A Collaborative Research Project Funded by:

DFID Department for International Development

Implemented by:

HPAI PRO-POOR HPAI RISK REDUCTION

Poultry Certification for Pro-Poor HPAI Risk Reduction

J. Ifft, J. Otte, D. Roland-Holst, and D. Zilberman

Mekong Team Working Paper No. 6

Table of Contents

List of Tables

List of Figures

Preface

Since its re-emergence, HPAI H5N1 has attracted considerable public and media attention because the viruses involved have been shown to be capable of producing fatal disease in humans. While there is fear that the virus may mutate into a strain capable of sustained human-to-human transmission, the greatest impact to date has been on the highly diverse poultry industries in affected countries. In response to this, HPAI control measures have so far focused on implementing prevention and eradication measures in poultry populations, with more than 175 million birds culled in Southeast Asia alone.

Until now, significantly less emphasis has been placed on assessing the efficacy of risk reduction measures, including their effects on the livelihoods of smallholder farmers and their families. In order to improve local and global capacity for evidence-based decision making on the control of HPAI (and other diseases with epidemic potential), which inevitably has major social and economic impacts, the UK Department for International Development (DFID) has agreed to fund a collaborative, multi-disciplinary HPAI research project for Southeast Asia and Africa.

The specific purpose of the project is to aid decision makers in developing evidence-based, pro-poor HPAI control measures at national and international levels. These control measures should not only be cost-effective and efficient in reducing disease risk, but also protect and enhance livelihoods, particularly those of smallholder producers in developing countries.

Authors

Jennifer Ifft, David Roland-Holst and David Zilberman work at the University of California – Berkeley (UCB) and Joachim Otte works at the Food and Agriculture Organization (FAO).

Disclaimer

Acknowledgements

We are thankful to Sigfrido Burgos Cáceres for formatting this document, and very grateful to DFID for funding this project.

Keywords

Poultry Certification, Disease Risk, Risk Reduction, HPAI, Avian Influenza, Chickens, Ducks, Markets, Poverty Alleviation.

More information

For more information about the project please refer to www.hpai-research.net.

Date of Publication: January 2009

Executive Summary

Introduction
This working paper describes the policy implications of a pilot study for promoting pro-poor H5N1 risk reduction by using the demand side of poultry markets to achieve higher food safety standards. In this way, smallholders can contribute voluntarily to the global commons of disease prevention, improve their livelihoods, and displace costly and inefficient government interventions in disease surveillance and control. Modelled on organic, fair-trade, and other speciality product marketing strategies, this pilot study is intended to combine risk management features with product quality development, correcting for negative surveillance/control effects, and opening the potential for private incentives to improve product quality and incomes for all participants in food value chains. This pilot study targeted markets in the outer districts of Ha Noi, as well as households around these markets. A questionnaire survey provided detailed information about the dynamics and key actors in the local live poultry supply chain. A second component of the study assessed the feasibility of establishing a private certification system for individual birds in the Vietnamese poultry value chain.

Rationale
In Viet Nam, demand for safe and high quality poultry has a largely untapped potential to contribute to both farm-level biosecurity and rural incomes. Quality in poultry refers to texture and flavour. These features relate to demand for local and crossbred chickens, which cost about 50 to 100 percent more than industrial chickens. The market for local, safety-guaranteed chickens is still undeveloped. Supply chains for local and crossbred chickens generally consist of small players that have established relationship with buyers, sellers and traders, as well as wholesalers and slaughterhouses. The major building blocks of a certified supply chain thus already exist, but players are not yet linked in a way that can be used to credibly communicate safety and quality advantages to consumers.

Project Activities
Most activities took place in the mainly agricultural Dong Anh district and consisted in constructing out a certified supply chain, a household survey, and an economic experiment. This location hosts several food markets. Farm selection criterion was supply capacity and biosecurity practices. A total of 35 small-scale farms with an average of 100 birds per farm participated in the study. Weekly visits were carried out by veterinary officials to monitor compliance and hygiene. All chickens were tagged at feet or wings for traceability and marketing purposes before going to market. Partnering slaughterhouses processed project birds for distribution through their vendor networks. Incoming and outgoing birds were inspected and certified by local veterinary authorities.

Eight vendors were recruited at four different markets. These vendors received posters, leaflets, decorations, shirts and aprons. Bird packaging and bags displayed project logo and slogan. Vendors pushed sales after receiving training on the advantages of safety-guaranteed chickens and recorded prices at different times.

In 800 surveys, households were asked about their purchasing behaviours, attitudes and other characteristics that impact chicken consumption choices. Demographic information was also collected. To fine tune survey findings, an economic experiment was applied to observe actual choices and to control conditions under which those choices are made. Welfare economics was used to calculate compensating variations between project and non-project chickens, which roughly resembles a safety premium. This method allowed more precise measurement of premiums.

Main Project Findings

One of the main findings was better understanding on how existing institutions and stakeholders can work dynamically towards traceable supply chains. It became evident that trust, reliability, credit, conflict resolution, and contract enforcement are main components of these relationships. Vendors reported consumer product acceptance but also mistrust; others claimed that selling safe chickens differentiated them and extended their client base. Tags were popular among clients and exemplify a simple innovation that improves traceability. Vendors were able to charge higher premiums for project chickens marketed as local breeds, but less when marketed as crossbred chickens. Crossbred project chickens sold for 9,000 to 14,000 VND (US$0.56 to US$0.88) less than typical indigenous chickens, but still at significantly higher prices than crossbred or industrial chickens. Altogether, our calculations estimate safety-branded chickens to sell at an average premium 10,000 VND (US$0.63) per head. This premium covers all expenses incurred and provides a profit.

Our survey reveals that households consume more than one type of meat or seafood daily, and that pork, beef, and fish dominate as protein sources. Not surprisingly, over half of respondents report never visiting a supermarket, whereas nine out of ten are within 15 minutes of a wet market. These wet markets sell live and whole fresh local chickens, while supermarkets sell frozen birds and fresh cuts of industrial chickens. Half the respondents had not heard of safety-branded chickens. Close to two-fifths of respondents regularly buy chickens that had government certification stamps, but these are not seen as a credible certification. Also, live birds are cheaper than slaughtered ones; live chickens are preferred because customers can determine their quality and health. Regarding attitudes and beliefs, the main concern expressed was wet market and slaughterhouse hygiene. Furthermore, households who do not purchase safety-branded chickens report taste-related uncertainties as their most salient concern. When asked about trustworthiness, they reveal that stamping market inspectors have the lowest level of trust, while international companies and regular market sellers have the highest level of trust. Lastly, experimental methods further validated household preferences for taste-related factors of local chickens, but also suggest that branding and traceability have an important role in decision-making processes. Our studies suggest households would be willing to pay for safety-branded chickens sold in wet markets.

Policy Recommendations

The experiences gained through this pilot study could serve as a basis for scaling up and expanding branding and traceability programmes nationwide. To begin with, cooperation with farming groups that currently mandate or promote safe production practices can also help recruit farmers already interested in doing so, especially those with free-grazing chicken production systems that are so important for maintaining meat quality (taste - texture) perceptions. Further, access to information and technology valuable to smallholder farmers could increase their participation. In the financing front, tailored credits could aid with the high upfront investment costs in advertising and quality product assurances that could lead to established brands or labels that in the long run have relatively low costs to maintain. Professional training is also important, especially for product certification and enforcement of standards by veterinarians and technicians. Similarly, education on contract drafting and conflict resolution to producers, traders and vendors is relevant. Local officials should be informed of the potential socioeconomic benefits of certified supply chains, and made aware that successful marketing strategies for traceable chickens rely on establishing trust, uniqueness, and good taste. The government could play a critically positive role by nurturing a supportive policy environment for firms to work with smallholder farmers to establish successful projects, and these could include: strengthening of veterinary institutions, providing intellectual property protection, supporting development of third-party labelling or branding programs, improving existing market infrastructures, and developing small wholesale markets with registered slaughterhouse facilities in strategic urban locations. In conclusion, it is clear that consumers assign high valuations to safety and traceability, and these are willing to pay if their requirements are met.

Introduction

This working paper gives a full program evaluation of activities for testing the marketing of safety-branded free range chicken as part of the pilot project for 'Certified Smallholder Poultry Supply Chains'. The objective of this work, and the larger project from which it originates, is to improve understanding about how markets can act as catalysts for rural poverty alleviation.

One component of the pilot project for 'Certified Smallholder Poultry Supply Chains' in Ha Noi – Viet Nam has been designed to assess the potential for coordinating risk management and product quality development. Private sector investments and public policy related to smallholder supply chains should be informed of (**1**) how a certified supply chain might operate and manage risk under local conditions and of (**2**) consumer demand for smallholder poultry that has been branded for both quality (taste and texture) and safety. Without adequate demand and credible supply chain risk management, smallholder poultry farmers will have increasingly limited access to formal markets, especially in countries that are battling HPAI epidemics and trying to reduce disease risks at large. The results reported here will provide evidence on the value that consumers place on safe chicken from smallholder farmers, as well as demonstrating how a certified supply chain can manage safety risks of chickens sourced from smallholders.

Previous work (Ifft *et al.*, 2007) has shown that Ha Noi consumers have a considerably revealed and stated willingness to pay for safe chicken. Demand for safe and high quality poultry has a largely untapped potential to contribute to both farm-level biosecurity and rural incomes in Viet Nam. In addition to safety, consumers have a high willingness to pay for quality, which in Viet Nam is related to the texture and flavour of meat. This desired texture and flavour comes from the following characteristics of chicken production: (**1**) limited use of concentrate feed, (**2**) use of native chicken breeds, and (**3**) a grazing area for chicken where they can forage. These characteristics lead to a high prevalence of 'local' and 'crossbred' chicken[1] in the Hanoi diet, despite significantly higher prices than industrially produced chicken. Local and crossbred chicken cost about 50 – 100 percent more than 'industrial chicken'.

Local and crossbred chicken are largely raised by smaller, poorer farming households, providing a unique opportunity for poor households to both benefit from market growth and to contribute to public health improvements. The level of trust in the current certification and market inspection system in urban areas seems to be low, as the majority of households believe that the safety of chicken could be improved. The market for chickens that both has a credible safety guarantee and meets quality requirements is largely undeveloped, with most private companies limiting investment to industrial broiler production or only selling through supermarkets. This component of the project tested the marketing of chicken that meet both safety and quality demands, by taking advantage of existing supply chains and local resources.

Supply chains for local and crossbred chickens generally consist of small players that do not sell to anonymous buyers, but have established relationship with both the buyers and sellers that they work with. This type of informal, repeated relationship does have some disadvantages in terms of lack of formal contract protection and moral hazard, but the strength of these relationships can support development of a safer, integrated supply chain. Most poultry farms in northern Viet Nam with over

[1] Local chicken refers to native breeds raised on a foraging diet, industrial chicken refers to exotic breeds that tend to be raised on concentrate feed alone, and crossbred chicken are various crosses between local and industrial chicken. Local chicken are allowed to scavenge freely, while industrial chicken is produced in cages in closed sheds. Crossbred chicken are usually allowed to scavenge in a fenced area, with a small amount of a concentrate or other purchased feed used.

50 head report having regular safety inspection, as well as wholesale traders, slaughterhouses and vendors that sell smallholder chicken. The major building blocks of a certified supply chain thus already exist, but players are not yet linked in a way that can be used to credibly communicate safety and quality advantages to consumers (Ifft *et al.*, 2008). This pilot project took advantage of these existing conditions, relationships and systems for safety inspection to develop a certified supply chain for smallholder chicken, with upgrades in production / safety standards and training as necessary.

Hanh *et al.* (2007) suggests that agro-food quality improvement in Viet Nam requires both upgrading of public institutions with relevant responsibilities as well as promotion of private sector involvement. Some companies do sell industrial chicken with safety branding or a safety guarantee, but clientele take-up has been slow due to the undesirable characteristics of this type of chicken for consumers, including both poor taste and unavailability in local wet markets (Ifft *et al.*, 2007).

Through careful tracking of sales of safety-branded free range chicken (both local and crossbred), we have demonstrated that there is significant value to be created through supporting development of supply chains that can guarantee the safety of chicken produced by smallholder producers. This requires investment in several areas, including brand development, production standards, and supply chain coordination. This project has also elucidated which public institutions might be strengthened to support smallholder poultry supply chains.

The subsequent sections will be organized as follows: First, we will explain the project activities we developed for pilot supply chain that provided safe free-range chicken to Ha Noi markets and how these chickens were marketed. Also, we will explain the household survey which was an important evaluation tool for establishing preferences for safety-branded free range chicken, and immediately after, we will discuss our economic experiment design. Next, we will discuss in detail the major findings from the pilot supply chain and household survey, and in the final section, we will discuss the policy implications of this project and of its findings.

Project Activities

In this section we will cover the development of our supply chain, a household survey, and our economic experiment design.

Development of a Supply Chain

In this subsection, we will provide details on how a secure supply chain for free-range, smallholder-produced chicken was developed in Viet Nam.

Location Selection

Dong Anh District was the site of most project activities for production and processing of chicken. Dong Anh is one of the outer (rural) districts of Ha Noi, and has a large agricultural sector, with an area of 10,515 hectares under cultivation and approximately 85,000 pig heads, 12,500 cattle heads and 1.6 million poultry[2] heads. HPAI outbreaks have been rare, and none have been experienced since an isolated outbreak in one commune in 2007. Other than this instance, the only other recorded HPAI outbreaks occurred in 5 communes in 2005. Dong Anh has an estimated 9,000 households raising chicken on a scale of 50 head and more per household, who are generally oriented towards meat instead of egg production. Vaccination campaigns for HPAI have been carried out for a few years now, and the district veterinary office also provides various other vaccines for all farmers.

Dong Anh also has a small wholesale market called Bac Thang Long. This market is well-established, and all slaughterhouses operating in the market are registered, meeting national standards for hygiene and safety. Registration is not easy to achieve, and so far only a few poultry slaughterhouses in the Ha Noi area have achieved registration. The slaughterhouses in Bac Thang Long supply chicken to several supermarkets in the Ha Noi area, as well as several wet markets. The traders serving this wholesale market and the slaughterhouses were surveyed under the same project last year. The Dong Anh district veterinary office has cooperated with several activities of the pilot project for 'Smallholder Certified Supply Chains', and has a good relationship with project staff.

Dong Anh was selected for several reasons: most important being that the desired number of chicken (3,600 birds) could be supplied within the desired selling period. The strong relationship of the project with the veterinary office and the high capacity of this office also make Dong Anh an ideal location choice. Limiting project activities to one district was helpful in streamlining project coordination. Dong Anh is about 45 minute away from Ha Noi centre, which further facilitates project management and commuting.

The district veterinary station enforces veterinary law and regulations in several areas, including (**1**) prevention and preparedness for epidemics and diseases, (**2**) control for slaughtering activities in the area, and (**3**) management of veterinary products in the area. Local veterinary staff who are in charge of cooperating with veterinary unit of communes are under directive from the district veterinary station for the responsibilities as follows: (**i**) updates of the number of live stocks in the area (from one to three communes), (**ii**) update of the epidemic situation in the area, (**iii**) implementing vaccinations, treatments, disinfection and sterilization of animal production areas, (**iv**) enforcing veterinary regulations at the commune level, and (**v**) provision of animal health and nutrition advice to farmers in their respective areas.

[2] Dong Anh District People's Committee First Half Report of 2008 & Dong Anh Vet Station.

The district veterinary office had important role in this testing marketing activity. Their key responsibilities were (**a**) farm selection, (**b**) farm monitoring, and (**c**) technical assistance to farmers. The veterinary office also had a role in introducing slaughterhouses and coordinating with traders for delivery of birds. The senior staff of the veterinary office oversaw implementation of these activities, and 2 commune-level veterinary technicians worked for the project on a full-time basis. The district veterinary office staffers also assisted in coordinating delivery of birds to project slaughterhouses.

Two commune level veterinarians were in charge of supervising chickens at farms and putting tags on chickens. They also coordinated delivery of birds to project slaughterhouses, in association with two chicken traders and one veterinary inspector at the wholesale market. Veterinary inspectors supervised slaughtering and also facilitated introductions to slaughterhouses that had capacity for delivery of project chickens to their vendor networks.

Farm Selection and Biosecurity Standards

The main selection criteria of farms were that they were able to provide a sufficient number (at least 50 birds) of crossbred or local chickens within the trial selling period and that they met high biosecurity standards. The farms had to further agree to allow the veterinary officer or an external inspector to enter their farms at any time, contingent on following a biosecurity protocol. These farms also had to commit to informing the local veterinarian of any problems that might arise, and were given phone cards for this specific purpose.

The selected farms had to follow national safety regulations for poultry farms that cover several areas. Under the supervision of local veterinarians, they had to keep production facilities, tools and equipment regularly cleaned and disinfected with approved chemicals. The chicken waste also had to be managed under strict regulations related to control of epidemic disease and environmental pollution. Further, all project chicken were vaccinated against H5N1 avian influenza, Newcastle disease, Gumboro (infectious bursal disease) and Marek's disease. Farmers were required to immediately report any suspected sickness to the local veterinarian for diagnosis and treatment. Additionally, they also benefited from the advice of local veterinarians on safe poultry production.

In addition to the strict safety standards, the selected farms only used a small quantity of concentrate feed, as this leads to an inferior meat taste. The farms generally fed concentrate feeds for 10 to 30 days to chicks, and afterwards switched to feeding by-products. All farms had batch sizes of less than 300 birds, while average batch sizes were about 100 birds. The total number of participating farms was 35, with few farms kept as 'standby'. The farms on 'standby' followed project regulations, but only sold their chickens to the project if the participating farms didn't meet the safety or feeding requirements. A list of all participating farms and the number of chickens provided by each farm can be found in **Appendix D**.

Farm Monitoring and Chicken Tagging

The selected farms were visited at least once per week by an official from the local veterinary office for monitoring purposes. This ensured that chickens were continually being produced under high standards, and allowed for veterinary office staff to spot the possibility of any disease problems that arose. These visits allowed for supervision of how farms were following safety stipulations and feeding standards. The farms were not informed of these visits in advance.

An independent external inspector who is a seasoned veterinarian in Ha Noi was hired by the project. This external inspector randomly visited each farm at least once to ensure that farm biosecurity standards were thoroughly met. Having an independent external inspector was an extra safeguard against any problems with farm-level biosecurity, and also improved the credibility of final products.

The independent external inspector had over 20 years of experience in the Vietnamese veterinary sector and was able to give useful advice regarding both safety and nutrition practices to farmers, local and district veterinarians and participating slaughterhouses.

All chickens were tagged on their feet or wings within one week before they went to market. This tag was of a tough durable plastic material, and could not be removed. The tag also contained the (shortened) name of our project chicken slogan: 'Country Chicken'. This tag was sufficiently durable to survive slaughter and remained on the slaughtered chicken when delivered to market. For traceability purposes of the project, the tag ensured that chicken were not switched with non-project chicken after leaving the farm and also was a useful marketing tool as proof that the chicken had come from a farm with safe(r) production conditions.

Registered Slaughterhouses

The project partnered with two slaughterhouses from Bac Thang Long wholesale market. These slaughterhouses operate within the market and are monitored by market inspectors and veterinary officials. They agreed to accept the designated number of birds from the project and to distribute slaughtered birds to selected vendors through their distribution network. These slaughterhouses were selected for participation in this project for the strength of their relationship with high volume market vendors operating in Ha Noi markets. Delivery of birds was undertaken with coordination of local veterinarians who work directly with farmers, and traders supported by this project.

As registered slaughterhouses, these had to follow several safety regulations. The location of slaughter itself had to be permitted and approved by relevant authorities, which applies to all slaughterhouses in Bac Thang Long wholesale market. Slaughterhouses must follow specific hygiene guidelines, such as ensuring the availability of cleaning water and regular use of approved disinfectants. Regulations also cover disposal of waste from the slaughterhouses, and quarantine cages must be used to keep animals before slaughtering, with separation of poultry and cattle and other species (such as pigs, but pigs are not at all slaughtered in Bac Thang Long).

Following national regulations, all animals entering the slaughterhouses must be certified by local authorities at the origin and also at various check points, including by veterinary inspectors stationed at or near the slaughterhouses. Animals must be healthy, as slaughter of dead animals or animals with any signs of disease is strictly prohibited. Slaughterhouses are required to be constructed away from places which sell food, and the owner(s) must have no infectious disease, certified after regular medical examinations. After slaughter, all meat and organs are again inspected and certified by veterinary inspectors.

Vendors in Ha Noi Markets

Due to the short project duration from July to September, 2008 it was necessary to work with vendors that already purchased chicken from our selected slaughterhouses. The project recruited two vendors from Hang Da market, three vendors from Thang Cong B market, two vendors from Ngoc Ha market, and one vendor from Cho[3] Mo. The selected vendors only sold certified chicken that had been purchased from registered slaughterhouses. They also kept refrigerators to store birds in before they were sold, and were regularly inspected by veterinary and market staff. These vendors were selected on the basis of their ability to sell on average 15 project chickens every day, as well as selling non-project chicken. These vendors had an important responsibility to promote chickens and were individually trained on the 'advantages' of project chickens. Seven of the vendors sold fresh chickens, while one in Cho Mo sold boiled chickens. Boiled chicken is more convenient, while fresh

[3] Cho is the Vietnamese translation for market, and is used to refer specifically to open-air markets that sell fresh produce, meats and seafood, as well as other goods. Cho and market will be used interchangeably in this report.

chicken is considered to have a better flavour when prepared at home. All chickens were sold on the day of slaughter, which usually occurs during the early morning.

As a part of their contractual agreements with the project, all vendors recorded prices of all chickens sold one week before the project started, during the project duration, and one week after the project ended. The number of chickens sold at each market location and their average prices can be found in **Appendix C**. Market selling prices will be thoroughly discussed in the results section.

Marketing Activities

The project developed a logo and slogan for chickens to be sold. The logo shows a crossbred or local chicken that is grazing surrounded by a circle, which symbolizes how the project has connected all parties involved in producing, trading, processing and selling chicken. The slogan of the project roughly translates as 'The Authentic Country Chicken'. Country chicken implies good taste and also safety, while the word 'authentic' implies that chickens are from a known source.

The project provided posters and leaflets for participating vendors, and posters were also displayed in the market locations. The market vendors received decorations for their stands plus shirts and aprons with project logo and slogan. Project vendors packaged chickens for customers in bags similar to bags normally used to deliver chicken from Bac Thang Long market to retail markets. These bags were produced with higher quality materials and have a special design with the logo and slogan of the project. The tag was advertised and promoted to consumers as proving authenticity and source of the chicken, as it could easily be identified as a distinguishing characteristic of the chickens being sold.

Vendors had a large role promoting project chickens, as they have a long term relationship with most of their customers. They were individually trained to know the activities of the project and how to use promotion materials provided to them. A key factor to the success of this project was persuading vendors of the product safety guarantee and good taste of project chickens.

Household Survey

The second set of activities involved a household survey near markets where project chickens were sold. Household surveys can provide important information on consumers' habits and preferences related to overall chicken consumption.

Survey Design and Implementation

The design of the household survey utilized methods developed by Roland-Holst *et al.* (2007). Project vendors were asked where most of their customers lived. Generally these live within areas surrounding the market. From these descriptions 'market catchments areas' for each of the four markets was defined on maps. In each 'catchment area', several blocks were defined based on map coordinates and randomly generated numbers. The number of selected households varied based on the number of project vendors in each market and also the time vendors began to sell chicken (in Ngoc Ha and Cho Mo markets sales started about 1 - 2 weeks later than other markets).

The estimated refusal rate was 33 percent, so 1,200 households were selected for an anticipated total of 800 household surveys completed. Household selections were done through systematic selection processes, to compensate for differences in density between blocks. Systematic selection was done by dividing the total number of households in a market area by the desired number of household to be interviewed, which gives an interval of j. Then each j^{th} household was selected to be interviewed, starting from a randomly selected initiating household. The actual refusal rate was

slightly lower than estimated and varied by market area. The table below gives the name of each market and other information about sampling and surveys completed.

Table 1. Details on number of blocks, households selected and surveys completed.

Market	Nr. of blocks	Nr. of selected households	Nr. of surveys completed
Cho Hang Da	7	400	352
Cho Thang Cong B	8	400	258
Cho Ngoc Ha	5	300	240
Cho Mo	4	100	73

Six enumerators with relevant experience and/or a relevant academic background were recruited to implement the surveys. All enumerators had a working knowledge of English, and a survey coordinator was hired to assist with training and implementation, as well as any necessary translation. The survey took approximately 25 - 30 minutes to complete, and each enumerator had a total of 200 households to visit over a 4 week period. Enumerators were trained for both block listings and implementing the survey. Training manuals can be found in **Appendix A**. The survey was tested three times, and a final version can be found in **Appendix B**.

The survey was designed to cover purchasing behaviours, attitudes and household characteristics that might impact chicken consumption choices. The survey covered several areas, including food purchasing habits, household characteristics, and attitudes towards chicken brands and food safety in general. Detailed data was collected on the most recent chicken purchases (up to past three chicken purchases), as well as all meat and seafood purchased over the past two days. Data was also collected for average consumption levels and shopping habits, as well as previous experience with safety branded chicken. Household attitudes as related to chicken quality and safety were included in the survey, as well as the levels of trust in various individuals and/or institutions. Sections were included on brand preferences, knowledge of safe poultry handling, and actual poultry handling practices. Demographic information collected included, among other things, food expenditure, employment of housewives, education, and family structure.

Economic Experiment

The third set of activities revolved around an economic experiment dealing with price differentials. This economic experiment allowed us to use proven methodologies that allow for precise identification of consumer's valuation of traceability and safety branding.

Design and Methods

Well-defined stated preference methods can be important research tools, but are ultimately limited in that they do not necessarily reflect actual behaviour or preferences. Data collected from actual behaviour or consumption choices is ideal, but often economists want to measure preferences related to goods or services that are not actually sold. Furthermore, data on actual consumption choices does not always allow economists to control for the context under which those choices are made. Economic experiments offer a method for economists to observe actual choices made by households, and to also control the conditions under which those choices are made. In this context, an economic experiment was therefore ideal for measuring consumers' valuation of traceable smallholder chicken that had a safety brand.

After taking the survey, each survey respondent was offered a choice of two discounts for two types of chicken as a gift for taking the survey. Each set of two discounts was randomly assigned to each household, and one type of chicken was project chicken and the other type was either regular

crossbred or local chicken. The coupon was redeemable from one of the project vendors. The household was told the price of each type of chicken and was given a brochure explaining project chicken before they made their choice. Through this experiment, we used welfare economics to calculate compensating variations between regular and project chicken, which is similar to the 'safety premium' concept described below.

We can define the 'safety premium' as the price difference between 'regular' and 'safety-branded' chickens that makes consumers indifferent between purchasing either type of chicken. This project had two ways to measure consumer valuation of safety-branded chicken: (**1**) project vendors recorded prices and sales volume for all chicken sales, including non-project chicken, before, during and after the time that they are selling project chickens. This was used to calculate the price differential between project and non-project chicken of different breeds and levels of quality using hedonic price regression, and (**2**) through survey data analysis.

The actual price differential can be affected by many factors, such as the need for vendors to sell a certain amount of chickens under their contractual obligations to the project. Although vendors were not required to sell a specific number of chickens each day, their overall obligation and the short length of the project did not allow for supply and price to be exactly managed like it would have been under a commercial venture, hence, using an economic experiment for households making a consumption choice between controlled alternatives allowed for a more precise measurement of safety premiums.

Main Project Findings

In this section we will discuss the main findings related to certified supply chains, risk management, household survey and from our economic experiment.

Certified Supply Chain and Risk Management

Developing a Replicable Supply Chain

The project took advantage of many existing institutions to develop a traceable supply chain for smallholder poultry. This was especially important in selection of vendors, as vendors generally are only willing to work with slaughterhouses that they currently source from. For example, in one market were we attempted to recruit vendors, these rejected our proposal because of a previous bad business deal with a state-owned poultry enterprise. Although Bac Thang Long wholesale market was not responsible for this, its involvement through political pressures had led to a bad relationship for vendors in that market.

Trust is very important in supply chain relationships, as supply chains cannot be changed without taking these relationships into account. The good relationships between our project with Dong Anh veterinary office allowed for access to slaughterhouses that turned out to be reliable business partners. One of the reasons of working within existing relationships is because the use of credit is widespread. Often payment is only made to slaughterhouses after vendors sell poultry, and then to traders, and so on. Supply chain players are therefore dependent upon their regular trading partners in many aspects with high transactions costs for switching, which can lead to situations where certain parties exercise market power over others. For example, a single slaughterhouse might supply all vendors in a particular wet market and dictate selling prices as a monopoly would.

Farmers in our project were recruited by local veterinarians based on criteria discussed above, and linked to project slaughterhouses through traders working with those slaughterhouses. These relationships were effective with relatively few problems, but could have been easier to implement if traders directly had a role in introducing farms for selection. This could also have been facilitated by giving slaughterhouses a more central role in recruitment project partners. Slaughterhouses provided introduction to their vendor networks, and could have been able (if asked) to do the same for their trader networks. Although the project was able to use its relationships with slaughterhouses and the district veterinary office to ensure smooth transactions between farmers and traders, for a long term project using existing farmers and traders, these relationships might be less easy to manage.

The project also took advantage of existing veterinary institutions with Dong Anh district. Although the level of implementation varies widely (Ifft *et al.*, 2007), several regulations for chicken production and local monitoring and certification of trading exist. Veterinary supervision of production, trading and slaughter is already mandated by law, and we were able to work with veterinary staff to ensure that tags were applied to project poultry and that national-level production standards were followed.

Using existing institutions also helped with contract enforcement. Once agreements were reached with all parties (other than farmers), they honoured their contracts with the project. The structure of payments and benefits of the project certainly helped to ensure this, as did the commitment of various parties. Extra farmers were recruited in case a farmer didn't sell chickens to the project, and some of these farmers ended up selling to the project. In one case, a project farmer chose to sell his chickens to a wedding party. Having backup farms was essential for this short term project, but for commercial ventures or long-term projects, contract enforcement could be strengthened by denying access to future purchases to farmers who do not follow contract terms.

Community-based contract enforcement might also be used, in which case a community would lose access to a market in case one or more farmers did not abide to their contracts.

Training of project participants was an important part of overall activities, and project staff spent significant time explaining project goals and requirements as well as incorporating feedback into project activities. This was effective in developing strong relationships and reliable partnerships, but occasionally activities were delayed when individuals within the supply chain raised certain concerns. Use of formal stakeholder meetings at the beginning of the project could have mitigated some of these problems. For example, a stakeholder meeting at the retail level would have included vendors and their staff, market inspectors, and market officials. These meetings would have not only served the purpose of ensuring cooperation from all parties, but could have facilitated training activities.

Market Level Experiences

Project vendors uniformly reported that project chickens were of good quality, and popular with customers. Some reported that their customers were wary of certain poultry brands, because of a bad business deal in the past with a certain poultry company that involved some low-quality chicken meat. In this respect, they mentioned that tags were preferable to chicken just being sold under a brand. Although consumers reported generally high levels of trust with domestic and international companies who sell poultry, new brands or unknown companies may face a certain amount of suspicion. Project vendors also reported that many customers were excited about project chicken availability and willingly happy to pay a premium price without much consideration, while others first wanted evidence of tastiness. It seems likely that good reputation for meat tastiness could be essential for any safety-branded chicken to be widely accepted and purchased at a high price premium. Many vendors suggested extending the project to local chicken in exit interviews.

Some project vendors were reluctant to charge price premiums for project chickens because they mostly worked with regular customers. If vendors themselves had also been charged a premium for chickens, they likely would have passed it on to regular customers, but this was not possible for the project to do. Some vendors also reported that steady advertising or overall reputation effects of being involved in the project led them to gain new customers. This is an intangible benefit of selling branded products that could induce vendors in future initiatives. For future projects, inducing vendors to sell safety-branded or traceable chickens distributed through their regular source should not be difficult as long as brand reputation can be maintained.

Traceability systems require not only sufficient technological and institutional mechanisms, but must also convince consumers of the trustworthiness of the system. For example, consumers currently have high levels of trust for international companies and established supermarkets, as well as their regular go-to market (cho) sellers. The chicken sold through this project relied on both branding and use of tags. The tags proved to be simple to implement and effective in ensuring traceability. Vendors reported that tags were popular amongst consumers. Local veterinary staff reported no trouble in putting tags on chickens, and tags proved sturdy through transport and slaughter. Although tags might not work within every traceability system, they are an example of a simple innovation that improves traceability.

Analysis of Vendor Selling Price

As previously stated, all project vendors reported selling prices for both project and non-project chickens. This shows the level of premium that project vendors were able to receive for project chickens during test marketing, and gives insight for consumer valuation of project chickens. We believe that these estimates may be slightly downward-biased, as vendors were under obligation with the project to sell chickens and were also able to purchase chickens at the same price as for similar non-project chickens. Further, some consumers were reluctant to pay higher prices until a

reputation had been established. As will be discussed in the next section, we also believe the calculated price premium from the economic experiment has a slight upward bias. Hence together, both estimates provide a range at which a price premium for traceability can be charged.

A guide to the different breeds of chicken sold by project vendors can be found below in Table 2. Average prices for each vendor can be found in **Appendix C**.

Table 2. Chicken breeds sold by project vendors.

Breed	Description
Local	Local chicken, no specific breed
Crossbred	Crossbred chicken, no specific breed
Red	A high quality variety of crossbred chicken
Tam Hoang	A variety of crossbred chicken
Industrial Chicken	Exotic breeds raised on concentrate feed
Ri	A variety of local chicken
Ta Lai	"Local Crossbred" chicken, likely used by vendors for higher quality crossbred chicken or for marketing
Tha Vuon	"Free Grazing", similar to Ta Lai
Layer	Hen used for egg production
Medical	Special chicken cooked with herbs for soup
Mia	A variety of local chicken
Ta do	Uncertain
Fighting Cock	Retired fighting cocks, generally considered to be a local variety

Hedonic price regressions allow for analysis of the price premium for traceable and safety-branded chickens. These regressions allow us to control for factors such as more persuasive vendors and the time at which chicken is sold. We use two types of hedonic price regressions: one in which breed is controlled for and project chicken has its own variable; the other in which project chicken is considered to be its on breed. We can consider project chickens to be its own breed because project farmers raised similar types of crossbred chicken under similar conditions. Because most farmers sold all of their birds on the same day or during two days, controlling for day of sale allows control for any unobserved variation in quality amongst farms.

The explanatory variable in all regressions is price received per chicken, and is reported in units of 1,000 VND (16,000 VND = US$1). Right hand side variables include market dummies (three markets total), vendor dummies (seven vendors total), chicken breed/type, a dummy for project chickens, and a dummy for a coupon being used (in conjunction with the experiment). All regressions originally included one of three ‘time variables'. The first is a dummy for month, as the project was conducted in both September and August. The second is a dummy for each day of sales, and the third is a time trend where day one equals 1. Choice of time variable does not so far have a large impact on our variable of interest, so for simplicity we report results only where a dummy for each day is used.

We have a total of 1832 price observations (some for several heads of chicken with the same characteristics), of which for 287 we do not have the quantity of chicken sold. Hence we ran regressions both with and without accounting for quantities of chickens sold. This is abbreviated as FW, or using a frequency weight for head of chicken sold for each observation.

We also ran some estimation where we gave a greater weight to observations for days when no chickens were sold (BW). This is due to the fact that there are fewer overall observations from days

when no project chickens were sold, and often vendors would sell less of certain types of chicken when they were also selling project chickens.

There was an 8th vendor operating in a 4th market (Cho Mo) that sold a small amount of project chickens as boiled chicken product. This vendor was excluded from all regressions due to very little price variation (only sold project chickens during project period) and the small number observations. Sales were also low because the owner of the stall was injured shortly after becoming involved in the project.

Table 3. Results without weighting for quantity sold.

Description	All Types (1)	Only Local (2)	Only Red (3)	Only CB (4)	All CB Agg (5)	All Local Interact (6)
Project Chicken	3.94 (0.44)***	5.40 (0.65)***	4.38 (0.99)***	6.18 (0.84)***	3.77 (0.44)***	5.37 (0.64)***
Observations	1,832	891	280	341	1,832	1,832
R-Squared	0.88	0.43	0.70	0.78	0.88	0.88

Note: All price observations are included.
Standard errors are reported in parentheses and * significant at 10% ** significant at 5% *** significant at 1%

Table 4. Results weighted for quantity sold.

Description	All Types (1)	Only Local (2)	Only Red (3)	Only CB (4)	All CB Agg (5)	All Local Interact (6)
Project Chicken	3.40 (0.14)***	3.68 (0.35)***	2.31 (0.13)***	1.56 (0.26)***	3.02 (0.14)***	2.28 (0.17)***
Observations	11,874	3,836	3,777	1,173	11,874	11,874
R-Squared	0.90	0.26	0.67	0.68	0.90	0.90

Note: Some price observations are excluded because they do not give quantities, which appear to downward bias estimates.
Standard errors are reported in parentheses and * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Results with non-project periods sales weighted.

Description	All Types (1)	Only Local (2)	Only Red (3)	Only CB (4)	All CB Agg (5)	All Local Interact (6)
Project Chicken	2.94 (0.14)***	3.89 (0.30)***	3.11 (0.13)***	0.06 -0.24	2.90 (0.14)***	2.47 (0.16)***
Observations	17,399	5,892	5,209	1,413	17,399	17,399
R-Squared	0.91	0.37	0.56	0.56	0.91	0.91

Note: Non-project period prices are given a weight of 5 here.
Standard errors are reported in parentheses and * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Results with project chicken as a "Breed".

Description	No Quantity Weight (1)	Quantity Weight (2)	Non-Project Weight (3)
Project Chicken	-9.11 (0.63)***	-14.62 (0.24)***	-14.91 (0.21)***
Crossbred	-23.61 (1.46)***	-24.81 (0.50)***	-23.84 (0.36)***
Red	-24.35 (0.87)***	-22.04 (0.26)***	-22.85 (0.19)***
Tam Hoang	-33.93 (0.97)***	-37.77 (0.34)***	-38.16 (0.27)***
Industrial	-48.47 (0.72)***	-49.11 (0.26)***	-49.75 (0.19)***
Ri (local)	-14.39 (1.03)***	-6.18 (0.52)***	-4.67 (0.36)***
Mia (local)	-20.29 (2.18)***	-21.03 (1.43)***	-19.89 (1.32)***
Observations	1,832	11,874	17,399
R-Squared	0.78	0.81	0.85

Our results show a range of estimates of premiums for project chickens based on selling prices. Table 3 shows results for the impact of project chickens on prices, without weighting price observations for quality. Table 4 shows results when each price observation is weighted for quantity of chicken sold, in which some price observations are dropped, while Table 5 shows results when project chickens were sold on days when non-project chickens were sold too and thus are given a greater weight. In Column 1 of Tables 3 to 5, all breeds of chicken are included in the analysis, and the estimated premium per head is 3,000 - 4,000 VND (US$0.19 – US$0.25). Columns 2 to 4 of Tables 3 to 5 only include local chicken, red chicken, and different crossbred chicken in the each regression, respectively. Vendors seem to have been able to charge a higher premium for project chicken when it was marketed as a local breed, while estimates for red and all other crossbred chicken are mixed.

The regressions in Column 5 of Tables 3 to 5 aggregate different types of crossbred chicken into one category. In Column 6, an interaction variable for project chickens being sold as local chickens (this happened for some vendors) was also included. Although within range of other estimates, these price changes don't seem to show a consistent upward or downward trend from estimates derived when all breeds are included. Estimates from Table 3 are likely higher due to vendors who did not record quantities having higher prices, and other vendors who more generally had higher volume of sales selling project chickens at lower price premiums.

Table 6 considers project chickens as its own breed of chicken. Local chickens were the 'reference' breed omitted from the regression, so all coefficients on project chicken or other breeds in Table 6 show the price differential between that type of chicken and local chicken. Local chicken is consistently the most expensive type of chicken sold by project vendors and in Ha Noi in general. It appears that project chicken sold for 9,000 to 14,000 VND (US$0.56 to US$0.88) less than local chicken, depending on the regression specification, but still at significantly higher prices than 'ordinary' crossbred, red, Tam Hoang and industrial chicken. Many project vendors initially estimated that project chickens could sell for a premium of 5,000 to 10,000 VND (US$0.32 to US$0.63) per chicken, which indeed seems to be feasible based on these estimates.

In conclusion, project chickens are estimated to sell at a premium of around 10,000 VND (US$0.63) per head more than their closest match of non-branded crossbred chickens.

Household Survey and Economic Experiment

The household survey revealed many interesting and important facets of consumer behaviour and attitudes towards chicken and also meats in general. We will divide these results into three sections: (**1**) consumption, (**2**) attitudes and (**3**) risk behaviours and knowledge. These findings can provide policy guidance on both traceability systems, and public and animal health policy.

Consumption Habits

Although most households consume more than one type of meat or seafood on a daily basis, poultry consumption is in general not regular. Figure 1 provides a visual representation of average weekly chicken consumption, which is about 0.25 kg per adult equivalent. All survey respondents recorded all meat purchases over the past two days. The number of observations for each type of meat consumed (other than poultry) can be found in Table 7. The amount of meat per purchase can also be found in Table 7. Pork, beef, and seafood clearly dominate as protein sources; egg purchase is also a common practice.

Figure 1. Average weekly chicken consumption per adult equivalent.

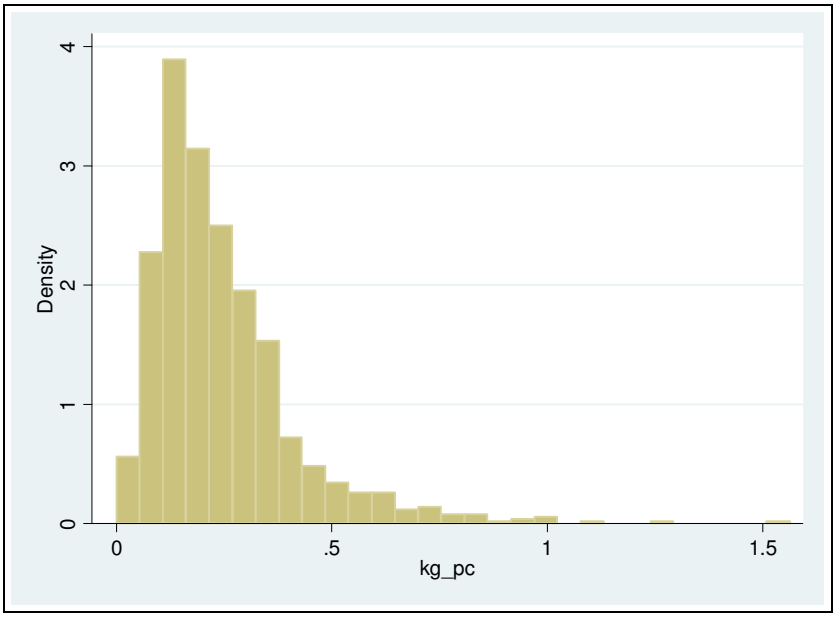

Table 7. Meat purchases over two days and average amount of purchases.

Type of Meat	Observations	Percent of Total	Average Amount	Std. Dev.
Pork	984	32	0.5	2.7
Beef	432	14	0.4	0.2
Duck	100	3	1.1	0.3
Muscovy	81	3	1.1	0.3
Fish	608	20	0.8	0.4
Other Seafood	391	13	0.5	0.4
Egg	406	13	4.2	2.0
Flying Birds	37	1	0.9	0.8
Dog	25	1	0.9	0.4
Other	6	0	1.0	0.7
Total	3,070	100	-	-

Note: All amounts are measured in kg, expect for egg, which eggs, which is measured by number of eggs.

Location of purchase also varies by type of meat. Households reported location of chicken purchases and meat purchases 'on average', and for their most recent chicken purchases. Households were asked detailed information about their most recent three chicken purchases, although some households could only recall one or two of their past chicken purchases (Table 8). ('Cho' refers to open air or wet markets, which generally specialize in fresh meat and produce, as well as various other foods.) 54 percent of respondents report never visiting a supermarket while 25 percent of respondents go to supermarkets at least once per month. Of households who visit supermarkets, 75 percent have to travel 15 minutes or more to get to the supermarket. However, 60 percent of all households are within 5 minutes and a further 35 percent are within 10 minutes of a wet market.

Table 8. Location of chicken and meat purchases.

	Chicken		Meat	
Location	Average	Most Recent	Average	Most Recent
Cho	79%	69%	90%	90%
Corner Seller	8%	10%	4%	5%
Wholesaler	2%	3%	0%	0%
Supermarket	5%	13%	5%	4%
Countryside	3%	4%	0%	0%
Other	2%	1%	1%	0%

The location of purchase relates to both breeds and cuts purchased. The tables below show breed purchased by location, and different types of cuts purchased for each breed. Supermarkets tend to specialize in industrial chickens and Tam Hoang chickens, which is a lower quality variety of crossbred chickens. Informal retailers and wet markets sell mostly live and whole fresh chicken, while supermarkets sell more frozen chickens and fresh chicken parts. More processed parts are sold in supermarkets, but markets for more processed chickens still seem to be limited.

Table 9. Chicken breed / type sold by purchase location.

Type / Breed of Chicken	Local Cho	Other Cho	Corner Seller	Whole-saler	Super-market	Country-side	Other	N
Local: Ri	74%	0%	9%	3%	7%	6%	1%	772
Local: Other	65%	1%	15%	7%	7%	3%	1%	307
Local: Mia	74%	1%	6%	4%	13%	1%	1%	156
Crossbred: Tam Hoang	49%	0%	7%	1%	43%	0%	0%	148
Crossbred: Other	67%	0%	3%	0%	27%	0%	3%	30
Industrial	63%	1%	12%	2%	17%	0%	6%	196

Table 10. Chicken cuts sold by location.

Location	Live	Whole Fresh	Parts Fresh	Boiled	Frozen	Other Cooked	N
Local Cho	33%	47%	20%	0%	0.2%	1%	1,105
Other Cho	25%	50%	13%	13%	0%	0%	8
Corner Seller	47%	35%	17%	0%	0%	0%	167
Wholesaler	73%	22%	6%	0%	0%	0%	55
Supermarket	1%	57%	36%	0%	5%	1%	205
Countryside	84%	16%	0%	0%	0%	0%	57
Other	13%	26%	30%	0%	4%	26%	23
Total	**33%**	**45%**	**21%**	**0.1%**	**1%**	**1%**	**1,620**

51 percent of survey participants had not heard of chickens that had a safety guarantee from a company, while 49 percent had heard of this kind of chickens. Of those who had heard of safety-branded chickens 58 percent had at some time purchased these chickens, and 42 percent had not.

69 percent of households reported buying safety-branded chicken at a supermarket, 44 percent at a special shop for chicken, and 3 percent in a market (Cho). Table 11 shows reported prices for safety-branded chickens of different breeds, separated by household's current consumption status. Interestingly, prices paid by households that no longer consumed safety-branded chickens are not necessarily lower than those who are still consuming this type of chickens.

Table 11. Prices of safety-branded chickens.

Chicken Type	Not Currently Purchasing Safety-Branded Chicken		Currently Purchasing Safety-Branded Chicken	
	Mean (000' VND)	N	Mean (000' VND)	N
Local: Price	92	10	101	50
Local: Premium	21	5	15	11
Crossbred: Price	87	10	83	49
Crossbred: Premium	9	2	13	9
Industrial: Price	68	5	57	34
Industrial: Premium	10	1	15	12

36 percent of all households reported regularly buying chickens that had government certification, which is usually a stamp. The table below shows the number of recent purchases that have either

government certification or a safety brand. A large percent of chicken purchases are of live chickens, and safety-branding is very rare for local breeds. Government certification of chickens seems to be low in the neighbourhoods surveyed, although they are all located in central areas of Ha Noi.

Table 12. Safety certification of recently purchased chickens.

Type of Breed	% With Safety Branding	% With Government Certification	% Sold Live	N
Local: Ri	6%	17%	40%	772
Local: Other	5%	30%	51%	307
Local: Mia	5%	38%	26%	156
Crossbred: Tam Hoang	36%	17%	17%	148
Crossbred: Other	68%	17%	10%	30
Industrial	26%	36%	3%	196
Total	12%	24%	33%	1,609

Table 13 compares prices for live and slaughtered chickens amongst different breeds. Chickens that are purchased live seem to be significantly cheaper than chicken that are slaughtered. The lower price of live chicken can be accounted for by the fact that less processing is required, and also that live chickens are illegal and hence there are no certification-related costs. Anecdotally, households also report preferring live chickens because they can look at chickens and determine its quality and safety. Project vendors who were licensed to operate in markets and sold only government certified product also remarked 'unfair competition' from informal vendors selling live chickens.

Table 13. Prices paid for live and slaughtered chickens (in '000 VND).

Description	Live Chicken			Slaughtered Chicken		
	Mean	Std. Dev.	N	Mean	Std. Dev.	N
Local: Ri	78.8	9.3	302	89.3	13.6	464
Local: Other	74.8	5.9	151	87.1	9.7	147
Local: Mia	72.8	5.4	39	78.4	15.9	115
Cross: Tam Hoang	68.6	6.4	25	73.9	10.2	123
Cross: Other	68.0	2.0	3	70.9	26.0	26
Industrial	51.7	6.1	6	57.1	15.4	188

Attitudes and Beliefs

The survey included several questions about respondents' attitudes and beliefs. The following table details rankings on several concerns. For quality factors, those related to taste seem most important, such as meat flavour, feed source, meat texture (meat should not be soft), and freshness. These quality-related factors are mostly found in local chickens and to a large degree in crossbred chickens. For factors specifically related to safety, avian flu, other diseases, unsafe feed additives, and poultry origin are the most important to consumers. The final column of Table 14 reports the results of statistical tests to see if quality and safety concerns are the same for chickens and other meats.

The only areas where concerns are significantly different seem to be for market and slaughterhouse hygiene, where average scores for chickens are lower than those for other meat. This might be due to disease concerns being relatively greater for chicken than other safety-related concerns. The fact that chicken tends to be more likely to be purchased live also indicates that these types of concerns might be lower for chicken than for other meats.

Table 14. Importance of quality and safety attributes for chickens.

Location	Chicken	All Other Meat	P-Value
Price	6.4	6.5	0.50
Meat Flavour	7.2	7.2	0.90
Freshness	8.9	8.9	0.70
Feed Source	7.7	7.8	0.35
Safety (general)	8.7	8.6	0.31
Supply	5.4	5.4	0.51
Preparation Time	5.2	5.1	0.51
Soft Meat	7.8	-	-
Yellow Skin	6.4	-	-
Market Hygiene	7.2	7.3	0.05
Origin of Meat	7.4	7.3	0.21
Disease Risk	8.0	8.1	0.20
Safety Inspection	7.3	7.4	0.31
Unsafe Feed Additives	7.9	7.9	0.77
Slaughter Hygiene	6.9	7.1	0.02
Avian Flu	8.3	-	-

Table 15. Reasons for purchasing safety-branded chickens.

	Not Currently Purchasing Safety-Branded Chicken, n=80		Currently Purchasing Safety-Branded Chicken, n=189	
Description	Percent	Std. Dev.	Percent	Std. Dev.
Safety	53	0.50	87	0.33
Convenience	15	0.36	55	0.50
Tradition/Habit	1	0.11	10	0.30
Just trying/curious	78	0.42	31	0.46
Cheap	0	0.00	2	0.14

Table 16. Reasons for not currently purchasing safety-branded chickens.

	Previously Purchased Safety-Branded Chicken, n=73		Never Purchased Safety-Branded Chicken, n=189	
Description	Percent	Std. Dev.	Percent	Std. Dev.
Too Expensive	16	0.37	10	0.30
Do not trust safety guarantee	14	0.35	27	0.45
Not tasty	70	0.46	72	0.45
Not convenient to purchase	10	0.30	43	0.50
Not important to me	-	-	14	0.35
Only trying	66	0.48	-	-

Table 17. Reasons for not regularly purchasing government certified chickens.

Description	Percent	Std. Dev.
Too Expensive	30	0.46
Don't trust certified chicken is safe	57	0.50
Convenience/Not available where I regularly shop	54	0.50
Not Important	42	0.49
Purchase chicken from countryside	30	0.46
Purchase safety-branded chicken	1	0.08

Note: n=577.

During survey, households gave reasons for purchasing or not purchasing safety-branding chickens, as well as for not purchasing certified chickens. For households who regularly purchase safety-branded chickens, safety and convenience seem to be the most common reasons for purchase. Because most safety-branded chickens are purchased at grocery stores, households are likely referring to buying it while purchasing other items. Similarly, 43 percent of households who have never purchased safety-branded chicken report inconvenience as a reason for not purchasing safety branded chicken. This is in line with the number of households who never shop at supermarkets.

Although convenience is important, households who don't purchase safety-branded chicken report taste-related factors as the most important in determining their purchase decisions. For government certified chicken, lack of trust in government certification, convenience and lack of interest are key reasons for purchasing other types of chicken. As shown in Table 18, market inspectors (who stamp chickens) have the lowest level of trust, while international companies and regular market sellers have the highest level of trust.

Table 18. Level of trust related to chicken safety.

Description	N	Mean	Std. Dev.
Regular Market Sellers	919	7.4	1.8
Domestic Company	906	7.1	1.5
International Company	905	7.6	1.6
Market Inspector	918	5.3	2.2
Dept. of Animal Health	917	6.1	2.2
Supermarket	914	7.1	1.8

Table 19 shows the ranking of households' importance of brands for various items. Brands seems to be the most important for appliances and cosmetics, but less so for vegetables and alcohol. However, on average, most households consider brands to be at least somewhat important in purchasing decisions for several items.

Table 19. Importance of brands in purchasing decisions for various household items.

Item Description	Mean	Std. Dev.
Cosmetics	7.1	2.2
Appliances	7.0	1.8
Clothing	5.6	2.3
Alcohol	5.0	2.9
Vegetables	4.9	2.6

Most households have good knowledge of basic risks related to chicken consumption and HPAI, as indicated in Table 20. Households also seem not to have recently consumed chicken blood, which

used to be a popular food item in Viet Nam when prepared in certain ways. About 25 percent of the sampled households reported slaughtering poultry at home, and of those less than a quarter use gloves. It is not surprising that knowledge of HPAI risks is high, given the frequency of HPAI campaigns in media outlets, as indicated in Table 21. However, given frequent purchases of live chickens and slaughter of chickens at home, behaviours have not yet changed.

Table 20. Safety-related behaviours and knowledge.

Knowledge/Behaviour	Percent
Unaware that touching a live chicken with an HPAI infection is riskier than eating cooked meat of the same bird	0.4%
Unaware that eating raw chicken blood is riskier than eating cooked chicken organs	0.9%
Ate raw blood during or after Tet holidays	4.6%
Do not wash hands after handling live poultry	1.4%
Do not slaughter poultry at home	76%
Slaughter poultry at home without gloves	19%
Slaughter poultry at home with gloves	6%

Table 21. Exposure to HPAI campaigns in media outlets.

Source	Never Exposed	Exposed > 6 months ago	Exposed within past 6 months
Newspaper	8%	52%	40%
TV	1%	57%	42%
Poster	23%	30%	47%
Radio	38%	24%	38%
Public Loudspeaker	31%	28%	41%

Valuation of Traceability Premiums

Each household was asked to chose between two coupons of differing amounts, one for project chickens and the other for either local or crossbred chickens. The left column of Table 22 shows differences in discounts offered to households. For example, a household who was offered a 17,500 VND (US$1.09) discount for project chickens and a 20,000 VND (US$1.25) discount for local chickens would be included in the calculations for entry at '-2500' in the left column. The table below shows households' choice of discount coupon based on the differences between discounts. Household choices appear to be rational, as increasingly fewer households select project chickens when the discount differential decreases

Table 22. Gift selection when (A) type of other chicken is local, and (B) when type of other chicken is crossbred chicken.

	(A) Project vs Local Chicken		(B) Project vs Crossbred Chicken	
Discount Differential	Prop. Selecting Project Chicken	N	Prop. Selecting Project Chicken	N
<-2500 VND	28%	98	57%	112
-2500	39%	66	70%	77
Same Discount	65%	83	91%	89
2500	71%	62	94%	84
>2500 VND	85%	87	96%	129
Total	**57%**	**396**	**82%**	**491**

Based on our economic experiment, willingness to pay for traceability appears to be large – up to 91 percent of households chose traceable (branded project) chickens over non-branded crossbred chickens when the discount was the same for both. 57 percent chose traceable project chickens even when the discount for it was US$0.25 or more lower than that for non-branded crossbred chickens.

Using random utility theory, we estimated and interpreted consumer preferences with compensatory variation (CV) between traceable and non-traceable chickens representing the "safety premium" of traceable chickens. This approach uses variables for project chickens (dummy variables) and either the market price minus coupon discount or the coupon discount as explanatory variables, and the conditional logit model allows for direct interpretation of coefficients. These results are well-identified, as price or coupon amounts varied exogenously through random discounts, and choice of breeds was also randomly assigned. Because households faced different choices between project chickens and either local chickens or crossbred chickens, we must separate our estimations into two groups: households for which the type of "other chickens" was crossbred, and households for which the type of other chickens was local.

The safety premium is 16,000 VND (US$1) per chicken purchase when the type of other chicken is crossbred chicken. The willingness to trade between discounts when the type of other chicken is crossbred chicken is about 7,500 VND (US$0.47). When estimating for choices between project and local chickens with adjusted price (market price minus discount) as an explanatory variable, the coefficient on project chickens is not statistically significant, so we cannot estimate the safety premium under this scenario. However, when estimating with discounts as explanatory variables, we do have statistically significant results indicating that willingness to trade between discounts is about 2,300 VND (US$0.14). The price of local chicken was about 20 percent higher than that of project chickens and this fact should be taken into account when interpreting results.

In summary, these results validate household preferences for taste-related factors of local chickens, but also indicate that branding and traceability have an important role in decision-making processes. The safety premium of 16,000 VND (US$1) when choosing between the same types of chicken with and without branding is consistent with other results. Further, in Table 11, we see that households who currently report purchasing safety-branded crossbred chickens are paying 13,000 VND (US$0.81) as premium. These numbers might be slightly upward-biased due to (**A**) framing of choices based on discount rather than price and (**B**) preferences to purchase brands from an unfamiliar supplier. However, consistency with previous findings indicates that any upwards bias would not be large.

The number of households purchasing safety-branded chickens is quite low, likely because safety-branded chickens are usually only available in supermarkets. This research suggests that households would be willing to pay for safety-branded chickens sold in wet markets.

Policy Recommendations

Several important policy recommendations can be made from the poultry supply chain activities, testing marketing schemes, household surveys and economic experiments. These recommendations can be largely divided into two categories: The first are recommendations for scaling up and expanding branding and traceability programmes, and the second are demand-related findings of the study that have implications for HPAI and overall animal health policies. This section will focus on development of certified supply chains for smallholder-produced poultry, as it is the most popular type of poultry in northern Viet Nam and will require innovative solutions different from those commonly used in industrial poultry production and supply systems.

Development of Certified Poultry Supply Chains

Managing Cost

Experiences gained through implementation of this project and other work done in Viet Nam have implications for managing costs in certified poultry supply chains. Because this project was a short-term pilot/demonstration project, costs from this project alone are not appropriate to evaluate the cost effectiveness of certified poultry supply chains. The actual cost effectiveness of any certified supply chain will vary based on local market conditions, feed costs, distance to markets, etc.

Managing costs at farm level for participation in controlled supply chains could initially be undertaken by working with farms that already have safe production practices. Further, investments for improving biosecurity for semi-confined or semi-scavenging poultry production systems are not necessarily large, as most chickens are already confined to grazing areas or gardens. Cooperation with farming groups that mandate or promote certain production practices can also help with recruitment of farmers with a lower overall cost structure. Allowing chickens to graze is important for maintaining meat quality (taste and texture), so most smallholders use marginal land, land for tree crops and vacant lots for free-grazing chicken production. Chickens are usually confined in these grazing areas, and cost effectiveness is ensured by these already diversified production systems.

Vaccination against HPAI and other poultry diseases will likely be an important part of the requirements for participation in a certified supply chain (CSC). Although smallholder farmers often do not vaccinate for major poultry diseases, the benefits of doing so would be large. One project farmer reported large decreases in death losses due to correct and disciplined use of Newcastle and Gumboro vaccines. Although purchasing avian flu vaccines may not have an immediate or tangible benefit for farmers, use of other vaccines does. Some project farmers also reported that poultry nutrition information they received from the project was helpful.

More generally, access to information and technology are valuable to smallholder farmers and could increase the likelihood of participation in CSC. Reimbursement of farmers could take into account the value of these services, as well as regular market access. Direct links of supply chains participants might also create value through increased efficiency that could be passed on to all participants, including farmers. Negotiations with farmer groups could also help manage production costs of CSC.

Traders and slaughterhouses that participate in CSC might have to separate birds, but otherwise their duties would not be significantly different from those of other traders and slaughterhouses. Given the high level of competition between these groups, there are no reasons why trading or slaughtering costs of CSC should be especially high in the long term. Vendors reported that chickens slaughtered in fully mechanized systems lose some quality characteristics valued by Vietnamese consumers, but currently labour costs are low enough for this to not be a major cost issue.

Vendors also reported reputation effects from selling project chicken; the same effects could be possible for selling branded or tagged chicken from any successful certified supply chain. This type of chicken is considered a high value product; thus margins for vendors should also be higher. Initially high upfront investment costs in advertising combined with a quality product can lead to established brands or labels that in the long run have relatively low costs to maintain.

Although poultry supply chain participants won't likely need high levels of payments for long term involvement in CSC, enforcement of standards may be a cost issue to consider. Participation needs to be intrinsically valuable enough so that CSC access denial serves as a punishment to deter intentional misconduct. At farm level, this should be an especially powerful tool for farmers to follow contracts. Collective punishment at local levels may also have important roles in contract enforcement, especially if farmer groups are partnered. If all farmers in an area lose market access due to one breaking contracts, self-policing may occur. This same policy could also apply to traders-processors.

Enforcement of production and trading standards by veterinarians and other technicians is also important at many levels. Local veterinary officials and staff and market inspectors fulfil this role, and have the benefit of greater knowledge of areas they cover as well as performing their duties more efficiently. In any given setup, some external supervision will be necessary to ensure final product and build a brand or label that consumers can trust. More generally, development of cost-effective institutions/processes for contract enforcement will be a critical aspect of any CSC.

Keys to Successful Risk Management and Supply Chain Coordination

The key aspect of successful risk management and supply chain coordination are effective use of existing institutions and development of strong mechanisms for contract enforcement. As previously discussed, utilizing existing institutions is important not only for cost effectiveness of CSC, but also necessary for their mere existence. Contract enforcement is essential to manage risk and maintain brand reputation in the long-term.

Our project used local veterinary staff, but also added extra staff and training as necessary. If some existing institutions are generally doing a good job of delivering safety chickens to urban areas, then the focus of a CSC would be to find a way to effectively communicate this to consumers and add extra safeguards when needed. Use of existing institutions does not mean total reliance on existing institutions. Consumers currently have low levels of trust for stamped chickens and their local market inspectors, so this system would have to be altered in a CSC. Consumers have more trust in their local market vendors than government agencies and domestic companies, so these vendors could have an important role in making a CSC a more reliable and reputable entity.

One of the findings of our project was that slaughterhouses are key players in supply chains, with direct links to both traders and market vendors. Hence slaughterhouses could be key partners in development of CSC. Working with slaughterhouses may well also facilitate farmer recruitment.

Use of existing institutions can also help with contract enforcement. Supply chain participants are careful about maintaining strong business relationships with each other. Farmers in this project reported that they were only willing to work with traders they knew or that had a good relationship in their community. Self-policing can make a CSC more cost-effective and sustainable. Contracts need to take into account the large costs that a negative incident would have on a brand or a product. Our project ensured contract compliance by delaying full payment until all activities were completed, and also partnering with veterinary and market inspection staff. As government officials, they could sometimes apply pressure for contract compliance when the project is unable to do so. Contract design and compliance is a critical aspect in developing a CSC, and rigorous design of contracts, as well as use of existing institutions, can help to ensure success.

Marketing Traceable Poultry

Successful marketing of traceable poultry is an important part of setting up a CSC, which can be done with a brand, label, or some other unique distinguishing feature on chickens. Specific promotional and advertising activities will have to be solely based on the intended audiences and local conditions. Pricing chickens will also be based on supply and demand conditions, and our analysis above has indicated that a significant premium is possible to get.

Ensuring quality is an important part of any marketing strategy: vendors report that popularity of safety-branded local or crossbred chickens would be based at least partially on a reputation for taste. Any promotion activities should be based not only safety advantages, but also on assurances of good taste. Although consumers might buy safety-branded chickens during times of epidemics - as evidenced by increasing purchase of live chickens - long term purchase is also based on quality preferences.

Vendors also report that some consumers are wary of brands if they have had a bad experience with it in the past. In this respect, any CSC would have to make careful plans to build up a brand and ensure its reputation, or likewise for a label, etc. The trust of the certifying agency must also be taken into account. Consumers seem to have little trust in local market inspectors, so third party involvement is strongly advised. Companies would likewise need to be careful to build a brand and safeguard its reputation tightly.

Many vendors reported that their consumers liked the tags, and trusted the information presented by project materials and advertisements. If successful with consumers on a large scale, chicken tags might face copying by competitors who don't follow strict safety standards, which would decrease their value. Hence, tag design would have to be done with this in mind. Although tags are used to ensure traceability, it also had the added advantage of giving project chickens unique and easily identified characteristics. This is a common marketing strategy for many types of products, and establishing "uniqueness" that cannot be easily copied is important for CSC.

In summary, the key aspects of a marketing strategy for traceable chickens are to establishing trust, uniqueness, and good taste. Traceable or safety-branded chickens have not been widely available in Hanoi's wet markets, but effective marketing strategies could change this situation so urban demand for safe chickens can help improve biosecurity of poultry production and trade.

Role of Government

The private sector has already had success in selling chickens in supermarkets with safety-brand features, and also some ancillary sales through specialty shops. However, the overall impact has been limited due to preferences for local and crossbred chickens, as well as preference for shopping in more convenient wet markets. If market driven systems are to be effective on a larger scale, chicken from CSCs must be sold in wet markets and smallholder-produced chicken. Hopefully projects like this one will continue to demonstrate how CSCs for local and crossbred chicken can be profitable. Even before this project was completed, it was already being copied by a supermarket that had a relationship with Bac Thang Long wholesale market. It is likely that the projects' use of local institutions is what made it easily replicable. More generally, a supportive policy environment for firms to work with smallholder farmers can help to establish such projects in the future.

A supportive policy environment could include, among other things, strengthening veterinary institutions, providing intellectual property protection, and supporting development of third-party labelling or branding programs. Existence of membership clubs for chicken farmers is also promising, as it could make it easier for companies to enter into contracts with farmers and enforce those

contracts. Farming groups also can facilitate access to better information and technology for poultry production and marketing.

Development of small wholesale markets with registered slaughterhouse facilities might also be an appropriate area for government involvement. Bac Thang Long (BTL) wholesale market was established by a state-owned company, and its presence allowed this project to source from small farmers while still using registered slaughterhouses in a market supervised by government inspectors. Smaller wholesale markets around Hanoi often source from traders who work with small farmers raising higher quality chicken. The amount of local chicken being marketed through BTL is much higher than that of Ha Vi: a much larger wholesale market. Small wholesale markets might also allow for competitive sourcing of smallholder-produced chickens over larger areas. Local chickens predominate in Viet Nam, but are expensive in many urban areas. Developing infrastructure for local chickens to be sourced to urban areas from a wider area through CSCs could help improve the current biosecurity situation.

Implications of Poultry Demand Patterns for HPAI Policy Formulation

Current consumption patterns indicate that in average North Vietnamese households, chickens are consumed at home at most once per week and other meat types are more frequently purchased. Local chickens are a comparatively expensive meat type, with industrially-produced chickens priced competitively against other meats. It appears however that households are not consuming low-quality chicken in favour of other meat choices. Although this trend applies to food consumed at home, it does indicate that as meat consumption increases, chickens may have a smaller share relative to other meats than in other Asian countries. This could change if there is a structural shift in preferences, but current evidence indicates that strong preferences for local chickens persist. How preferences and behaviours evolve will have a large impact on the development of the poultry industry and hence biosecurity policy.

Our household survey results indicate that there is a large informal sector for sale of live poultry in Ha Noi, which largely sells local chickens. Poultry vendors operating informally are currently able to sell chickens for significantly lower prices than vendors selling slaughtered poultry. For our household survey sample, live chickens had a large market share. The level of live sales is higher than found in a previous survey of Hanoi households in 2007 by Ifft *et al.*, but is in line with observations that market regulations and consumer concerns for safety have weakened with decreasing HPAI outbreaks. Some project vendors also complained about competition from informal vendors, while consumers like low priced chickens that they consider to be higher quality, as well as the ability to select their own chicken. The presence of this informal sector seems to be pervasive, especially as it is able to meet consumer demand for tasty, affordable chickens. Policies that increase prices of slaughtered local and crossbred chickens may lead more households to buy live chickens, and this should be taken into account in policymaking.

Presence of informal markets elucidates consumer preferences for poultry that should be taken into account in sector restructuring efforts. Biosecurity policies can impact supply of certain types of chickens and increase or decrease its costs, leading to a new market equilibrium that might have unintended consequences. For example, policies that increase costs of legally-certified local chickens without added consumer benefits might lead to higher sales of live chickens. Such a policy might result in an increase of veterinary checkpoints. Market forces might make policies less effective, but they also have the power to improve biosecurity. As indicated in this study, consumers have high valuations for safe and traceable poultry, and will pay for it if their other requirements are met. Likewise, the consequence of any policy that impacts poultry supply will also be affected by demand forces, so consumer demand and preferences should also be taken into account in policymaking.

References

AED - Academy for Education Development (**2008**) Vietnam Poultry Association (VIPA) - organized poultry clubs supported by AED/USAID. Presentation to Biosecurity Working Groups, Ha Noi: 5 Sept, 2008.

Ifft, J., Otte, J., Roland-Holst, D., and D. Zilberman (**2008**) Poultry market institutions and livelihoods: Evidence from Viet Nam. PPLPI Research Report Nr 08-02.

Ifft, J., Otte, J., Roland-Holst, D., and D. Zilberman (**2007**) Demand side approaches to HPAI risk reduction. PPLPI Research Report Nr 07-10.

Hanh, P. T., Burgos, S., and D. Roland-Holst (**2007**) The poultry sector in Viet Nam: Prospects for smallholder producers in the aftermath of the HPAI crisis. PPLPI Research Report Nr 07-08.

RAP-ECTAD (**2008**) E-Newsletter, July/August 2008, Ed. A. Burnett.

Roland-Holst, D., Otte, J., and D. Pfeiffer (**2006**) Initial assessment of the impact of poultry sales and production bans on household incomes in Viet Nam. PPLPI Research Report Nr 06-04.

Roland-Holst, D., Soares-Magalhaes, R., Pfeiffer, D., Dung, D., and J. Otte (**2006**) Pilot programme for certified smallholder poultry supply chains for Ha Noi. PPLPI Research Report Nr 06-11.

Roland-Holst, D., Epprecht, M., and J. Otte (**2007**) External shocks, producer risk, and adjustment in smallholder livestock production: The case of HPAI in Viet Nam. PPLPI Research Report Nr 07-05.

Roland-Holst, D., Chadwick, D., Ifft, J., and V. Reed (**2007**) Livestock Surveys for IPALP, Research Update, PPLPI, FAO, Rome.

Soares-Magalhaes, R., Pfeiffer, D., Wieland, B., Dung, D., and J. Otte (**2006**) Commune-level simulation model of HPAI H5N1 poultry infection and control in Viet Nam. PPLPI Research Report Nr 06-10.

Soares-Magalhaes, R., Quoc, H. D., and L. T. Lan (**2005**) Farm gate trade patterns and trade at live poultry markets supplying Ha Noi: Results of a rapid rural appraisal. PPLPI Research Report Nr 07-05.

Appendix A: Training Manuals

Enumerator Training Manual

Household Survey

Pilot Programme for Certified Smallholder Poultry Supply Chains for Hanoi

Instructions

You have been hired to participate in market survey of Hanoi households. Your principal role is to conduct interviews with selected households in 4 neighbourhoods of Hanoi. Your role is very important for this study.

The purpose of the survey is to evaluate Hanoi residents' shopping habits and preferences, as well as their experience with safe and certified chicken. Your task is to interview the subjects included in this study. The quality of your data collection is directly responsible for the quality of the data that will be used in this study.

You will be individually visiting the households that have been selected. Your responsibilities include:

- Participating in a training and survey testing and listing activity
- Visiting households based on selection from listing
- Interview approximately 130-140 households in a 3-4 week period
- Keep completed surveys in order and return them on a regular basis
- Report questions/problems to supervisor
- Provide feedback to supervisor

This manual provides details of your responsibilities. Please read this manual carefully. You can refer to this throughout the duration of the study if you have questions. You may also contact your supervisors.

Survey testing

After training, you will help test the survey. This is an important time to become accustomed to conducting the surveys. Your feedback during this time is very important in helping us improve the survey procedures and data that we will collect.

After you test a few surveys, you will fill out a form asking for your feedback. While you are giving the surveys, please take note of:

- Any questions that are difficult to understand
- Any questions that are difficult to answer (people seemed unsure of their response)
- Any questions people found strange
- Length of survey and questions that take particularly long time to answer
- Anything else you think is important

Survey testing will take place the afternoon after training and the next day. When you are completed, you will return your surveys and your feedback form to the supervisor by 5pm on the next day.

Implementing the Survey

Visiting selected households

- Identify yourself & the survey very briefly
- Show the reference letter
- Identify if the appropriate person to interview is home
- Take the survey and give the coupon upon completion
- Have then fill out consent sheet upon completion

Approaching Selected Households

During this survey period, you will work on interviewing households assigned to you by the supervisor. You will be given a list of households to visit that will be based on all of the households randomly selecting after the listing activity. Your goal is to visit all of these households and have them take the survey. However it is expected that some households may refuse and others may for some reason not be available. If you cannot find a household, please make a note and inform the supervisor. During the survey period, you will attempt to visit all selected households. If during a certain visit they are not home, you can return again during subsequent days. If they are busy, you can ask to reschedule.

Do not go to households other than those whose address has been provided for you. If you are having particular difficulty in a certain area persuading households to participate in the interview, please inform the supervisor. It is very important to keep track of the households you have visited and the ones that you still need to return to.

If someone is home, please identify yourself based following the instructions on the survey and show the reference letter. You will be interviewing the person who is responsible for purchasing the majority of the food that is consumed inside of the home. This person should be a household member as well (not an employee of the household). Ask if this person if available. If this person is not there, you should thank them and ask if there is another time to return to do the interview.
If this person is at home, you may request that they participate in the survey.

General procedures for giving the survey

Your role as an interviewer is to ensure uniform answers from ALL respondents. We want to make sure that all interviews are conducted exactly the same way. Please ensure the following guidelines are followed when giving surveys:

1. Read directly from the survey document – do not paraphrase or change the question in any way
2. Read the question slowly
3. Do not answer questions about meaning of a question. Use following guidelines if this situation arises:
    - Restate the question – sometimes this will be sufficient
    - Politely state that you have no other information than what is survey or that you are not sure
    - Encourage them to answer the questions as best possible
4. Do not pressure participants to answer questions quickly, some questions may take more time
5. Do not express surprise or interest in any responses, just politely confirm their response
6. Do not add apologies or explanations for questions unless they are printed in the questionnaire

7. Gently encourage survey participants to answer every question. If they refuse to answer, please write 999 on the survey form. If they want to answer but don't know, enter the code 888.

Giving the Coupon

Thank the household for their participation upon completion of the survey, and tell them that as a gift for taking part in the survey, we will be offering them a coupon for their participation. Follow the script that is given for you on the survey. Explain that you will need to write their name and address on the coupon, because you have strict instructions that only the households that complete the survey can use the coupon.

Reviewing and store completed forms

Before you leave the household, please review the completed survey. Make sure there is an answer for EVERY question that is appropriate for the respondent in the questionnaire. If you do not, you will need to re-ask the participant. Once the survey is completed, ask them to sign a sheet stating that they have participated in the interview. This sheet will be provided for you. We will also request that the participant provide their phone number. If asked, you can tell them we need there phone number so their participation in the survey can be verified if necessary by the project sponsors and managers. There is only a very small chance someone will actually contact them, and all phone numbers will be destroyed upon completion of the survey.

Please store the forms together in a way that cannot be damaged. You will need to arrange to return completed questionnaires to the supervisor at the agreed times.

Survey Schedule

You will have 3-4 weeks to complete 130-140 surveys; this is almost 40-45 surveys per week. It is very important to do at least 40 surveys each week and not fall behind by thinking you can complete more surveys later during the survey period. You will be assigned to interview specific household at the beginning of each week. On every Monday morning starting on August 16, you will need to collect surveys and information for the households that you have been assigned to interview. At this time you will turn in all of your surveys from the previous week.

It is possible that on occasion the supervisor will accompany you for an interview or visit the neighbourhood where you are conducting surveys. During the first week of surveys, there may be extra meetings arranged to ensure that the survey is being implemented as intended and address potential problems.

If an unforeseen difficulty does arise, such as a sickness in your family or some disturbances in an area you are supposed to be visiting, please inform the supervisor to arrange for more time to complete your surveys. While it is important to complete your allotment of surveys in timely manner, it is also very important not to rush the surveys and impinge the quality of the data collected.

Guidelines for Block Listing

Introduction

In any survey, random selection of survey participants is essential for collection of quality data and credible results. The activity that you will be undertaking is a critical aspect of random selection of households for our survey. You will need to carefully follow the instructions below and must ask if

there is something that you do not understand. Finally, listing is not always a precise activity, so you will be responsible for making independent judgments based on the guidelines you have given.
You will do all your work in pairs, with one other enumerator.

A. Before Listing

1. You will be given a map(s) of a particular neighbourhood. There will be 10 places on each map that are marked with a number from 1 to 10.
2. You will visit the place marked #1 first, then #2, and so on.
3. It is possible that a certain location might not be in a residential area. You should make a note of this and then move to the next location if this is the case. For example, you should move to the next area if the coordinate is in a park, lake, school, hospital, army barracks, restricted area, etc. Hotels or serviced apartments for foreigners are also not to be included. It is OK if there are shops in the area, as long as families are living above/behind the shops.
4. You will first define the area that is a "block", after which you will "list" all households living in the "block" that you have defined.
5. You will need to list a total of 5 blocks in each 'neighbourhood'. If more than five out of the 10 locations do not fit the criteria of a "residential area" as given in (3), please contact your supervisor.

B. Defining a block

1. "Blocks" in principal should approximately the same size. On the map that you are given, the suggested area for a "block" will be marked for you
2. When you visit the location that is given, first see if it is location in an actual block or a large apartment building, either based on the map and suggested block area or your observation. If this is the case, draw a map of the area and then you can move to listing the households.
3. If the location is not on a block or large group of apartment buildings, then you will have to further define the block that is shown on the map. Any alleys or small roads that are not on the map but that are in the block that is defined on the map should be included. Use your best judgment for the boundaries of the block.
4. Once you have defined the block, draw a rough sketch of the block on the paper that has been provided for you.

B. Listing all Households

1. You will need to write the numbers (addresses) of all households dwelling units on the sheet for the block that you have defined. You will also make short comments to help with identification of the households and also make comments on any difficulties encountered. If there is not specific address or several households share the same house number, you will need to give directions on how to distinguish households.
2. A household dwelling unit is anywhere where a family lives. This may be a single person or extended family. If there is an apartment building, all apartments should be listed with the apartment number.
3. Some blocks may include an apartment or group of households that is difficult to access. If possible, you might ask the manager or guard for permission inside to for the purpose of selecting households for a survey (showing the reference letter). It is possible that you will be denied access or that it will simply not be possible to access a large number of households in a block. If a large number of the households in a block are inaccessible, you do not need to list households on this block. Simply make a note of this and move to the next location. If only a small number of households are inaccessible, make a note of this and then continue listing all other households.

4. Listing should be sequential – all households should be listed in the order that you walk through the block.
5. Presumably some residences will be on top of shops, etc. You need to be prepared from time to time to make discreet inquiries about where families live.
6. Listing should generally go quickly but there will be some cases in which you will need to take more time to make some inquires about the location of households.
7. As you are listing households, you may want to add identifying characteristics (house numbers etc) to map that you have drawn, which would help someone find a specific household.

C. After Listing

1. You will list all of the blocks in the neighbourhood that you have been given. One neighbourhood will be completed on Monday. Please contact your supervisor as soon as your work is completed.

Once you have listed five blocks, please return the maps and listing sheet to your supervisor at the designated time. You may be asked to make some modifications or further comments for clarity.

Household Survey

Contract for Enumerators

I _____ agree to work as an enumerator for the Household Survey for the Pilot Programme for Certified Smallholder Poultry Supply Chains for Hanoi. I understand my responsibilities described in the training manual. By signing this contract, I agree to:

1. Participate in Training and Testing of the Survey
2. Implement the household selection procedure as described in listing manual
3. Work individually to complete approximately 130-140 interviews in a 4-5 week period
4. Follow all guidelines in the training manual and all instructions given during the training session.
5. Give completed surveys to the supervisor at the agreed intervals
6. I understand that I will be paid 34,000 VND per day for travel costs and a 25,000 VND per survey completed

Signed

_____

Name Printed:

Date: / /

Appendix B: Household Survey

No.	Question		Response	
1.	How many **Kg** of chicken meat do you purchase for your household during an average week?			_____
2.	We would like to ask some information about the last 3 times you have purchased chicken. You can use this calendar as a reference. We will go from the most recent to the earliest chicken purchased.			**Go to end of survey**
3.	How many times a month on average do you go to a supermarket and purchase food? Please include any trip when food is purchased.			_____
4.	On average, how many minutes do you spend traveling to (a) the supermarket you usually buy food at and (b) the nearest market that you usually buy food at? Estimate using the most common type of transportation, for example on foot or motorbike [do not ask (a) if Q3=0]			**a.** _____ **b.** _____
5.	Where do you often buy chicken or meat and seafood? Where else do you buy them? How often do you buy it at each place? (Calculate yourself and check that it adds up to 100)		**Chicken**	**Other Meat and**
		a. Open/wet market	_____ %	_____ %
		b. Corner selling shops	_____ %	_____ %
		c. Meat wholesale trader	_____ %	_____ %
		d. Supermarket	_____ %	_____ %
		e. Countryside	_____ %	_____ %
		f. Other	_____ %	_____ %
		Total (check sums to 100)	_____ %	_____ %
6.	What are the types of meat, excluding chicken, which you have bought in the last 2 days? (start with yesterday, and don't include today).			**Go to end of survey**
7.	How important are the following things for you when you purchase chicken? Please rate on a scale of 1-10, with 1 = not important ever; 10=extremely important (Please get ranking for all categories for chicken first, then all other meat)		**Chicken**	**Other Meat, Not poultry**
		a. Price	_____	_____
		b. The meat itself should have a delicious flavor, even without adding seasoning	_____	_____
		c. The meat should not be soft	_____	
		d. The meat should be fresh	_____	_____
		e. The chicken skin should have a nice yellow color	_____	
		f. The animal should not get their food from concentrate feed	_____	_____
		g. Safety of the meat	_____	_____
		h. Time for preparation	_____	_____
		i. The type of chicken or meat that I prefer is not easy to find in the market	_____	_____
8.	Please rate how concerned you are about the following aspects of safety for chicken and other meat. Use the same scale as in the previous question. (Please get ranking for all categories for chicken first, then all other meat)		**Chicken**	**Other Meat, Not poultry**
		a. Unsanitary marketplace conditions	_____	_____
		b. Don't know the source or origin of the meat	_____	_____
		c. Worried about avian flu disease risk	_____	
		d. Worried about all other disease risk (excluding AI)	_____	_____

		e. Inadequate safety inspection	_____	_____
		f. The animal feed might have antibiotics or unnatural chemicals in it	_____	_____
		g. The slaughtering conditions might not be hygienic	_____	_____
		h. Other _____	_____	_____
9.	Before this survey had you heard of the type of safety-branded chicken we asked about in Question 2?	(YES OR NO: If YES – GO TO QUESTION 10, IF NO GO TO QUESTION 17)		_____
10.	Have you ever bought this type of chicken? [If they said YES in Q2, then you don't have to ask, the answer YES]	(YES OR NO: If YES – GO TO QUESTION 11, IF NO GO TO QUESTION 16)		_____

11.	What varieties of safety-branded chicken have you purchased? What is the average premium in dong/kg that you pay or paid over the regular price for exact same type of chicken? If you don't know the premium over regular price, then what is the total price in dong/kg that you paid? (CHECK EITHER PRICE OR PREMIUM, IF DON'T KNOW ENTER 888 IN AMT CATEGORY)		Premium	Price	Amount VND/kg
		a. Local	☐	☐	_____
		b. Crossbred	☐	☐	_____
		c. Industrial	☐	☐	_____
		d. Other _____	☐	☐	_____

12.	Why do you or did you buy safety-branded chicken? (CHECK ALL THAT APPLY)	a. Safety	☐
		b. Convenient to purchase	☐
		c. Tradition of purchasing safety chicken	☐
		d. Wanted to try safety chicken to see if I liked it	☐
		e. Other _____	☐
13.	How often do you buy safety-branded chicken? **(CHECK ONLY 1 BOX: FOR (a) go to Q 14, for all other responses go to Q15)**	a. Tried a few times but no longer purchase	☐
		b. Every time I purchase chicken	☐
		c. More than once a month	☐
		d. About once a month	☐
		e. Less than once a month	☐
14.	Where do you purchase safety-branded chicken? (CHECK ALL THAT APPLY) **Go to Q 17**	a. Supermarket	☐
		b. Market	☐
		c. Special shop for safe chicken	☐
		d. Other _____	☐
15.	Why do you no longer buy safety-branded chicken? (CHECK ALL THAT APPLY) (GO TO Q17)	a. Too Expensive	☐
		b. Didn't believe it was safer than other chicken	☐
		c. It was not tasty	☐
		d. I was only trying and not that interested	☐
		e. It is not available where I regularly shop	☐
		f. Other _____	☐
16.	Why have you never purchased safety-branded chicken? (CHECK ALL THAT APPLY)	a. Too expensive	☐
		b. Don't trust if is safer than other types of chicken	☐
		c. It is not convenient or available where I regularly shop	☐
		d. It is not important to me	☐
		e. I believe it is not tasty	☐
		f. It is not fresh	☐

		g. I have heard it is not tasty	☐
		h. The variety or breed that I prefer is not available	☐
		i. Other _____	☐
17.	Do you usually buy government certified or stamped chicken? [same type asked them about in Q2]	(YES OR NO: If YES – GO TO QUESTION 19, IF NO GO TO QUESTION 18)	_____
18.	Why don't you usually purchased government certified chicken? (CHECK ALL THAT APPLY)	a. It is too expensive	☐
		b. I don't trust that it is actually safe	☐
		c. It is not available where I usually shop	☐
		d. It is not important to me	☐
		e. I am able to purchase live chicken or purchase chicken from the countryside.	☐
		f. Other _____	☐
19.	How much do you trust the following entities' ability to provide or certify safe chicken? Please rank your trust on a scale of 1 to 10, with 1= no trust at all, 10=absolute trust. *[Read all choices first before you ask for the ranking]*	a. A market seller that you regularly purchase chicken from	_____
		b. Domestic company	_____
		c. International company	_____
		d. Your local market inspector	_____
		e. Dept. of Animal Health	_____
		f. Supermarket	_____
20.	**a.** On average, what is the total amount of money that you spend on all food for each week, including food that you prepare and food eating out for breakfast and other meals? **b.** Of that amount, how much is for food eaten outside, including eating out for breakfast and meal meals **c.** Of the total amount you spend per week on food, how much is for food that is eaten in the home? [Enumerator: ensure that b + c = a. If it does not check with them and adjust as necessary. The purpose of c is to ensure they estimated correctly. Help them estimate per day and take times 7 if this is easier]		**a.** _____ **b.**_____ **c.**_____
21.	For the money you spend for food to eat in the home how much is for the following categories? [Remind them of their answer to 20c, the answers to these questions should add **approx.** equal 20c]	a. Rice	
		b. Vegetables and fruit	
		c. Meat and Seafood	
22.	Of the money that you spend on meat and seafood (21C), what is the average amount that you spend every week on: Check 22 c+ 22d + 22e (+22f) = 22b	a. All seafood	_____
		b. All meat	_____
		c. All meat except poultry	
		d Poultry meat excluding chicken	_____
		e Chicken meat	_____
		f Eggs	_____
23.	On average, how often do you go out to buy food to be consumed in your home? (CHECK ONLY 1 RESPONSE)	a. Less than once a day	☐
		b. Once a day	☐
		c. More than once a day	☐
24.	How many people of the following ages live in your household? [If no person is >22, skip Q25]	a. Children under 10	_____
		b. 10-22	_____
		c. 23-60	_____
		d. >60	_____
25.	How many people over 25 in your household have the following education as their highest level?	a. Primary school	_____
		b. Secondary school	_____

		c. High School	_____
		d. University undergraduate	_____
		e. University postgraduate	_____
26.	Who is involved in food preparation in your home? (CHECK ALL THAT APPLY; " b & c are people other than the respondent)	a. You	☐
		b. HH member >55	☐
		c. HH member <= 55	☐
		d. Employee of your HH	☐
27.	In response increasing food prices, is your household….	a. Not changing in any way how you purchase food? [Go to Q28 if yes/check]	☐
		b. Purchasing less expensive food sometimes or often?	ST ☐ Often ☐
		d. Buying less food than before?	☐
28.	Do you have a job outside of the home? Is it part or full time? (CHECK 1 BOX ONLY)	a. No job	☐
		b. Part Time	☐
		c. Full Time	☐
29.	Do you think it is more dangerous to: (a) touch a live bird that has avian flu or (b) eat cooked meat from a bird that has avian flu? (CHECK EITHER A OR B)		a. ☐ b. ☐
30.	Do you think it is more risky to: (a) eat cooked poultry organs or (b) eat raw poultry blood? (CHECK EITHER A OR B)		a. ☐ b. ☐

31.	Do you remember ever seeing or hearing information about how to protect yourself from Avian flu from the following sources? Was it since the beginning of the lunar year or Tet? (**check only 1 box per row)**		Never	Before Tet	After Tet
		a. Newspaper	☐	☐	☐
		b. TV	☐	☐	☐
		c. Posters	☐	☐	☐
		d. Radio	☐	☐	☐
		e. Public Loudspeaker	☐	☐	☐

32.	Has someone from your family eaten raw chicken or duck blood since the beginning of the year? (0=no, 1=yes)	_____
33.	Do you currently slaughter poultry in your home? If yes, do you usually wear gloves when you slaughter the poultry?	Do **NOT** slaughter at home ☐ Slaughter at home but no gloves ☐ Slaughter at home & wear gloves ☐
34.	Do you usually wash your hands after touching or handling live poultry? (0=no, 1=yes)	_____
35.	Does your family own a car? How many?	_____
36.	Would you pay extra for a shirt or pants if it is a brand at the level of Vietnamese brands such as An Phuc or May 10 or Viet Tien, as compared to a similar shirt or pants without a brand? (0=no, 1=yes)	_____
37.	How important is brand when you make purchasing decisions for the following items? Please use a scale of 1 to 10, with 1= not important at all, 10= very important	a. Clothing _____ b. Vegetables _____ c. Cosmetics/Toiletries _____ d. Alcohol _____ e. Electrical appliances other than radio or TV _____
38.	As a gift for your participation in our study, you can choose between 2 gifts. They are both discounts that can be used at _____ Market. Your first gift choice is an _____ VND discount for a whole chicken of "ga que" or "tagged chicken" and the 2nd is a _____ VND discount for a whole chicken of type _____**.** This discount can only be used for a whole chicken only, not other cuts and or ½ chicken. This coupon expires 1 week from now. For this market, the average	a. "Ga Que" ☐

			b. Other Chicken ☐
39.	For the gift that you didn't choose, how much higher would the discount have had to be for you to pick it instead? [*answer the absolute level of discount that they would have required, not the extra or the difference, if "only for free" write the reference price from the previous question]*		_____
40.	Is _____ Market a market that you regularly buy food at? (0=no, 1=yes) (IF THEY ANSWER YES TO THIS, YOU WILL NEED TO FIND OUT IF A CERTAIN VENDOR IS THEIR REGULAR SELLER WHEN YOU GIVE THE COUPON AND MAKE SURE THE COUPON IS FOR THIS SELLER INSTEAD OF THE ONE THAT HAS BEEN ASSIGNED TO THEM)		_____
41.	Had you ever heard of "Ga Que" before this survey? (0=no, 1=yes) (*if they answer no finish the survey)*		_____
42.	Have you ever bought "ga que"? If yes, what price did you pay? (leave blank if they never bought it) **(1) IF NO & Q40=yes – go to Q45. (2) IF NO & Q40 = no finish survey. (3) IF YES go to Q43**		_____
43.	How did the following factors influence your decision to buy "ga que" on a scale of 1 to 10, with 1 = not important at all and 10 = extremely important,	a. Curious/wanted to try	_____
		b. I thought it was safer	_____
		c. I thought it was tastier	_____
		d. The seller provided very good information	_____
		e. The advertisements and stall decorations were impressive or convincing	_____
44.	If the type of ga que you bought was crossbred (not local or "red"), was the taste of Ga Que (1) worse, (2) the same, or (3) better than regular crossbred chicken? (*answer 1 2 or 3)* [**END SURVEY]**		_____
45.	Why did you not buy Ga Que? (read all choice and check the ones that apply)	a. Didn't want to buy chicken	☐
		b. It was too expensive	☐
		c. I did not believe it was safe	☐
		d. I did not believe it was tasty	☐
		e. I usually don't buy crossbred chicken	☐

Respondent's Age _____ Respondent's Gender: Male ☐ Female ☐

Is the household: Very poor ☐ somewhat poor ☐ Middle class/Average ☐ Somewhat rich ☐ Very rich

Appendix C: Vendor Selling Prices

Description	Hang Da Market			
	Non-Project Chicken		Project Chicken	
	Mean	N	Mean	N
Local	95	1044	-	-
Red	73	302	80	552
Crossbred	-	-	77	126
Ta Lai	81	54	85	9
Tha Vuon	-	-	80	46
Industrial	47	679	-	-
Description	**Thang Cong B Market**			
	Non-Project Chicken		Project Chicken	
	Mean	Mean	Mean	Mean
Local	97	1070	92	257
Red	100	188	-	-
Crossbred	77	920	79	493
Ta Lai	68	72	68	238
Tha Vuon	66	156	69	357
Industrial	67	18	69	50
Tam Hoang	58	885	57	164
Industrial	43	307	-	-
Description	**Ngoc Ha Market**			
	Non-Project Chicken		Project Chicken	
	Mean	Mean	Mean	Mean
Local	95	359	96	347
Ri	75	140	74	8
Mia	75	37	-	-
Red	77	46	80	112
Crossbred	-	-	80	22
Ta Lai	77	24	-	-
Tam Hoang	40	22	-	-
Industrial	39	359	-	-