

Insights in improving food safety in smallholder pig value chains in Vietnam

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This policy brief provides information to help national and provincial policymakers better manage food safety along the smallholder pig value chains in Vietnam. It proposes cost-effective, practical interventions based on evidence from a multi-year research in Vietnamese traditional markets.

Key messages:

- Biological contamination of pork *Salmonella* was found in all retail types leads to high-risk for consumers in Vietnam.
- Strengthened hygiene practices in traditional markets is important to improve pork safety.
- Incentive and simple interventions developed by the SafePORK project can improve food safety in slaughterhouses and traditional pork retail and are scalable.
- Consumers expressed a high demand for pork sold by more hygienic shops and are ready to pay a premium.
- Alternative solutions to replace antimicrobials in pig fattening showed promising results from a pilot supporting the government's roadmap towards prudent use of antimicrobials and reducing antimicrobial resistance in livestock.
- A cooperative of local pig producers proved to be a good model to promote the development of the Vietnamese indigenous Ban pig value chain and helped create linkages to private sector.
- Understanding the roles of women and men in different nodes of the value chains is important to support compliance towards more hygienic practices.
- Enhanced risk communication, as a key part of a risk-based approach, is needed to inform the public of actual health risks from food. Food safety communication campaigns and approaches need to be tailored to targeted stakeholders to address differences in trust and needs.
- Various avenues have been used to strengthen awareness on food safety and align policy such as the Food Safety Working Group, Food Safety Risk Assessment taskforce, and sustainable food system transformation.

Overview of SafePORK project

The 'Market-based approaches to improving the safety of pork in Vietnam' (SafePORK) project was funded by the Australian Centre for International Agricultural Research (ACIAR). It was carried out from 2017 to 2023 in the provinces of Ha Noi, Hung Yen, Nghe An, Thai Nguyen and Hoa Binh. The International Livestock Research Institute (ILRI) partnered with Hanoi University of Public Health (HUPH), the Vietnam National University of Agriculture (VNUA), the National Institute of Animal Sciences (NIAS), and the University of Sydney, Australia (USYD), to implement the project. Project associated partners included the Thai Nguyen University of Agriculture and Forestry (TUAF), the Royal Veterinary College (RVC), the London School of Hygiene and Tropical Medicines (LSHTM), the Australian Volunteers International (AVI), and the Southeast Asia One Health University Network (SEAOHUN). SafePORK also engaged with the private sector – specifically Happy Mart, Biospring Company, Green Feed Company and Bac Tom – in project activities.

SafePORK sought to reduce the burden of foodborne disease in informal, emerging, and niche markets. Food safety was improved through light-touch and market-based approaches – contributing to more hygienic pork for consumers – while safeguarding the livelihoods of different pork sector actors.

Food safety in Vietnam

In Vietnam, pork is the most consumed meat and is mainly distributed via traditional open markets. These markets supply nutritious and diverse food to millions of people. Yet, food hazards are pervasive. Consumers' wariness of contaminated food is common, along with limited trust in food laws and enforcement capacity. Concerns over food safety are high and growing. A national representative survey identified food safety as a top concern (USAID 2015).

Despite being crucial for Vietnamese livelihoods and nutrition, and providing employment to tens of thousands of traders (primarily women), traditional pork value chains are a potential source of disease. This is particularly a challenge in wet markets, which are supplied mostly by smallholder farmers. At the same time, pork is more affordable and accessible at these markets compared to modern food outlets. As such, the SafePORK project developed a theory of change with a pathway and indicators to guide the team in implementing simple interventions that would develop capacity for actors at slaughterhouses and traditional markets to address *Salmonella*, the key pathogen in the pork value chain. The project conducted interventions at 10 slaughterhouses in four provinces (Hung Yen, Nghe An, Thai Nguyen and Hoa Binh), in 29 pork shops at three markets in two provinces (Hung Yen and Thai Nguyen), and one cooperative of indigenous Ban pig farmers in the Hoa Binh Province.

Main findings

Food safety performance across key pork value chains

A food safety performance tool was developed and used in key

pork value chains of Hanoi, Hung Yen and Nghe An. Between September 2018 and April 2019, the tool gathered information on the presence of microbiological hazards (e.g., *Salmonella*) and the knowledge, attitudes and practices of pork value chain actors.

Microbial contamination levels in pork

Researchers collected 671 samples of pork from modern and traditional retailers and food services. The overall prevalence of *Salmonella* in pork was found to be 58.1%, ranging from 50.9% to 80.5% depending on retail type. Only 6% of pork met the Vietnamese standard for total bacterial count contamination (QCVN 8-3: 2012 < 5x10⁵ CFU/gram). The high level of biological contamination in pork is attributed to transportation time, storage conditions, and poor hygienic practices during handling.

Consumer's knowledge, attitudes, and practices in food safety

Actors covering all pork smallholder value chains were surveyed and 533 responses were collected. Most actors believed unsafe pork could be detected by physical attributes such as smell, taste or appearance. They also showed concern over the possible role of chemical residues in causing cancer risks. Regarding attitude towards foodborne diseases, 91–100% of value chain actors blamed poor hygienic practices as the main cause of foodborne diseases and considered foodborne diseases serious illnesses. Various value chain actors revealed seven key reasons leading to unsafe pork: poor hygiene, low quality inputs, diseases, long duration of meat transportation, unclear origin of pork, and improper preservation and processing techniques.

Overall trust levels in different pork supply chain stakeholders regarding pork safety decrease from rural to urban areas, and along the value chain from producers (highest) to consumers (lowest). Most downstream value chain actors agreed that pig producers are most responsible for producing safe meat.

Predefined propositions to improve pork safety were shown to participants to rank in preference order. The formation of cooperative groups and improving market linkage were the top priorities for most respondents, regardless of value chain. Other common preferences included tamper-proof labelling, frequent publication of test results done on market pork samples, and carrying out government campaigns to raise awareness of the importance of food safety among value chain actors.

Consumer perception and purchase behaviour, willingness to pay for safe pork

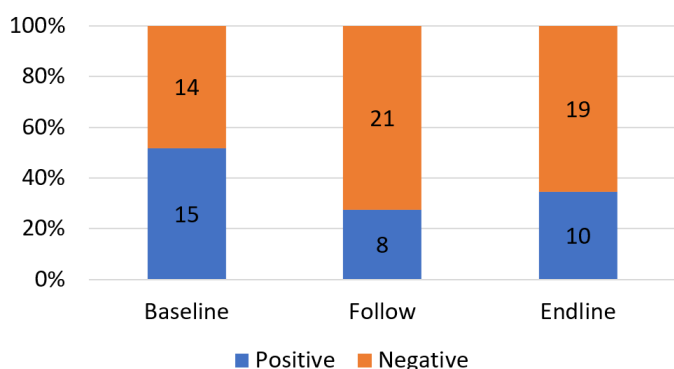
To determine consumer perception, purchase decision and willingness to pay for safe pork, two approaches were tested: a food auction experiment (October–November 2021 in Hung Yen and Thai Nguyen) and a state preference survey (April 2022 in Hung Yen and Nghe An). The auction experiment created a market environment where consumers could bid for pork sold from upgraded pork shops. Results revealed consumers were willing to pay a 20% premium for such pork. Corresponding results gained from the state preference survey showed 80% of consumers are willing to pay 15–20% more for perceived safe pork. Results from both surveys indicated a high demand for safer pork products, even if offered for a premium price.

Simple interventions to improve pork safety

In the past, various approaches such as Good Agriculture Practices (GAP), certification and traceability have been tried with limited uptake. The SafePORK team designed interventions using a systemic approach to include food safety performance assessments, participatory diagnosis, formative research, and piloting and testing of interventions. Emphasis was given to private sector involvement including by feed supplier (Green Feed), provider of antibiotics alternatives (BioSpring), and food stores (Happy Mart and Bac Tom). The results of from this work included:

- In collaboration with private sector partners and TUAf, a probiotic on-station trial revealed there is no advantage using antibiotics in pig fattening. In addition, pigs in the probiotic groups had leaner pork which may fulfil consumers' preference.
- Slaughterhouse interventions used tailored stainless-steel grids to prevent pig carcasses contacting the floor, frequent washing of hands and surfaces, and better separation of clean and dirty zones to further reduce carcass contamination. Equipment costs varied by slaughter facility ranging between USD 200 and USD 1,800 with a shared contribution of 20-50% by slaughterhouse owners.
- In retail, separation of ready-to-eat pork, raw pork and intestines, and frequent washing of meat selling surfaces and vendors hands. In addition, good-hygiene-pork branding practices were promoted among retailers. The project team tested hygienic cutting boards with select retailers receiving cutting boards to test its feasibility for daily use in December 2019. Cost of provided equipment per retailer was USD 35.
- Interventions were supported by behaviour nudges in collaboration with RVC, UK. An intervention guideline was also developed.
- The SafePORK simple interventions proved its effectiveness in reducing *Salmonella* prevalence in retail pork by 28% (Figure 1).

Figure 1: *Salmonella* prevalence at pork shop in Vietnam



Cooperative: a marketer for indigenous Ban pigs

The SafePORK project helped improve market linkages and food safety for indigenous Ban pork. In January 2021, the Hoa Binh Province authorities and the Department of Intellectual Property under the Ministry of Science and Technology, recognized the

Ban breed benefits at least 90 farmers in the Da Bac Ban Pig Cooperative in the country's northwest. Thirty producers and two slaughterhouse operators participated in better market recognition training under SafePORK. Capacity development was provided to leaders and members of the cooperative. This established new market channels for Ban pork produced by the Da Bac Cooperative, including a developed business model, facilitated exchange visits, and negotiations between cooperative members and food stores (e.g. in Hanoi). New retail channels emerged including selling live 'small' pigs to Hoa Binh or Hanoi, and slaughtered 'heavier' pigs to consumer groups via online platforms (Zalo) and the food store chain Happy Mart.

Lessons from the gender-sensitive approach

SafePORK paid particular attention to the relationship between gender roles and food safety. The project adopted a gender-sensitive approach in all activities and accommodated women as equal beneficiaries of interventions. Training and risk communication events were organized in time and venues that were more convenient for women to join. As a result, women are better equipped with new methodologies and technologies they can apply to their production and family nutrition activities. Some significant findings of gender roles in studying the value chains were applied to the project interventions such as the dominant role of women in retail, the dominant role of men in slaughtering, women's cautiousness towards foodborne illnesses and chemical residues in pork/food, and women's skepticism in interventions related to farm production, certification and tests.

Food safety risk communications

Surveys were conducted between July and December 2019 to identify the gaps between communication research and how food safety can be best communicated to the public. Lecturers and students at universities, leaders of food safety sub-administrations and sub-departments of Animal Health and Livestock Production, and media and consumers from Hanoi and Hoa Binh Province participated in the survey. Research showed there is public demand for appropriate food safety information to help them reliably select safe food. Media reports often focus on negative messages, which may contribute to increased concerns, instead of presenting evidence-based recommendations to help people protect themselves from unsafe food. All actors show trust towards official media channels such as TV and newspaper, rather than social media or celebrities. Notably, community loudspeakers are preferred in rural areas. The survey results influenced the design of risk capacity building training and supporting materials.

Risk communication campaigns targeted pig value chain actors including consumers, media, policymakers and state civil servants. Overall, more than 700 participants (70% women and 30% men) were included in the training. This includes nearly 200 participants in training of trainers (TOT) in Hung Yen and Nghe An who conducted their own responsibility training sessions during the last two years of the project. A loudspeaker campaign addressing pork safety aspects is estimated to have reached 45% of community members in Tien Lu District of Hung Yen Province, and Dien Chau District of Nghe An Province. This is equivalent to about 120,000 community members including 70,000 women. Various stakeholders were involved in the development of five food safety training manuals that target different value chain actors.

Animal welfare in pig value chains

Animal welfare aspects targeting slaughterhouse workers, which were explored in 2019 as a part of a student exchange program between the project and USYD, revealed a general limited understanding of the concept. Also, with the support of USYD, an online training course on 'Animal welfare along smallholder pig value chains,' was organised in 2022. It shared information on animal welfare along the smallholder pig value chains with 22 participants (eight women) from different government agencies, academia, and research institutes in Vietnam. Basic animal welfare issues across farming, transportation and slaughter contexts were provided and discussed. During the no-cost extension of the initiative, an animal welfare framework in traditional pig production of Hoa Binh (white and indigenous pigs) was tested. The initiated animal welfare research will continue in initiatives under the CGIAR umbrella, such as Sustainable Animal Productivity.

Research capacity building

The research team consisted of 33 researchers. Capacity building under the project benefitted three PhD students, eight MSc fellows (three international), and 52 students. Two Vietnamese researchers gained specific training from the Australia project partner (USYD) and three USYD students conducted a case study in Vietnam. Three volunteers under the AVI program contributed to the project, one of them as part of her MSc.

Scientific and related outputs

Research outputs from SafePORK include 22 peer-reviewed articles, two PhD theses, 10 MSc theses, and 48 presentations at conferences/workshops. Other related outputs include: participation in high-level forums (e.g. One Health Partnership for Zoonoses, World Health Organization), 18 briefs/notes/fact sheets, three manuals, various training curricula, media articles, and press releases and blog posts.

Policy translation, capacity development and networking

Since June 2021, ILRI has served as chair of the Vietnam Food Safety Working Group (FSWG)—in recognition of a decade of pork safety research by the institute and national partners in an initiative funded by the ACIAR, which started with the former '[Reducing disease risks and improving food safety in smallholder pig value chains in Vietnam](#)', or PigRISK project and continued with SafePORK.

SafePORK provided substantial inputs to Vietnam's preparation for the United Nations Food System Summit (UNFSS) in September 2021. The project's results were incorporated in discussions and presented at the national and regional dialogues on UNFSS's Action Track 1—*Ensuring access to safe and nutritious food for all*. As a result, food safety gained strong attention during UNFSS. Vietnam's President, Nguyen Xuan Phuc, also highlighted the project's results in a speech at the summit in New York City.

Following UNFSS, the SafePORK team joined a core group providing food safety-related inputs into the draft of the National Action Plan for Food System Transformation, a process facilitated by the Vietnam Academy of Agricultural Sciences under the Ministry of Agriculture and Rural Development.

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Photo credit

Page 1 (left): ILRI/Chi Nguyen
Page 1 (right): ILRI/Vu Ngoc Dung

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