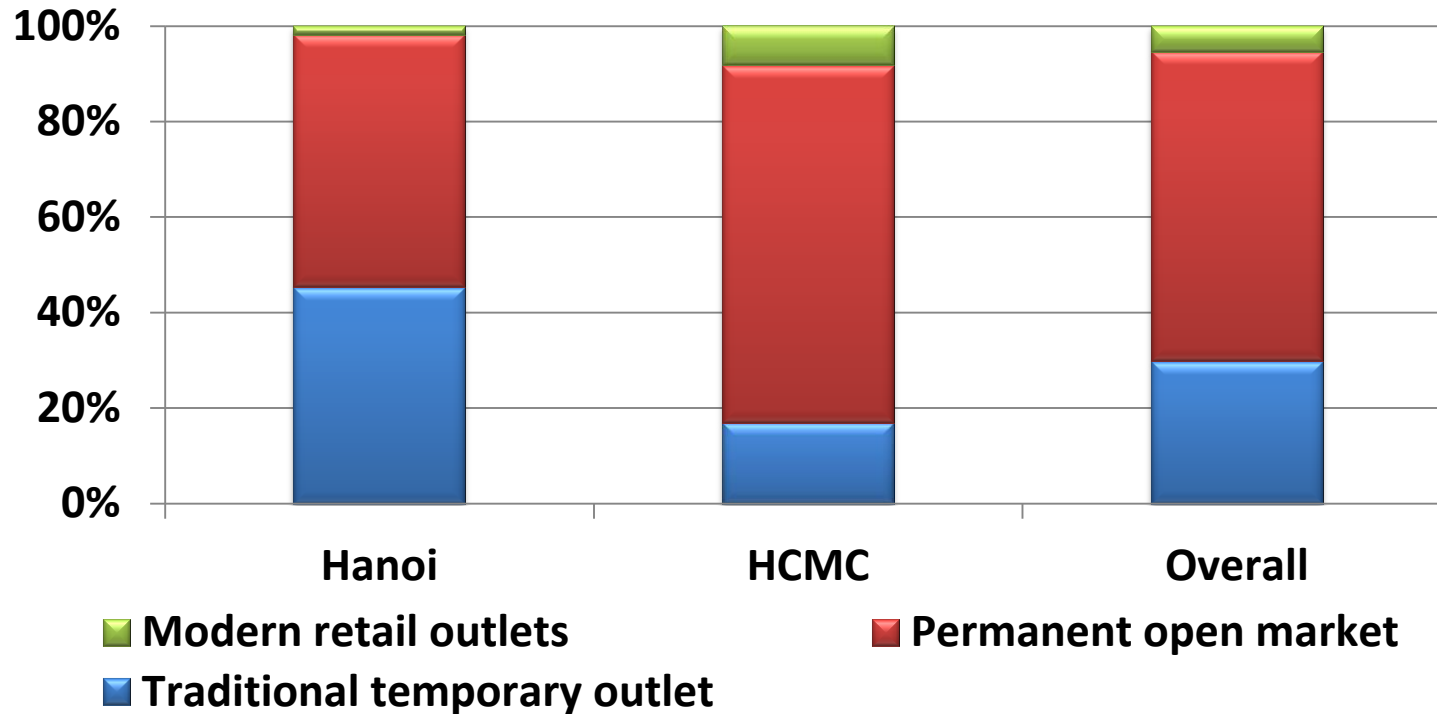
Traditional market outlets remain the most preferred purchase outlets for fresh pork by Vietnamese consumers

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)

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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
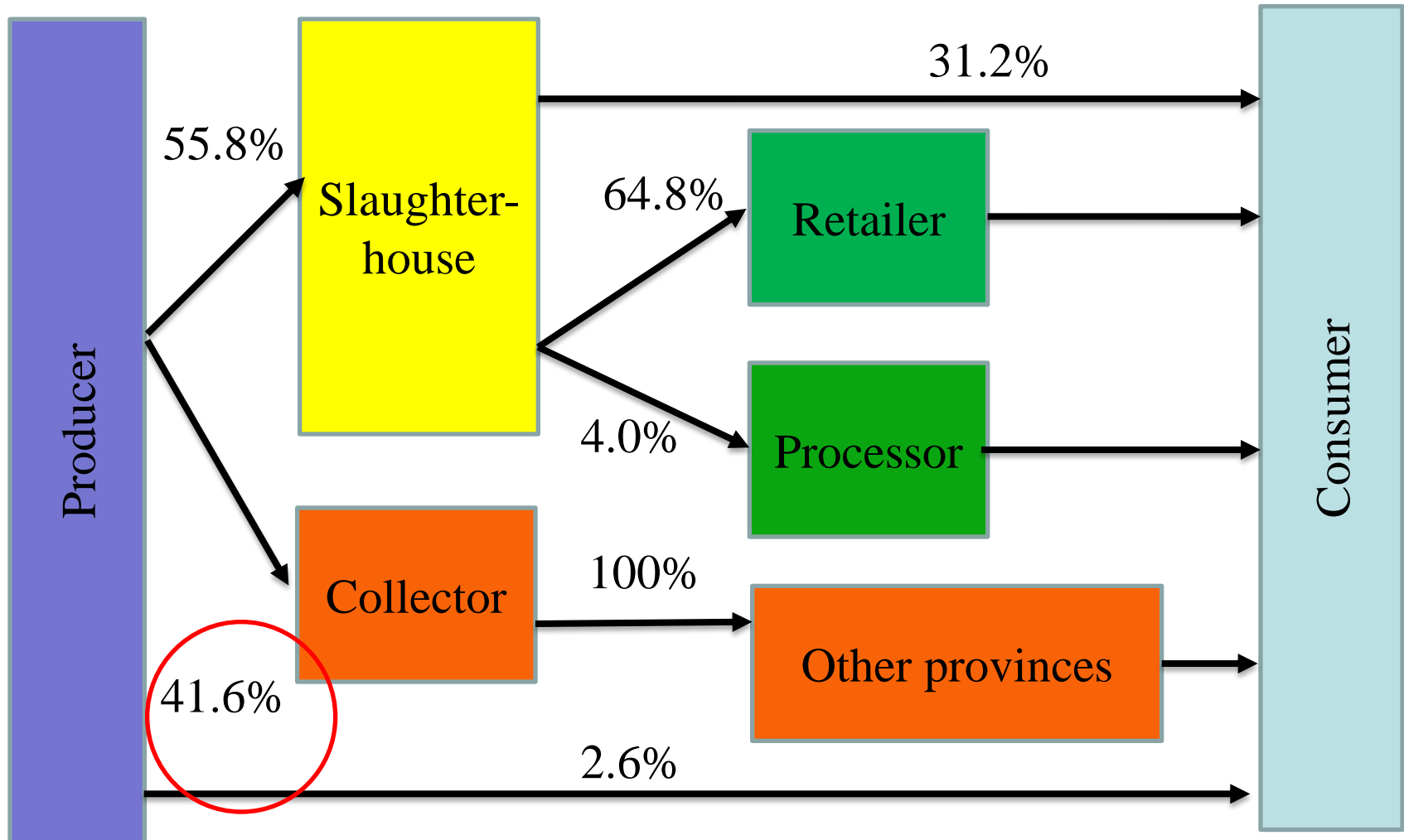
PigRisk: Selected results
Demographic of VC actors

	Farmer (n=400)	Slaughterhouse (n=51)	Processor	Retailer (n=74)	Consumer (hh leader) (n=416)
1. Gender					
- Male	48.6	51.0	36.4	6.8	80.1
- Female	51.4	49.0	63.6	93.2	19.9
2. Average age	46.9	47.1	47.9	47.1	48.5
3. Education					
None & Primary school	3.8	3.9	0	2.7	6.0
Secondary & high school	89.9	96.1	100	97.3	71.4
Other (higher)	6.2	0	0	0	22.6

PigRisk: Selected results for production performance (by location)

	Hung Yen	Nghe An	All
Pig herd size (latest cycle)	16.4	9.5	13.5
Average weight/pig (kg)	107.0	60.8	87.4
Time cycle (day)	146.0	99.4	126.3

Results from RIA – production constraints

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

Problem/Constraints	Ranking	
	Hung Yen	Nghe An
Feed quality	na*	1
High feed price	na*	2
Low quality of veterinary drugs	3	3
Low pig price	na*	4
Lack of capital	1	5
Lack of knowledge and skills in animal health management	2	-
Lack of veterinary doctors/ para-vet	4	-
Disease	5	6

*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
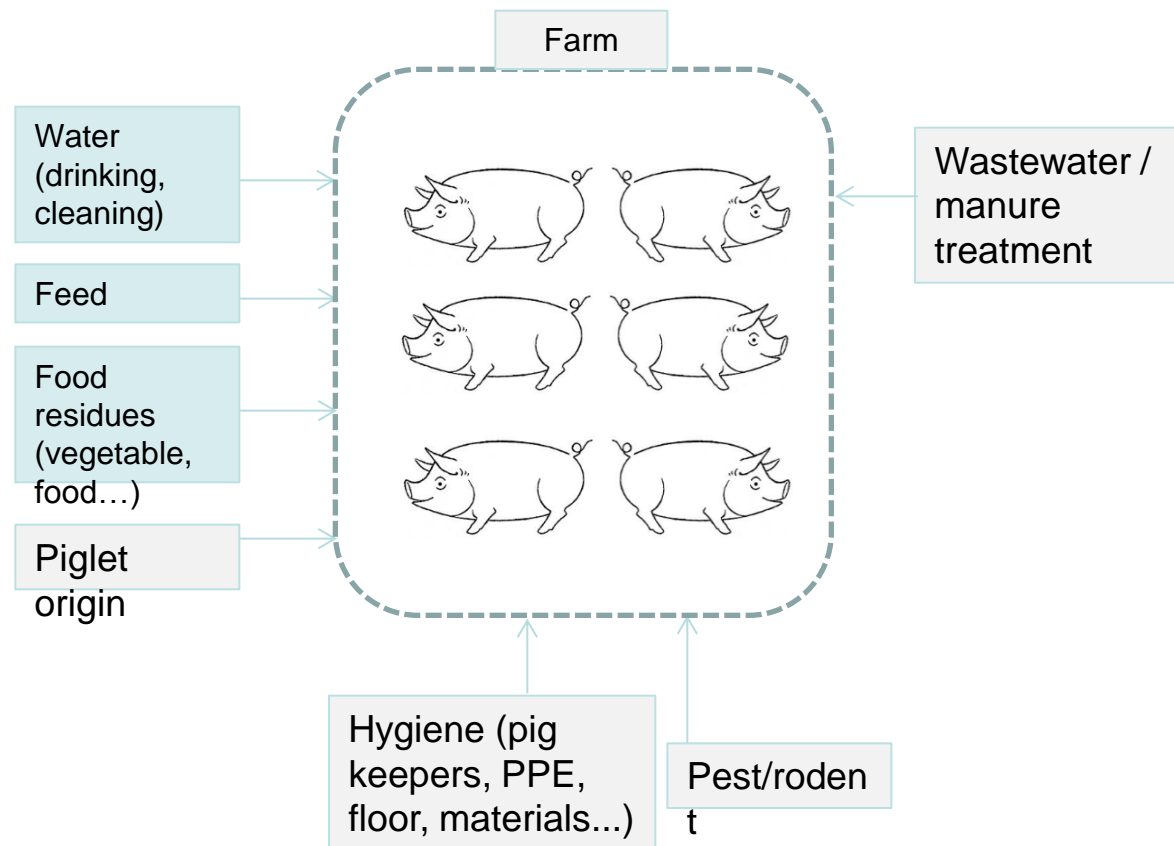- ❑ **Pig feed storage** (e.g. signs of moisture, approx. 50%)

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

PigRISK: Food safety

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.*
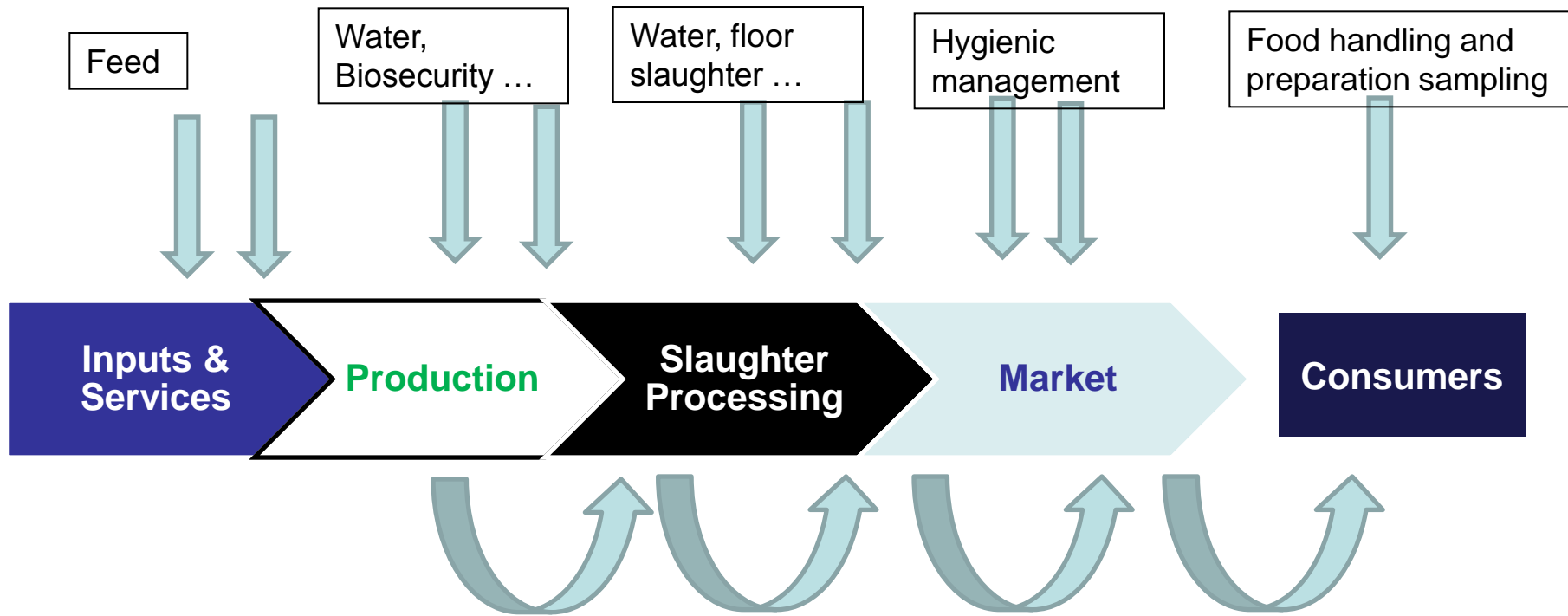
Incentive-based interventions

Incentive-based interventions

Feed

Water, Biosecurity …

Water, floor slaughter …

Hygienic management

Food handling and preparation sampling

Inputs & Services → **Production** → **Slaughter Processing** → **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 experience**s (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

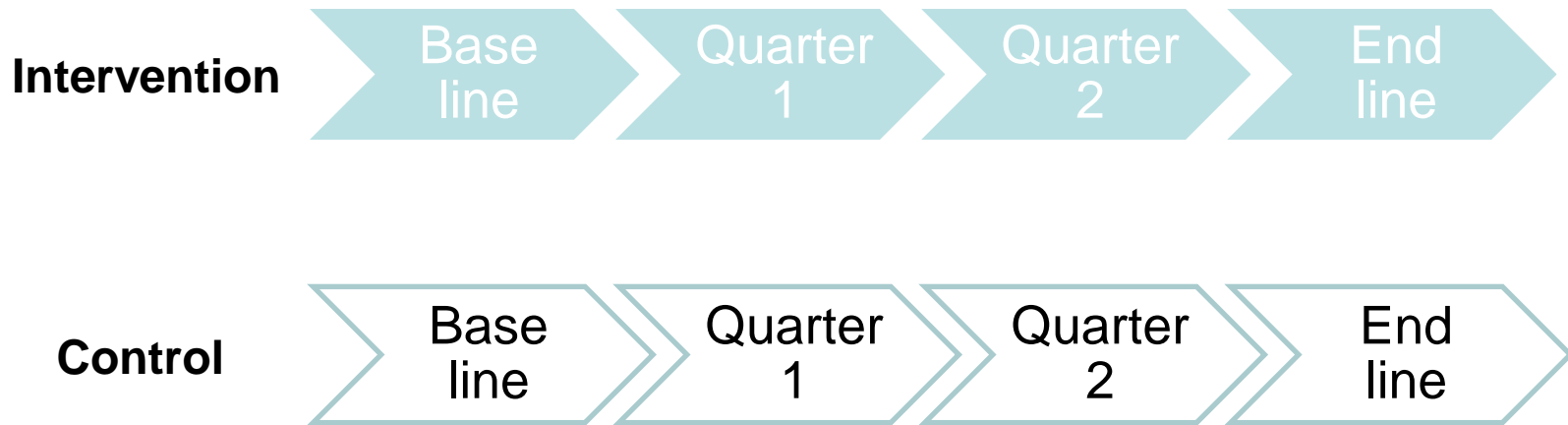- Experiences from other VC work of ILRI (e.g. Pig Uganda)

- **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

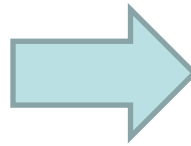# Randomized control trials (RCT)

- 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.

RCT

	Base line	Quarter 1	Quarter 2	End line
Intervention	Base line	Quarter 1	Quarter 2	End line
Control	Base line	Quarter 1	Quarter 2	End line

Quarterly follow-up to capture related variations

PIG SLAUGHTER-HOUSE

Source: Sinh, Handlos & Unger, 2014

PORK MARKETS

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

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