



VIETNAM FOOD SAFETY RISKS MANAGEMENT

Challenges and Opportunities





Vietnam Food Safety Risks Management Challenges and Opportunities

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Contents

List of figures	8
List of tables	9
Acknowledgements	11
Acronyms and abbreviations	12
Executive summary	15
1. Introduction	19
1.1. Context	19
1.2. Objectives	19
1.3. Methods	19
1.3.1. Round-table discussion and consultation workshop	20
1.3.2. Technical missions	20
1.3.3. Food Safety Working Group (FSWG)	20
1.3.4. Literature review, data analysis and synthesis	20
1.4. Scope of the study	21
1.5. Reading guide	21
2. Institutional setup and capacity for food safety management	23
2.1. Legal framework	23
2.2. Institutional framework	24
2.2.1. Responsibilities between national and provincial levels	25
2.2.2. Coordination	26
2.2.3. National Strategy for Food Safety for 2011 to 2020 and a vision towards 2030	27
2.3. Standards and technical regulations	27
2.4. Inspection, enforcement, surveillance and control	28
2.4.1. Inspection and enforcement	28
2.4.2. Surveillance	29
2.4.3. Import controls	31
2.4.4. Export controls	31
2.4.5. Human resource capacities and challenges	32
2.5. Food safety laboratories	34
2.6. Accreditation of conformity assessment bodies	35
2.7. Food safety training programs at academic level	36
2.8. Key messages from this section	36

3. Key pork and vegetable value chains in Ha Noi and Ho Chi Minh City	39
3.1. Rationale for value chain selection	39
3.2. Pork value chain in Ha Noi and Ho Chi Minh City	39
3.2.1. Consumption	40
3.2.2. Production	40
3.2.3. Pig processing system	40
3.2.4. Distribution system	41
3.2.5. Food safety risks	42
3.3. Vegetable value chain in Ha Noi and Ho Chi Minh City	43
3.3.1. Consumption	43
3.3.2. Production	43
3.3.3. Distribution	44
3.3.4. Food safety risks	44
3.4. Some implications for the value chains in the case of Ha Noi	45
3.4.1. Responsibilities of different ministries and departments	45
3.4.2. Laws and regulations	45
3.4.3. Surveillance, inspection and preventive approaches	46
3.4.4. Available data	46
3.4.5. Food safety laboratories	46
3.4.6. Training	46
3.5. Food safety production models	46
3.6. Key messages from this section	47
4. Food safety hazards, risk and health impact	49
4.1. Risk-based approach: hazards and risks	49
4.2. Food safety hazards	49
4.2.1. Biological hazards	50
4.2.2. Chemical hazards	51
4.2.3. Physical hazards	55
4.3. Foodborne disease outbreaks	55
4.3.1. Overview of available information	55
4.3.2. Commodities, affected groups, time and locations	57
4.4. Food safety risks and health impact	59
4.4.1. WHO 2015 report and other sources on foodborne disease burden	59
4.4.2. Current knowledge on health impact of foodborne diseases in Vietnam	59
4.4.3. Gaps: Contamination data versus health risks	62
4.5. Key messages from this section	62

5. Food safety risk communication and management: Challenges, confidence, trust and priorities	63
5.1. Current risk communication challenges: Lack of confidence and trust of consumers	63
5.2. The phenomenon of food scares	63
5.3. Economic impact of food scares	64
5.4. Strategic response	64
5.5. Techniques of risk communication	65
5.6. Communications strategy	65
5.7. Challenges within government	66
5.8. Key messages from this section	66
6. Food safety impacts on trade	69
6.1 Current trade situation and long-term trends	69
6.2. Food safety and trade issues	69
6.3. Major food exports	69
6.4. Safety of exported food	69
6.4.1. Major food safety hazards in food exported from Vietnam	71
6.4.2. Trends in food safety performance	71
6.4.3. Divergence between export and domestic food safety	73
6.5. Major food imports	74
6.6. Safety of imported food	74
6.7. Membership in trade agreements	75
6.8. Key messages from this section	76
7. Recommendations	77
8. References	84
9. Annexes	89

List of figures

Figure 1: Hierarchy of laws in Vietnam presented for the Food Safety Law	23
Figure 2: Distribution of responsibilities related to food safety.....	24
Figure 3: The structure of food safety management from central to local level.	26
Figure 4: Food safety laboratory structure in Vietnam.....	34
Figure 5: Ministry of Health food safety laboratory system.....	35
Figure 6: Pork value chain supplying Ha Noi and Ho Chi Minh City.....	39
Figure 7: Vegetable value chain supplying Ha Noi and Ho Chi Minh City.....	43
Figure 8: Potential chemical hazards from farm to fork.	52
Figure 9: Shigellosis distribution in eight regions in Vietnam every five-year period from 1999 to 2013.....	60
Figure 10: Number of food safety alerts for food exported from Vietnam to the European Union (2005-15)....	72
Figure 11: Food safety violations for food exported from Vietnam to Japan.....	72

List of tables

Table 1: Non-compliant food products detected during an import inspection, 2014.....	31
Table 2: Human resources of the Crop Food Safety Management System in MARD and provinces.....	33
Table 3: Summary of food sources of major microbial hazards and health effects (in order of the magnitude of health burden in the WHO Western Pacific region B (which contains Vietnam)).	51
Table 4: Origins of selected chemical food hazards in vegetables	53
Table 5: Numbers of food poisoning outbreaks, cases and deaths in Vietnam, 2006 to 2013	55
Table 6: Numbers of food poisoning outbreaks, cases, hospitalizations and deaths in Vietnam in 2014 and 2015.....	56
Table 7: Numbers of foodborne disease outbreaks in Vietnam from 2010 to 2015, by cause of outbreak	56
Table 8: Numbers of foodborne disease outbreaks in Vietnam in 2014 and 2015, by geographical area.....	57
Table 9: Numbers of foodborne disease outbreaks in Vietnam from 2012 to 2015, by location.....	57
Table 10: Numbers of foodborne disease outbreaks in Vietnam from 2012 to 2015, by food type	58
Table 11: Numbers of deaths due to foodborne disease outbreaks in Vietnam, by cause of death	58
Table 12: Value of major food exports from Vietnam to the European Union and number of food safety notifications (2005-15).....	70
Table 13: Number of shipments from Vietnam to Japan inspected and in violation.....	70
Table 14: Hazards found in food exported from Vietnam to the European Union (2005-15).....	71

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Acronyms and abbreviations

ADB	Asian Development Bank
AEC	ASEAN Economic Community
AIDS	Acquired Immunodeficiency Syndrome
ASF	Animal-source food
AOSC	Accreditation Office for Standards Conformity Assessment Capacity
AOSC	Accreditation Office for Standards Conformity Assessment Capacity
APLAC	Asia-Pacific Laboratory Accreditation Co-operation
ASEAN	Association of Southeast Asian Nations
BoA	Bureau of Accreditation
BSE	Bovine Spongiform Encephalopathy
BVL	Bundesamt für Verbraucherschutz und Lebensmittelsicherheit
CFSMS	Crop Food Safety Management System
CFU	Colony-forming units
CI	Confidence interval
DAH	Department of Animal Health
DALYs	Disability Adjusted Life Years
DARD	Department of Agriculture and Rural Development
DCP	Department of Crop Production
EFET	Hellenic Food Authority
EFSA	European Food Safety Authority
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FERG	Foodborne Disease Burden Epidemiology Reference Group
FSWG	Food Safety Working Group
GAP	Good Agricultural Practices
GARP	Global Antibiotic Resistance Partnership
GMP	Good Manufacturing Practices
HACCP	Hazard Analysis and Critical Control Point
HIV	Human Immunodeficiency Virus
HPAI	Highly pathogenic avian influenza
IAF	International Accreditation Forum
IAFP	International Association for Food Protection
IFC	International Finance Corporation
ILAC	International Laboratory Accreditation Co-operation
ILRI	International Livestock Research Institute
IPH	Institute of Public Health

Acronyms and abbreviations

ISO	International Organization for Standardization
JICA	Japan International Co-operation Agency
LIFSAP	Livestock Competitiveness and Food Safety Project
MARD	Ministry of Agriculture and Rural Development
MOH	Ministry of Health
MOHLW	Ministry of Health, Labour and Welfare
MOIT	Ministry of Industry and Trade
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry of Science and Technology
MRLs	Maximum Residue Limits
NAFIQAD	National Agroforestry Fisheries Quality Assurance Department
NIFC	National Institute for Food Control
NFSL	National Food Safety Laboratory
OECD	Organisation for Economic Co-operation and Development
OR	Odds ratio
PAC	Pacific Accreditation Co-operation
PGS	Participatory Guarantee System
ppb	parts per billion
ppm	parts per million
QMRA	Quantitative Microbial Risk Assessment
QSEAP	Quality and Safety Enhancement of Agricultural Products project
QUATEST	Quality Assurance and Testing Centre
RAHO	Regional Animal Health Office
RASFF	Rapid Alert System for Food and Feed
STAMEQ	Directorate for Standards and Quality
SPS	Sanitary and Phytosanitary
TEQ	Toxic Equivalent
TPP	Trans-Pacific Partnership
USD	United States dollar(s)
VEPR	Vietnam Institute for Economic and Policy Research
VFA	Vietnam Food Administration
VietGAP	Vietnamese Good Agricultural Practices
VNCC	Vietnam National Codex Committee
WHO	World Health Organization
WTO	World Trade Organization

Executive summary

In Vietnam, food safety is of great and increasing importance to consumers and policymakers alike. The Government of Vietnam requested the World Bank and other development partners for assistance in assessing food safety risks and in providing policy recommendations on how to improve food safety risk management. To this end, a series of activities, including a literature review, field visits, round-table discussions and interviews with experts and consultations were held between January and July 2016. While food safety was broadly addressed, the emphasis of this review was on domestic urban markets with a special focus on pork and leafy vegetable value chains supplying Ha Noi and Ho Chi Minh City. This report presents the key findings to help identify priorities and practical solutions to address food safety.

Media reports, scientific literature, official communications and consumer complaints demonstrate that food safety is perceived as a major problem by consumers, industry and the government in Vietnam and there is emerging evidence that a relatively large share of food in Vietnam may be considered unsafe according to widely accepted food safety norms and standards. Most recently, a representative survey found that food safety was one of the two most pressing issues for people in Vietnam, more important than education, health care or governance. Food safety issues are the result of both widespread soil and water pollution—the legacy of industrial development of past decades—and poor practices by agricultural producers, food business operators and consumers. Such food safety issues could cost the country millions of dollars every year from treatment of illnesses alone. From the public health perspective, the main problems are biological followed by chemical hazards, from an economic perspective food scares and safety of exported products are important while from the consumer perspective chemical hazards in food are of most concern. Exported food appears to be much safer than food in domestic markets based on more rigid control systems implemented, demonstrating that food safety can be achieved in Vietnam as well as indicating duality in the food safety governance system: the effective system directed to ensuring exports meet international standards and the less effective and more convoluted system for domestic purposes. There have been several important initiatives for improving food safety, but further efforts are needed to develop effective, scalable and sustainable solutions.

The study focuses on two important and high-risk value chains (fresh pork and leafy vegetables) in order to concretely explore the food safety risks and identify solutions. Small-scale farmers produce most food (80%)

consumed in Vietnam, but intensification is increasing especially in the poultry and pork sectors. Most food (90%) is sold in traditional, informal markets but purchases in supermarkets are increasing. Still, consumers have a strong preference for fresh animal-source food (ASF). The fresh pork value chain is important in terms of diets and food safety risk. In Ha Noi, smallholder producers and informal slaughter and sale predominate while in Ho Chi Minh City, large-scale actors are more important. Most leafy vegetables are produced by smallholders and sold in traditional markets.

Many approaches have been tried for improving the safety of fresh food in Vietnam but there are still challenges in demonstrating improvements in food safety, or sustainability and scalability. Initiatives include modern food safety legislation; vertical integration of supply chains; support to modern retail and linking farmers to firms that impose private standards; co-operatives to overcome scale and marketing challenges; compliance with Vietnamese Good Agricultural Practices (VietGAP) assured by third-party certification; basic Good Agricultural Practices (GAP) which has simplified requirements; community-based certification whereby most monitoring, inspection and certification is done by communities; and Safe Agricultural Zones which concentrate production in certain areas. However, after more than 10 years of major efforts and investment by state authorities and market actors, the safe production and distribution systems have not been able to take a significant share of the market (current share is less than 10%), or to consistently show products are safer, or gain widespread consumer trust. Nonetheless, the demonstrated successes at smaller scale indicate promising approaches.

Vietnam has a modern food safety legislation system, but further improvements are needed in food safety performance. Three ministries have primary responsibility for food safety: the Ministry of Agriculture and Rural Development (MARD), the Ministry of Health (MOH) and the Ministry of Industry and Trade (MOIT). In addition, the Ministry of Science and Technology (MOST) is responsible for the development of standards, laboratory accreditation and the methods for quality control of imported and exported goods. MOH has overall responsibility, but not authority, to direct other ministries. Moreover, many food safety activities and resources are decentralized to provincial and lower levels. A modern and World Trade Organization-compliant food safety legislative framework is in place with a national strategy, laws, regulations and standards. However, as in many developing countries, there are major gaps between regulation and implementation. There is no comprehensive,

systematic reporting for food safety performance or routine surveillance and current efforts in surveillance of foodborne disease are fragmented and weakly coordinated. The current surveillance system is mainly indicator-based or event-based. Safety of food exports has been relatively well supported but there is less information on imports. There are several government, academic and private laboratories; technical capacities range from fair to good. Most of them are accredited; however, information on performance is limited as is participation in proficiency testing programs. Several hundred thousand samples are analysed each year but there is no systematic information on the results, reliability of tests or representativeness of sampling. There is good capacity for microbiology and chemical analysis. Capacity for risk assessment and risk communication is limited. Vietnam probably has around 5,000 food inspectors. It lacks a comprehensive, national food safety surveillance system. There is little information on outbreak response capacity.

Many biological, chemical and physical hazards have been found in food in Vietnam and biological hazards are the most important in terms of their known human health impacts. Based on available national and regional data, biological hazards are probably the most important cause of foodborne disease. The use of animal and human waste in cultivation is a risk factor for important biological hazards. The habit of consuming raw and lightly cooked vegetables and, among some groups, of consuming raw pork or fish and blood also leads to risks. Use of agricultural inputs, including pesticides and antimicrobials, is high in Vietnam, increasing the risk of residues in food. Illegal growth promoters appear to be commonly used as large amounts are imported, there is no legitimate use in food-producing animals and legitimate medical use is very low. Heavy metals are problematic in some areas, as are dioxins. While chemical hazards are common, the immediate disease burden from biological hazards should be prioritized. There were 373 outbreaks of foodborne diseases reported in 2014 and 2015 involving over 10,000 cases and resulting in 66 deaths. Evidence from similar countries suggests this greatly under-estimates cases in the community as only a small proportion of foodborne disease is ever recorded as outbreaks. Most of the reported incidences were caused by pathogens (41%), followed by biological toxins (28%) and chemicals (4%), with 34% occurring in the northern mountainous area alone.

Vietnam is one of the world's top exporters of seafood, rice, cashew nuts, coffee and pepper. However, trade is likely to increasingly compete on quality and safety, areas that Vietnam needs to strengthen. Inspections by importing countries suggest that most safety violations are in fish followed by fruit and vegetables. Most are the result of detection of biological hazards, followed by residues of agricultural inputs (antibiotics, pesticides and fungicides).

Despite a strongly rising trend in exports, notifications have remained relatively stable over the last 11 years indicating that food safety performance for exported foods is improving. Legal food imports are much lower in quantity and value than food exports. Beef, dairy products and temperate fruits are mainly imported from countries with high export standards and not likely to be of high risk. However, there are probably large amounts of illegal imports from China and the safety of these is difficult to determine. The high levels of imports of agricultural inputs also have implications for food safety.

Based on the experience of other countries, adopting risk-based approaches and building capacity is key to assessing, managing and communicating risk. Several developed countries have had successes with whole value chain approaches, industry-led programs and controlling key pathogens on the farm rather than downstream. Modern food systems have moved away from the 'command and control' approach to food safety, based on inspection and punishment, which is still dominant in Vietnam. Instead the focus is on co-operative strategies for compliance, prevention of incidents and enforced self-regulation by industry. Training farmers in good agricultural approaches has been quite effective in enabling small-scale producers to export, but experiences for domestic markets have been less encouraging (due to the lack of incentives for behaviour change). Several countries in which informal sector actors currently supply most food have had successes in training these actors, but these approaches are often not sustainable or scalable.

Risk communication is key to managing food scares and building trust in the food system, but, as in many countries, there has been little attention to this in Vietnam. It is important to build capacity in the techniques of risk communication, but also to develop over-arching strategies for dealing with food safety scares as these are likely to continue. There are also many misperceptions about food safety, not only among the public but also among academics and the government, and a concerted attempt should be made to address these through evidence generation and engaging communication.

The study made a series of recommendations, but given the failure in most developing countries to develop effective, sustainable and scalable models of improving food safety in domestic markets, these are strategic directions ('directions of travel') rather than firm recommendations for actions that will deliver solutions. Although in general, Vietnam has a solid food safety framework, the division of responsibilities across three ministries and the decentralization create challenges for implementation. Revising the food safety structure should be considered and a proposed pilot in Ho Chi Minh City would help in seeing its workability in the Vietnamese context. Risk assessment and risk communication are weak and capacity should be built in these domains and

dedicated units established. Risk assessment should be separate from risk management and will generate risk profiles and assessments, which, in conjunction with economic analysis, will allow risks to be prioritized. A systematic, comprehensive surveillance system is needed for foodborne diseases. The inspection and monitoring system should be risk-based but there should also be a move from an ‘inspect and punish’ to a ‘co-operative self-regulation’ model. Laboratory services can be strengthened through networking and proficiency testing. Training and capacity building are important, but behaviour will not change unless there is a change in the current incentive structure. Many initiatives for food safety management have been taken and many show promise, but continued development is needed for these to gain a significant market share and consumer trust.

1. Introduction

1.1. Context

Food safety is an emerging public health concern worldwide, especially in developing countries, which bear most of the burden of foodborne disease. Vietnam has become a rapidly urbanizing middle-income country. This has led to changes in people's diets, in particular increased demand for animal-source food products. The country's food system is increasingly integrated regionally and internationally. In the region, there are growing concerns about food safety and different forms and origins of food contamination that may manifest anywhere from farm to fork. Unsafe food can place multiple burdens on human health, farmer and enterprise viability, international market access, country reputation and attractiveness for tourism.

In Vietnam, food safety is of great concern to both consumers and policymakers and frequently appears in the media (Mai 2013; VietNamNet Bridge 2015; VietNamNet Bridge 2016) and in policy discussions (Hung Nguyen-Viet 2015; World Bank Vietnam 2016). This is the result of repeated episodes of adulterated and unsafe food. These include the following: frequent reports that toxic pesticide residues in vegetables, antibiotics and banned veterinary residues are often found in meat or suspected to be present¹; urea is used for fish conservation; spoiled animal-source food is salvaged and consumed and high levels of microbial contamination in meat are routinely reported. Food safety issues get a high level of attention when famous people die of cancer at a young age; the media asks: "Is there something wrong with our food"? The country's top leaders, too, have discussed food safety issues at meetings of the National Assembly. On 1 April 2016, the national television broadcaster launched an official program titled Say No to Contaminated Foods, which has been broadcasting daily on two golden time episodes at 0730 hours and 2030 hours on VTV1, VTV8 and VTV9 from Monday to Friday (Nguyen-Viet et al. 2017). An overview of key issues on food safety in Vietnam is presented in Annex 1.

The World Bank has been working with other development partners and various ministries and government agencies to scale up support for the food safety agenda. The Food Safety Working Group (FSWG) is an initiative to bring together key government agencies, line ministries and development partners for joint policy dialogue and discussions on food safety issues in Vietnam. It was created at the request of Deputy Prime Minister Vu Duc Dam and convened under his auspices at a meeting in June 2015. The group benefits from the active participation of the Office of Government (the designated focal point of coordination), Ministry of Health

(MOH), Ministry of Agriculture and Rural Development (MARD), Ministry of Industry and Trade (MOIT) as well as the Food and Agriculture Organization of the United Nations (FAO) (designated focal point among development partners), Asian Development Bank (ADB), Canadian High Commission, the Japanese International Co-operation Agency (JICA), New Zealand Embassy, Danish Embassy, Australian High Commission, the Food, Agri and Aqua Business Sector Committee of the European Chamber of Commerce, World Health Organization (WHO) and the World Bank. The government made a priority request for an urgent assessment of prevailing food safety risks in Vietnam, based on international best practice in risk assessment methodology. This report presents an analysis of the key issues of food safety in Vietnam with a focus on two main commodities—pork and leafy vegetables—to identify priorities and practical solutions to address food safety.

1.2. Objectives

The objectives of this food safety risk management study were to (i) take stock of the food safety situation and food safety control systems in Vietnam, (ii) analyse the food safety risks for selected key food value chains based on international best practice in risk assessment methodology and, based on these findings, (iii) provide recommendations to improve food safety.

1.3. Methods

A combined approach to collect and analyse data was used for this report. First, a round-table discussion on food safety in Vietnam was organized. This entailed consultation with leading food safety experts, practitioners, researchers, officials and businesspeople about their ongoing, past and future activities relating to food safety. It also entailed reviewing databases, policies, publications and reports that describe the status of food safety systems in Vietnam. A series of visits were made to government and private-sector institutions as well as to actors involved in food safety to discuss key issues on the subject. Finally, a consultation workshop was organized to present the technical report and collect feedback from key partners. The final report was summarized into a policy note that serves as key findings and recommendations to the Government of Vietnam and other food safety stakeholders. The International Livestock Research Institute (ILRI) and the Taskforce for Food Safety Risk Assessment were commissioned to work with partners to conduct part of

¹ Nine tons of salbutamol were legally imported for medical purpose in 2015 but only 10 kg was actually needed for human use; it is likely the rest was used for livestock growth promotion.

the above-mentioned activities of the assignment. This report also built on past work by the World Bank on the Vietnam Food Safety and Agricultural Health Action Plan (World Bank 2006) and on the Review of Food Safety and Quality Control under MARD carried out by FAO (October 2015).

1.3.1. Round-table discussion and consultation workshop

The initial round-table discussion was held on 7–8 January 2016 in Ha Noi. The aims of this meeting were to (i) provide the World Bank technical assistance mission with an overall picture of the food safety situation in Vietnam, (ii) take stock of food safety risks for selected key food value chains and (iii) brainstorm priorities and potential solutions to address key food safety risks. Sixty-six participants across various sectors, institutions, businesses and organizations attended the two-day meeting and related sessions. The round-table discussion had 22 presentations in four sessions:

- Food safety: Contamination situation and health impact
- Food safety: Value chains and economic impact
- Technical and institutional solutions for food safety
- Food safety risk management: Looking forward

In addition, there were four specific panel discussions to address key issues related to food safety, identify the key commodities and geographical locations and map the way forward following the in-depth study. A summary of the round-table discussion and abstracts presented are in Annex 2.

A consultation workshop was organised on 27 July 2016 to present the draft study report and policy note and collect comments from food safety stakeholders to improve both documents. The draft documents were shared with participants prior to the workshop. At the workshop, key highlights of the study were presented to allow the 52 participants to give their inputs. Questions and comments from the workshop were addressed in the final report.

1.3.2. Technical missions

Two technical missions were conducted, led by the World Bank and involving several partners including ILRI, ADB, FAO, Canadian High Commission, New Zealand Embassy, Embassy of France, Australian High Commission, the World Health Organization (WHO) and Centre de Coopération Internationale en Recherche Agronomique pour le Développement. The expert groups conducted a series of visits to government and private-sector institutions as well as actors involved in food safety in Vietnam to discuss key issues on food safety. The list of partners met is in Annex 3.

1.3.3. Food Safety Working Group (FSWG)

The FSWG was established in late 2015 as the result of interactions between development partners (mainly development banks and research institutions including the World Bank, Canadian High Commission, Embassy of New Zealand, FAO, WHO, JICA, ADB and ILRI), private-sector organizations and the Government of Vietnam (Office of Government, MOH, MARD and MOIT), with the government represented by Deputy Prime Minister Vu Duc Dam. The overall goal of the FSWG is to contribute to improved food safety in Vietnam and increased competitiveness of Vietnamese food products for domestic consumption and international trade. The meetings of the FSWG take place every two months and discuss food safety issues. The food safety risk management study has been discussed by the FSWG which has also contributed to the study.

1.3.4. Literature review, data analysis and synthesis

Information on food safety was obtained by searching databases such as ScienceDirect and Web of Science and from local sources in journals, newspapers and reports from governmental organizations (MOH and MARD). The information was then analysed and synthesized in terms of key issues for food safety and recommendations.

An important framework within which this analysis has been conducted is the toolkit that the WBG's Trade & Competitiveness Practice has published on Food Safety Reform in 2014² (see Annex 18). Through its eight Fundamental Pillars, the toolkit serves as a comprehensive checklist of where to get started and how to prioritize when undertaking Food Safety reform process. It also contains lots of helpful case studies from other countries. It is referred to as "the WBG toolkit" all along this report and the eight pillars are the following: (i) Food safety should be secured along the entire food chain (plough to plate, farm to fork, stable to table), (ii) Regulation by itself cannot ensure food safety, (iii) In a food safety system, primary responsibility (and liability) for the safety of food rests on food business operators, (iv) The role of consumers is also strongly emphasized, as they form the most potent force to drive food safety improvements: market power, (v) A preventative and risk-based approach should be the basis for regulatory reform, decision making, control, and self-control of food safety, (vi) International standards and scientific justification should form the basis of regulatory documents and measures, (vii) The impact of food safety reform on trade should be carefully considered, and (viii) Food safety regulation will always involve multiple players; co-ordination and collaboration are vital.

² <http://documents.worldbank.org/curated/en/995191474485316487/pdf/911840WP0Box380od0Safety0Toolkit0IC.pdf>

1.4. Scope of the study

Given the relatively short timeframe and limited resources, it was important to define properly the scope of the study. The mission and the Government of Vietnam agreed to focus on two major value chains: pork and leafy vegetables. Annual pork consumption in Vietnam is 2.45 million metric tons (or 27 kg per person per year), making Vietnam one of the top countries in the world for pork consumption per capita. Most pork is produced nationally and 83% comes from very small or small farms. Food safety is an issue along the value chain from production (including feed and veterinary drug inputs) to consumption and there are both microbiological and chemical risks, making it an interesting model to explore risk-based approaches to food safety. Leafy vegetables are also an important part of the daily diet of Vietnamese people. The main issue of public concern in this value chain appears to be pesticide residues, although production and consumption practices may result in a high risk of microbiological pathogens. In terms of geographical focus, this report focused on Ha Noi and Ho Chi Minh City, the two biggest cities of Vietnam, and targeted domestic food markets.

With the recent expansion of Ha Noi City limits, it has now become both a major consumer (7 to 8 million people) and a major producer (Ha Noi produces around 60–70% of its food demand). With similar size as Ha Noi, Ho Chi Minh City is able to supply only 20% of its food demand, with the remaining food being ‘imported’ from other provinces. Nevertheless, the city has more than 600 Department of Agriculture and Rural Development (DARD) inspectors. Like Ha Noi, Ho Chi Minh City wants to control food supply through gate markets and phase out small-scale slaughterhouses. Currently and as observed during the mission in 2015, the city has three ‘suitable’ gate markets for meat (one public and two private). The management model remains the same whether public or private; the owner offers a lease for several years (up to 10 years) for counters to wholesalers (26 in the visited market in February 2015) who receive pig carcasses from identified slaughterhouses and re-sell them to smaller retailers. The visited market could at that time process up to 4,500 carcasses per night.

1.5. Reading guide

This report has been structured in several sections. Each section presents the status and analysis of the respective aspect of food safety and ends with key messages of the section captured in a box. In addition, further information is provided in the set of annexes at the end of the report. At the end, recommendations are provided for food safety improvement. The report consists of nine sections as described below:

1. The **introduction** provides the context, rationale, objectives, method and scope of the study.
2. The section on **Institutional setup and capacity for food safety management** provides key information on the arrangement of the food safety management system and capacities to address food safety.
3. The section on **Key pork and vegetable value chains in Ha Noi and Ho Chi Minh City** presents the value chains of two key commodities, namely, pork and leafy vegetables in Vietnam’s two main cities: Ha Noi and Ho Chi Minh City.
4. The section on **Food safety hazards, risk and health impact** presents the concept of hazards and risks and analyses the key hazards, risks and health impact from food in Vietnam.
5. The section on **Food safety risk communication and management – Challenges, confidence, trust and priorities** addresses aspects related to risk communication, mainly from a conceptual point of view, but adds some practical aspects and details of recent events on food safety communication in Vietnam.
6. The section on **Food safety impacts on trade** analyses the trend of food trade and major food safety issues of food import, export and economy.
7. The **recommendations** highlight a series of possible reforms and capacity strengthening directions and areas of emphasis for food safety improvement in the short, medium and long terms.
8. **References** are then cited.
9. **Annexes** provide additional background or more specific information on various parts of the report. This also includes an overview on food safety in Vietnam (Annex 1) and a more detailed value chain analysis for pork and vegetables (Annex 17).

2. Institutional setup and capacity for food safety management

2.1. Legal framework

The Food Safety Law (2010) was promulgated on 17 June 2010 by the National Assembly of Vietnam with the aim of addressing the country’s growing concern on food safety risks and problems that impact on trade and human health. This law is a modern framework that aligns with international standards and approaches to food safety management. It assigns food safety responsibilities to three ministries: MARD, MOH and MOIT. Each ministry is assigned control of specific products across the entire chain, that is, from primary production, preparation, processing, storage and import-export to wholesale and retail distribution of these products. MOH, through the Vietnam Food Administration (VFA), has over-arching responsibility for food safety in Vietnam in addition to its other specific roles. Details of the roles and responsibilities are given in Section 2.2.

The food safety regulatory framework in Vietnam is the product of a complex multi-level legislative process. The Food Safety Law took effect in July 2011 and subordinate decrees were promulgated by the government to provide details on how the law is to be implemented. Further elaboration on implementation, including how tasks are to be delineated and distributed across national agencies and decentralized to the local level, was issued in the form of ministerial and/or inter-ministerial circulars and decisions. Figure 1 shows the theoretical hierarchy of laws.

The law states that food safety management must be conducted throughout the course of food production and trading on the basis of food safety risk analysis, thus covering the entire

food chain ‘from farm to fork’, in line with the WBG toolkit Pillar 1. It sets out requirements for the national management of food safety in Vietnam and covers:

- rights and obligations of organizations and individuals in ensuring food safety
- conditions for ensuring safety of food in production, processing and trading
- conditions for ensuring safety of imported and exported food
- requirements for advertisement and labelling of food
- requirements for testing of food and analysis of food safety risks
- prevention and management of food safety incidents
- information, education and communication on food safety
- state management responsibilities

As new problems arise, subordinate decrees/decisions and circulars are developed, resulting in many instruments that become difficult to comprehend. The matrix of laws, decrees, circulars and decisions related to food safety are listed in Annex 4. Many food safety authorities in other countries prefer to focus on general principles and processes rather than specific situation-dependent rules. Risk analysis provides a general framework for managing food safety and is preferable to the more prescriptive approach currently applied in Vietnam. It allows more focus on results and outcomes, as opposed to processes and outputs.



Figure 1: Hierarchy of laws in Vietnam presented for the Food Safety Law

2.2. Institutional framework

The Food Safety Law of 2010 assigns food safety responsibilities to three ministries: MOH, MARD and MOIT. Each ministry is assigned control of specific products across the entire chain, that is, from primary production, preparation, processing, storage and import-export to wholesale and retail distribution of these products. MOH, through VFA, has over-arching responsibility for food safety in Vietnam and is responsible for a number of commodities, food ingredients and packaging material. MARD is responsible for food safety in agriculture, agroforestry and aquatic products in the food supply. MOIT is responsible for some commodities and for retail marketing of food, namely, markets and supermarkets. The distribution of responsibilities is illustrated in Figure 2.

MOH has overall responsibility for the safety of food and drug production, food hygiene in the domestic market and unifying food safety policy. MOH through VFA is assigned responsibility for overall coordination in implementing the state management activities and is tasked with ensuring unified and effective food safety management which includes organizing the implementation of national strategies and the master plan on food safety. Its role includes providing information about the safety of food in the country.

More specifically, MOH is responsible for safety of food additives, food processing aids, bottled drinking water, natural mineral water, functional food and other foods. MOH is directly responsible for ensuring food safety in restaurants, canteens and other food services. In addition to its leading and coordinating role within MOH, VFA now has direct responsibility for monitoring food safety in the country, hygiene and safety regulations, standards, hygiene guidelines and labelling.

Although MOH is responsible for overall food safety, it does not have authority to direct the management of other ministries and departments involved in food safety management. This leads to more or less independent activities on food safety control by each ministry and, therefore, no comprehensive food control management system in the country. The role of MOH in this regard becomes one of coordinating and collating different reports. In many developing countries, multiple agencies are in charge of assuring food safety with overlapping (and sometimes conflicting) mandates and inadequate resources. There has been interest in re-structuring food safety governance. A single unified structure or an integrated system is likely to be more effective, but when it is not possible because of historical or political reasons, a national food control strategy can identify roles of the different government divisions involved in food safety (FAO and WHO 2003).

Primary production	Preparation, storage, processing, import-export	Distribution	
Primary production (crop, livestock, harvest, catching, capture)	Cereals	Wholesalers	Retail (markets, supermarkets and food shops) staurants, food courts and food canteens Catering services and street food vendors
	Meat and meat products		
	Fish and fishery products		
	Horticulture and horticultural products		
	Eggs and egg products		
	Raw fresh milk		
	Bee honey and bee honey products		
	Genetically modified food		
	Salt		
	Other agricultural products (sugar, tea, coffee and cacao)		
	Liquor, beer and beverages	Wholesalers	
	Processed milk		
	Vegetable oil		
	Flour, starch and processed products (confectionery)		
	Food additives and processing aids		
	Bottled drinking water and natural mineral water		
Functional food and micronutrient-fortified food			

Figure 2: Distribution of responsibilities related to food safety

MOH also has responsibility for setting standards and technical regulations on criteria and safety limits; tools and materials used for packaging and containing food; coordinating periodic reports from ministries, branches and provincial People's Committees on the management of food safety; and coordinating public awareness activities including dealing with food safety emergencies and warnings on any food poisoning incidents. In the management process, if any problem arises that cannot be assigned to a ministry, MOH is responsible for coordinating with MARD and MOIT to develop joint circulars to bring about clarity.

MARD is responsible for safety of cereals, meat and meat products, aquatic animals and products thereof, vegetables, tubers and fruits and products thereof, eggs and products thereof, fresh milk, honey and products thereof, genetically modified food, salt and other farm products under the government's regulations. MARD is also responsible for livestock, fisheries and crop production, livestock inspection and slaughter, post-harvest handling of agricultural products and wholesale wet markets.

Specifically within MARD, Decision No. 670/QD-BNN-TCCB issued on 4 April 2015 assigns the National Agroforestry Fisheries Quality Assurance Department (NAFIQAD) as the contact point in organizing the implementation of legislation on quality and safety of agroforestry and fishery products within MARD's authority. MARD Decision No. 1290/QD-BNN-TCCB issued on 17 April 2015 also assigns seven departments with the monitoring and inspection of agricultural, agroforestry and fishery food products.

MOIT is responsible for safety of liquor, beer, beverages, processed milk, vegetable oil, powder and starch-based processed products and other products under the government's regulations. The ministry is also responsible for the trade aspects of exported products. It has direct responsibility for the safety of some industrial food products. Its legislative role concerns the labelling of goods.

In addition to the above three ministries, **the Ministry of Science and Technology (MOST)** is responsible for laboratory accreditation and the development of standards and methods for quality control of imported and exported goods. The Directorate for Standards and Quality (STAMEQ) is responsible for standardization, metrology and the quality of goods and products. It issues national standards and implements a process of harmonization with international standards. Laboratory accreditation is under the auspices of STAMEQ's Bureau of Accreditation and carried out by the Vietnam Laboratory Accreditation Service.

2.2.1. Responsibilities between national and provincial levels

Food safety management is decentralized between central and local governments at all levels (from provincial governments to district and commune levels of government), especially for

the domestic sector. This is carried out through the People's Committee. The basic role as per the law is to promulgate local technical regulations, develop and organize implementation of regional master plans and take responsibility for food safety controls in respective areas. The framework for such decentralization is not standardized and varies between ministries and even departments under ministries (Annex 5a). As the resources for provincial and lower levels are allocated at the provincial level, the national ministries cannot enforce the norms or procedures. Accountability at provincial and lower levels is largely horizontal and the reporting of departments is to the relevant government level People's Committee. There is, however, also reporting vertically by departments to the responsible ministry but this is neither formalized nor aligned across ministries and departments at national level. The structure of food safety management from central to local levels is shown in Figure 3.

Specifically with regard to MARD, there are seven departments at national level and many of these have sub-departments at local level. In some cases, the sub-departments have been merged at local level as is the case with the Department of Animal Health (DAH) and the Department of Livestock Production, and the Department of Crop Production (DCP) and the Department of Plant Protection (DPP). The decentralization of the food safety responsibilities of MARD is shown in Annex 5b. FAO recently carried out a review of food safety and quality control under MARD and has proposed a re-structure at the national level.

At provincial level, there are 63 provincial-level units (58 provinces and five cities: Ha Noi, Hai Phong, Da Nang, Ho Chi Minh City and Can Tho) under direct authority of the central government. Under Decree No. 79/2008/ND-CP, the government has established a sub-VFA under each Provincial Department of Health with 11 administrative staff; 47 of the provinces have established sub-NAFIQAD with 12–15 administrative staff while the remaining provinces have divisions of quality management with 4–6 staff under DARD responsible for coordinating the management of quality and food safety. All 63 provinces and cities have a sub-DAH and sub-DPP under DARD.

At district level, there are 664 district-level administrative units consisting of rural districts, urban districts and cities under the provincial government. Each district has a district medical centre which could be used for implementation of a national food safety surveillance system. There are approximately 1,949 people involved in managing food safety and quality, that is, three people per district.

At commune level, there are 10,925 commune-level administrative units comprising 9,098 communes, 1,230 precincts and 597 rural towns. Each commune has a Commune Health Station which may be used for implementation of surveillance systems. There are approximately 11,516 people involved in managing food safety and quality with approximately one person per commune, although usually without salary.

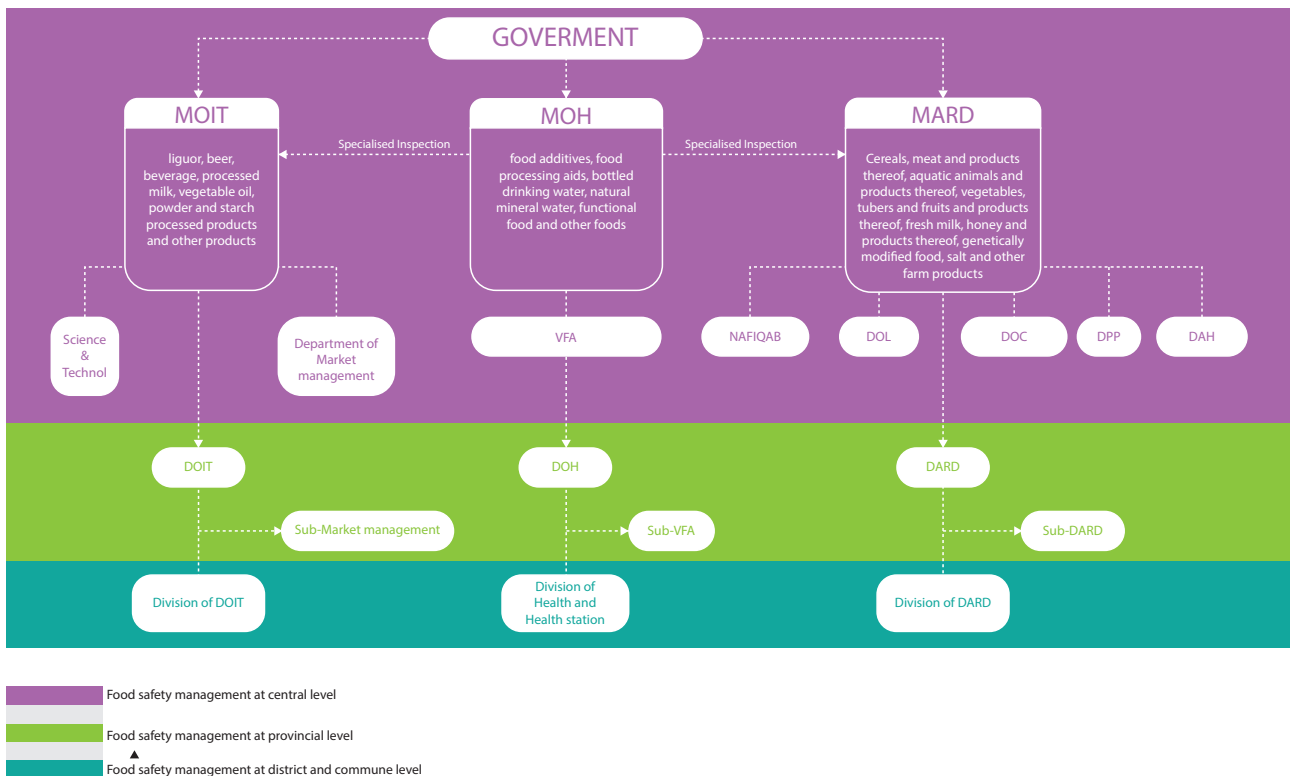


Figure 3: The structure of food safety management from central to local level

2.2.2. Coordination

Coordination of food safety management among the three ministries is done by the Inter-sector Steering Committee for Food Hygiene and Safety (chaired by the Deputy Prime Minister and co-chaired by the Minister of Health). The committee’s office is located at the Office of the Government but supported by VFA, which is also the national contact point for the Codex Alimentarius Commission, the International Food Safety Authorities Network and the Association of Southeast Asian Nations (ASEAN) Rapid Alert System for Food and Feed.

The country also has a National Target Program for Food Safety which has six components: (i) building capacity for food safety quality management; (ii) education and advocacy information for food safety quality management; (iii) building capacity for a food safety quality control system; (iv) prevention of food poisoning and foodborne diseases; (v) assuring food safety and hygienic agriculture, agroforestry and aquaculture and (vi) assuring food safety and hygienic industrial production and trade. The first four components are led by MOH and the fifth and sixth by MARD and MOIT, respectively.

Under the Food Safety Law, MOH has overall responsibility for food safety management in the country. To improve the implementation of the law, it was found necessary to develop regulations on the responsibilities held by ministries and sectors, the required level of co-operation between them and

MOH and the responsibilities of People’s Committees at all levels, thus completing the state food safety management system from the central to the local level. MOH needs to co-operate with other ministries to build and issue food safety management policies and should also implement related strategies and plans to avoid overlaps in legal documents.

The national and provincial inter-sector steering committees on food safety perform very important roles in coordinating the agencies responsible for food safety. The committees provide a forum for linking the three-ministry management of the food system. The primary focus of the national steering committee has been on the mandates of the three ministries, the processes they are following and what, if any, additional legislation is needed to carry out their respective mandates.

Further, communication with stakeholders has been primarily one-way: from the committee to them. There is not much transparency about the committee’s activities and the poor progress that has been made in accomplishing objectives such as those in the National Strategy for Food Safety. Coordination and communication between the national and provincial steering committees is weak and the national and provincial issues are addressed in silos and are not mutually inclusive. The primary means of sharing information between them is through minutes of meetings and other written documents and no physical meetings or close working relationships are evident, which does not help to advance food safety in the country.

To strengthen coordination of food safety management between the three ministries, Joint Circular No. 13/2014/TTL-BYT-BNNPTNT-BCT was issued on 9 April 2014. It deals with the allocation of tasks and co-operation among regulatory agencies in food safety management, co-operation in food safety inspection and validation of knowledge of food safety.

In MOIT, the Department of Science and Technology serves as the contact point and coordinates with other departments within the ministry to develop and issue legal documents on food safety management, particularly certificates of food safety compliance in retail markets, supermarkets and food shops which are under the jurisdiction of MOIT. The MOH-MARD-MOIT Joint Circular No. 34/2014/TTLT-BYT-BNNPTNT-BCT guides the three ministries on the labelling of goods for foods, food additives and packaged food processing aids. However, a key area to be addressed is obtaining certificates of origin of farm produce by MOIT from MARD.

2.2.3. National Strategy for Food Safety for 2011 to 2020 and a vision towards 2030

This strategy has been set out through a decision at the Prime Minister level to (i) ensure safety of food for consumers and emphasizes the responsibilities and rights of the organizations and individuals producing and trading food and of every citizen; (ii) implement the provisions of the Food Safety Law in a synchronized way through inspection, testing and management of food safety and (iii) strengthen information and communication on food safety.

The general objective of the strategy is that food safety master plans are implemented from production to consumption so as to improve the food safety situation in the country by 2015. Control of food safety throughout the food supply chain is to be set up and promoted efficiently and actively in the protection of health and consumer interests, to meet the requirements for development and integration of the country's international economy by 2020.

Four specific objectives have been laid down as below with specific targets for each:

1. Improve knowledge and practice of food safety among the target groups
2. Strengthen capacity of the food safety management system
3. Significantly improve food safety assurance in food producing and processing facilities
4. Effectively prevent acute food poisoning

It is understood that most of the targets laid down under the objectives have not been achieved due in part to the late completion of many subordinate regulations in directives

and circulars, but also because of unrealistic expectations of driving food safety operational management down to local production and trading. The strategy is currently under revision and is being led by VFA and MOH. There is also a Sanitary and Phytosanitary (SPS) Action Plan, with a new one currently under development through the SPS Office which is under MARD although it has focal points allocated in each ministry with one full-time and one part-time officer. It is important that synergy is maintained between the National Strategy led by VFA and the SPS Action Plan led by the SPS Office at MARD.

2.3. Standards and technical regulations

Vietnam has two types of national standards: mandatory and voluntary. National technical regulations, which are mandatory, are issued by MOH while Vietnamese national standards are issued by MOST and are voluntary. In addition, each ministry also develops its own voluntary standards, which generally relate to good practices, namely, Good Agricultural Practices (GAP), Good Agricultural Husbandry Practices, Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Point (HACCP).

For developing technical regulations, MOH has set up committees on which all other ministries and other stakeholders are represented. The draft standard is first developed and circulated to the committee. The World Trade Organization (WTO) through the SPS Office under MARD is also notified and any comments received are taken into consideration. The comments are then discussed and the standard finalized as a Technical Regulation, which is mandatory in the country. Currently, 54 regulations on food products have been issued covering the following areas:

- Limits of heavy metal contamination in food
- Limits of mycotoxin contamination in food
- Limits of microbiological contamination in food
- Specifications for food additives
- Maximum levels of food additives allowed for use in foodstuffs
- Micronutrient-fortified food
- Safety requirements for food contact material
- Maximum levels of radionuclides in food products
- Some products: milk products (milk powder, fluid milk, cheese and butter), drinking and mineral water, soft drinks, alcoholic drinks, edible ice, fortifying food and iodized salt

There is no formal manner of carrying out a risk assessment. However, some small-scale research initiatives have carried out risk assessments on heavy metals, aflatoxin in nuts and related products and Salmonella in chicken, among others.

The Vietnam National Codex Committee (VNCC) was established in 1994. The VNCC Board (six members) consists of leaders from relevant ministries (Health, Agriculture and Rural Development, Industry and Trade, and Science and Technology). Members of VNCC (46) include representatives from government agencies, food businesses, associations, universities and research institutes. The country's National Codex Contact Point is with VFA. Other than in the Codex Fisheries Committee, participation in Codex meetings is quite limited. Generally, Codex standards are adopted in the country.

VNCC has its own Codex-related website at <http://www.codexvn.org>; however, this is only in Vietnamese. It is linked to the international Codex website, FAO, WHO and other national websites such as MARD, MOIT, MOST and MOH.

Sections 10 and 11 of the Food Safety Law regulate food safety actors to follow national standards and technical regulations. Several Vietnamese food safety standards and criteria have been issued and harmonized with international Codex standards (pillar 6 of the WBG toolkit). For instance, the national technical regulations on Maximum Residue Limits (MRLs) of heavy metals (QCVN 8-2:2011/BYT), microbial contamination (QCVN 8-3:2012/BYT) and veterinary drugs (Circular No. 24/2013/TT-BYT) define limits in animal products (for example, fresh pork or chicken meat) and vegetables. Those regulations are in compliance with international Codex standards and propose amended methods for sampling and detection. Other Vietnamese standards and technical regulations on food safety also require the relevant actors to follow standards of, for example, livestock production and evaluation (QCVN 01-14, 15: 2010, 01-79: 2011/ BNNPTNT), transportation (QCVN 01-100: 2012/ BNNPTNT), food processing facilities and practices (QCVN 01-05: 2009/BNNPTNT) and packaging materials (QCVN 12-1, 2, 3, 4:2011/BYT).

2.4. Inspection, enforcement, surveillance and control

2.4.1. Inspection and enforcement

In general, although a risk-based approach has been specified under the law, it has been observed that in practice the three organizations follow different approaches and have different priorities in their inspection and enforcement strategies and different interpretations of the regulations. While a national target program has been developed under which the minimum target inspections have been laid down for each ministry, there is no coordinated national framework or strategy that addresses the whole of the food chain in a risk- and outcome-orientated approach. MOH coordinates this national target program and six-monthly reports are collated. For products under the control of more than one ministry, inter-ministerial inspections are held. Planning for these is decided by the inter-ministerial steering committee. These are organized three

times a year and are also held during special occasions like functions and food safety weeks or if a foodborne disease is suspected. In case of complaints or incidents, inter-ministerial inspections are also organized. Businesses are categorized into A, B and C categories jointly by the ministries.

While **MOH** has over-arching responsibility for food safety, it does not have the authority to direct other ministries in their work to ensure that highest risk foods are targeted and prioritized. Similarly, MOH does not have capacity to set requirements for the quality and depth of reporting as this is based on the priorities and programs of the separate departments. The major high-value export streams are given far greater scrutiny and attention than domestic foods and food supplies.

MARD follows a risk-based approach for exports with food businesses being categorized into A, B and C categories, depending on whether they meet the stipulated requirements. Focus is then targeted towards improving Category C businesses. The export sector is handled at the national level by NAFIQAD, while for the domestic sector, MARD develops protocols which are implemented at provincial and district levels and monthly reports are sent to NAFIQAD. The level of inspection and monitoring depends on their resource availability (finances and personnel). For imports, NAFIQAD has worked out risk profiles for products under their supervision. It is understood that staff at national level are trained on risk-based approaches but at provincial level, training on such approaches is still needed (based on information provided by NAFIQAD). However, at all levels the application and practices of a risk-based approach are still limited. An overview of the organizational structure of food safety management under MARD is given in Annex 6a.

VFA operates through the inspection department at the head office and 63 sub-departments, one in each province. At district level, it has clinics and health centres. There are around 14 members of staff at the head office and around 600 across the 63 provinces. VFA is responsible for monitoring of food safety incidents. Some risk assessments have been carried out but these are scattered research activities (for example, Salmonella in chicken and aflatoxin in nuts and related foods). Since 2009, they have been using risk-based monitoring based on a plan, which has been developed. The plan for the subsequent year is based on the results of the previous year. Not much work is available on the correlation between contamination and public health impact. Data on contamination are available but have not been linked to exposure and actual risks. The responsibilities are well categorized and at the national level, VFA oversees imports and large national or transnational food businesses and the quality and safety of bottled drinking water. The provinces are responsible for enforcement and inspection of larger food business operators who produce food for large-scale distribution and of catering systems and larger restaurants. The district-level and commune-level food safety enforcement is mostly on the small-scale and street food sectors.

MOIT: The Bureau of Market Management under MOIT is responsible for inspection of areas under its jurisdiction. The responsibility for large businesses lies at the national level while the smaller businesses are under the supervision of the provincial level. The businesses are inspected and licences issued, followed by regular or on-demand inspections. The principle followed for inspections is to have one inspection per business per year. The standards laid down by VFA are followed. Inspection is not risk-based. Samples are drawn by inspectors and these are paid for; however, in case of non-compliance, the amount is to be reimbursed by the businesses and this acts as a motivating factor for them to comply with the requirements. These inspectors look at marketing and other consumer-related aspects as well as food safety and the latter does not appear to be given priority.

Other than for exports where laboratory testing to confirm compliance against importing country requirements is common and imports where the cost is covered by the importer, most domestic inspection and enforcement activities are qualitative in nature and not supported by regular laboratory analysis. The laboratories used are those of MARD and MOH as well as private accredited laboratories.

At the market level, wholesale markets are under the supervision of MARD while retail markets and supermarkets or convenience stores are covered by MOIT. An area of focus is training consumers to identify safe food as only then can the good practice schemes be sustainable. As noted by the officials, once projects are completed, the initiatives are no longer implemented.

Further details on inspection for domestic versus import/export market, inspection frequencies and violations are given in Annex 7. These include:

- monitoring of Vietnamese Good Agricultural Practices (VietGAP), GAP, GMP, HACCP and hygienic conditions of compliance
- implementation of inspection on domestic and export products
- level of oversight according to business categories A, B and C
- common violations and type of sanctions

2.4.2. Surveillance

Vietnam still lacks a comprehensive national food safety surveillance system. Efforts in surveillance by different agencies are fragmented, weakly coordinated and poorly integrated. The data collected by different ministries through routine monitoring are not collated for joint use by ministries for risk-based food safety surveillance and controls. There still is a need to ensure that surveillance activities are consistent with international standards and that reliable information exchange systems are developed between provincial and national organizations. Surveillance systems are expensive

and there are limited possibilities to recover costs from the private sector. Hence, lack of operational funding is a serious constraint for setting up an effective surveillance system in Vietnam. Laboratory capacity and funding are not sufficient for routine surveillance or enforcement of related testing. There are laboratory data on exports and imports and some data from domestic inspection activities under the different ministries, but there is no overall plan or collation of national data for analysis and monitoring of foodborne diseases and food safety.

An active food safety surveillance system in Vietnam is at the formative stages of development, having components of integrated food safety surveillance such as market surveillance, surveillance of food business operators in manufacturing and service establishments, surveillance of imported products and surveillance of incidences of foodborne diseases.

MARD and VFA both carry out surveillance independently, a broad overview of which is provided below.

For **MARD**, residue and contaminant monitoring programs are regularly implemented by NAFIQAD for the fishery sector due to its export focus. Programs for meat (pork and other), fruits and vegetables have been started recently (in March 2016) in Ho Chi Minh City and Ha Noi. The plan is developed by NAFIQAD at national level but implementation is jointly with NAFIQAD at provincial level (sampling is the responsibility of the province and testing is done at country level). The main residues tested are β -agonists and veterinary drug residues in meat and meat products and preservatives in processed meats. In fruits and vegetables, the focus is on pesticide residues. The aim is to focus inspections on areas of risk and ensure that corrective actions are appropriately taken. The annual national surveillance system does not cover all provinces and all points in the food production value chain, so there is inadequate data on food safety for planning, investigation and inspection. MARD needs to consider at what point in the food chain the surveillance and testing for residues can be best managed: on farm, at primary processing or later in the food chain.

For **MOH**, surveillance systems for foodborne disease are under the authority of VFA. All health staff, whether they offer public or private services, are responsible for notifying food safety agencies at district or provincial levels when a suspected foodborne disease outbreak occurs in their area.

When cases of foodborne disease are admitted to a health facility, the facility has to report regularly to a higher-level facility and ultimately to VFA. In severe outbreaks or those leading to deaths, preventive medicine services, health facilities or district food safety agencies are permitted to share data and reports beyond their jurisdictions. Statutory surveillance systems and outbreak investigation reports maintained by public health authorities in Vietnam are mainly passive. Foodborne and waterborne diseases are reported from lower-level preventive medicine centres to higher-level centres and ultimately to the general Department of Preventive

Medicine in the MOH. VFA and food safety agencies mainly receive reports of food poisoning or gastroenteritis outbreaks where food transmission is suspected. Most outbreaks are detected when severe cases are admitted to health facilities or when deaths occur. A few events have been reported by district hospitals, health workers or local residents; some events have been detected via reports in the daily newspapers. Response capacity and resources at local levels are very limited and in most instances, central/provincial public health officials are responsible for supporting outbreak responses.

As at 31 December 2015, the Department of Food Poisoning Surveillance of VFA had developed a detailed plan for surveillance and evaluation of several hazards that contaminate common food products in the market. Surveillance activities were implemented by five implementation units, consisting of four specialized institutes (National Institute for Food Control [NIFC], Nha Trang Pasteur Institute, Institute of Hygiene and Epidemiology of Tay Nguyen and Ho Chi Minh City Institute of Hygiene and Public Health) and the Testing Centre of Drug, Food and Cosmetics of Thua Thien Hue. The system covers 13 types of food products, including meat and meat products, vegetables, tubers, fruits, aquatic products, milk and dairy products, grains, sauces and spices, confectionary, beverages, alcohol and beer, functional foods, food additives and prepared foods. Specialized institutes and food safety agencies take samples of food products based on annual guidelines issued by VFA, with a focus on high-risk foods in each province. Laboratory tests for each type of food product are based on the capacities of each institute or provincial laboratory or on quick-test kits. Because of limited budgets, VFA only allocates a small number of food samples to institutes and food safety agencies and samples are taken from any convenient market, rather than from strategic locations.

As at 31 December 2015, the provincial level had monitored 9,685 food samples, of which 85.8% were monitored periodically. Most of the samples monitored were domestic food products (accounting for 99.97%); 59.5% of samples were tested at the local Centre for Preventive Medicine, 29.5% by rapid tests and 30.0% in regional institutes and other units.

The results of monitoring are:

- Microbiological hazards: 20.5% of samples were contaminated with coliforms, followed by 20.1% with *Pseudomonas aeruginosa*, 18.3% with *Salmonella* and 10.1% with *Escherichia coli*.
- Chemical hazards: 10.6% of frying oil samples did not meet the standard for oxidized level, 6.6% of food samples tested positive for tinopal and 4.7% and 3.9% of food samples tested positive for borax and formaldehyde, respectively.

In Vietnam, only reports of outbreak investigations and hazard surveillance systems are used to monitor foodborne diseases, while other types of important surveillance systems

Box 1: Results of market surveillance at central level

The following are the results of surveillance of 1,143 food samples under 13 food sample groups with 28 surveillance objectives, in which 164/1,143 samples (14.3%) were found to be non-conforming.

- 15/156 samples (9.6%) of bottled drinking water failed in *Pseudomonas aeruginosa* microbial indicators
- 35/139 samples (25.2%) of canned vegetables failed in sodium benzoate indicator
- 45/140 samples (32.1%) of salted shredded meat failed, out of which 5/45 samples failed in sodium benzoate indicator and 42/45 samples failed in cyclamate indicator
- 54/122 samples (44.3%) of salted dried fruits of all kinds failed in cyclamate indicator
- 3/95 samples (3.2%) of powdered supplementary food/nutrition formula products for infants aged under 12 months failed in protein indicators as specified in the label
- 7/122 samples (5.7%) of dried beef failed in sodium benzoate indicators; 1/48 (2.0%) samples of functional food for men's health failed in sildenafil indicators
- 4/25 (16.0%) samples of functional food for fat reduction failed in sibutramin indicators

For the failed samples, follow-up inspections were ordered.

Source: VFA (2015)

(for example, notifiable foodborne disease surveillance, syndromic surveillance, behaviour risk factors, complaints and antimicrobial resistance systems) have not been established. Many health professionals are not aware of the importance of notifications, except in the case of severe events. Food inspections are conducted sporadically and depend on the annual budget that VFA allocates to each food safety agency.

The shortages in technical human capacity, laboratory equipment and financial resources mean that surveillance and outbreak investigation data are often incomplete and inconsistent. Determinants of foodborne diseases, such as environmental factors, hygiene practices and behaviours, have not been systematically studied in Vietnam. Late detection of outbreaks, insufficient information on trends of common foodborne diseases and high-risk populations and limited human capacities all impact response systems. More material on the operation of surveillance in Vietnam is included in Annex 6b.

2.4.3. Import controls

There are both formal and informal imports of food commodities into the country. To prevent unsafe products from entering the country, Decision No. 52/2015/QĐ-TTg of 20 October 2015 of the Prime Minister on the management of border trade with neighbouring countries has been promulgated. In effect, the respective ministries are responsible for their products. The standards used are those applicable for domestic purposes. The basic issue is that the import control process is not very well implemented which results in rather limited checks to see whether the imported product meets the standards or not. This causes concern to domestic producers who feel that they are treated unfairly; consumers also do not have confidence in imported products. Major food imports are cereals, edible fats and oils, fruit, flour and flour-based products.

There is no systematic reporting of non-conforming products detected at the borders. However, Table 1 gives an example of non-compliant food products detected during an import inspection and clearance of food import consignments in 2014.

In the case of MOIT, there is some level of risk-based inspection and if a specific number of consignments are tested and passed at accredited laboratories they get the benefit of simplified procedures for the next year; that is, they are only subjected to document checks but no further testing. In case of illegal imports, there is zero tolerance and goods are rejected and legally re-imported. MARD applies risk

profiling for all imported products and, based on the same procedures, the levels of checks for imported products are determined. Other than for quarantine controls, there is no system for pre-export inspection approvals of processors or exporters in exporting countries. However, Vietnam accepts test certificates of laboratories of exporting countries. No evidence of a common import control procedure based on FAO norms and guidance was evident. Coordination is at Customs, who inform the relevant departments on the arrival of consignments. The relevant departments first check for compliance with SPS concerns and then for food safety and compliance with Vietnam standards.

2.4.4. Export controls

For exports, the respective ministries are responsible for their groups of products. The standards used are those of the importing country. Major exports by value are fish and fishery products, coffee, cereals (rice), fruit, processed foods, vegetables and flour-based products. Each ministry handles its export control role differently.

For MOIT-related products, the food manufacturers are responsible for their product outcomes. They apply for externally audited International Organization for Standardization (ISO) HACCP programs. The manufacturers are responsible for monitoring of primary raw product producers. It is the responsibility of each food business enterprise in the value chain, from farm to processor to export markets, to actively manage food safety through a preventive

Table 1: Non-compliant food products detected during an import inspection, 2014

Group of food products	Total	Non-compliant criteria
Functional food, dietary supplements	13	Quality criteria: Protein lower than the announced rate 57.59mg/6 pills to >100–150 mg/6 pills Vitamin A is not inclusive or lower than the announced rate Vitamin E is not inclusive or lower than the announced rate Alpha Lipoic acid (-) to (+) Sibutramin (+) to (-) Total aerobic bacteria: 105 to 103
Packaged, canned or tinned food: mooncakes, chili sauce, ketchup, soybean sauce, beer	19	Mooncakes: Aflatoxin B1: from 2.31 µg/kg to 14.23 µg/kg (< 2 µg/kg) Chili sauce, ketchup, soybean sauce: Total aerobic bacteria: 105 to 107 (103–104) Beer: expired
Food flavouring, food additives (zinc oxide)	3	Expired Proportion of heavy metals (lead): 790.44mg/kg (49mg/kg)

Source: VFA (2015)

risk-based approach so that the next downstream business can maintain food safety. Failures at any stage pass food safety risks to the downstream clients. Government inspection ensures manufacturers and primary raw product producers comply with government regulations as well as international ISO HACCP programs required by international importers.

MARD has placed a high priority on supporting the export sector to enhance its competitiveness and expand international trade markets. MARD has good and effective export control systems, especially for products exported to the European Union such as fishery products, foods of animal origin, fruits and vegetables, to provide the necessary government bodies with SPS certifications for exports. NAFIQAD is responsible for food safety inspection and certification of fish and fishery products subject to official food safety inspection and certification in compliance with Vietnamese and importing countries' requirements. Further details on the type, level and frequency of inspection are provided in Annex 7.

Processors and other food business operators (animal feeds, storage, fishing boats and input suppliers) are approved for the purpose of exports based on European Union or other country requirements and a risk-based approach is used for surveillance. Health certificates are issued by NAFIQAD which uses its own laboratories. Consignments rejected in the importing country are authorized by NAFIQAD for re-entry to Vietnam.

2.4.5. Human resource capacities and challenges

In view of decentralization of the responsibility for domestic food safety inspection to the provinces and lower levels of local government, the capacity of local inspectors is very weak with respect to inspection performance and inadequate personnel. There is a lack of resources (personnel, finance and supporting policies) to adequately implement food safety control activities. Therefore, production monitoring is still weak. Food safety inspection and investigation is a specialized activity that requires specific education, training, skills and support systems. There is a need to review the compatibility between capacity and food safety management tasks of related agencies and departments in the agriculture sector from central to local level. The number of officers who have been trained and have expertise in food safety gradually decreases from the central level down to the local level due to combined assignment of food safety management and product quality management in their professional activities. In addition, it is necessary to determine where the greatest food safety risks lie and to focus resources where they can have the greatest impact.

The deployment of inspection resources in Ha Noi and Ho Chi Minh City has failed to follow major developments of these cities. With the recent expansion of Ha Noi City limits, it has now become both a major consumer (7 to 8 million people) and a major producer (Ha Noi produces around

Box 2: Case study – Crop Food Safety Management System

Within MARD, the ADB Quality and Safety Enhancement of Agricultural Products project (QSEAP) conducted pilot studies to set up a Crop Food Safety Management System (CFSMS) in 13 provinces to facilitate coordination, monitoring and management of food safety from the central level to the commune level. The institutional structure of the pilot system includes (i) a lead department for monitoring (NAFIQAD), (ii) a lead department for policy formulation, development of standards, accreditation of certification bodies and communication about crop food safety (NAFIQAD, PPD and DCP) and (iii) specialized positions at the provincial, district and commune levels responsible for the management of the food safety system. At provincial level, CFSMS is assigned to one agency such as provincial NAFIQAD sub-department or plant protection sub-department, depending on each province. The ADB mission to review QSEAP completion received positive feedback on CFSMS from Tien Giang, Lam Dong, Ho Chi Minh City and Thai Nguyen province. Table 2 presents a breakdown of the numbers of staff in the CFSMS implementation units and provinces.

Source: ADB QSEAP (2015)

60–70% of its food demand). But most of the inspection personnel are based in the Department of Industry and Trade, reflecting when the city was only an urban area. The DARD inspection and enforcement system is severely understaffed. With similar size as Ha Noi, Ho Chi Minh City is able to supply only 20% of its food demand, with the remaining food being 'imported' from other provinces. Nevertheless, the city has more than 600 DARD inspectors.

The food safety management role at the district and commune level is very new and does not have a person in charge. There is no legal framework that defines the responsibilities of the commune people's committee system on food safety enforcement and management. Currently, at the grassroots commune level, food safety control is conducted by provincial and district inspection agencies that are located mostly in the city and town far from the production field. It is recommended that commune people's committee should be involved in food safety control, with strong coordination with inter-level agencies.

Table 2: Human resources of the Crop Food Safety Management System in MARD and provinces

Implementation unit and province	Total staff	Female staff	Male staff
NAFIQAD	7	5	2
DCP	4	2	2
DPP	4	1	3
Bac Giang	14	1	13
Ben Tre	2	0	2
Binh Thuan	11	5	6
Da Nang	10	1	9
Hai Duong	8	3	5
Lam Dong	11	5	6
Ninh Thuan	8	3	5
Phu Tho	12	5	7
Son La	4	3	1
Thai Nguyen	9	2	7
Tien Giang	5	1	4
Vinh Phuc	13	11	2
Yen Bai	15	4	11
Total	137	52	85

Source: ADB QSEAP (2015)

There is a shortage of facilities and equipment for inspection and food safety control activities, such as sampling tools, food safety quick test kits and laboratory testing. There is a need to provide technical assistance to improve food testing capacity in support of the food safety inspection system, training and equipment to apply a risk-based approach to food safety. Data on inspection resource capacity from the ADB QSEAP³ showed the number of inspectors and personnel working in monitoring, inspection and management of crop production from the central level down to provincial, district and commune levels. There are 15 inspectors in relevant MARD departments (NAFIQAD, DPP and DCP) and an average of 10 to 15 inspectors in each province. There are 1,000 to 1,500 inspectors for crop production management from MARD to the local level. Similarly, there are 1,000 to 1,500 inspectors for management of products of animal origin

and 1,500 inspectors for the fishery sector. At the district level, a huge number of inspectors would be needed.

In many provinces, sub-NAFIQAD were newly established but with very limited investment in facilities and equipment, unclear assigned tasks and functions as well as limited human resources (only 12 to 15 permanent officers). Implementation of activities faces a lot of difficulties in many aspects and it is not easy to meet the assigned tasks.

Currently MOIT, which is in charge of monitoring and inspecting all products for sale in markets and supermarkets (except the wholesale wet markets), has about 7,000 market inspectors⁴ tasked to control and monitor all types of markets throughout the country (Anon 2016).

³ QSEAP final report, 2015

⁴ Food safety risk management study: Discussion note (25 January to 5 February 2016)

2.5. Food safety laboratories

According to the Food Safety Law of 2010, three ministries are mainly involved in food safety testing, namely, MOH, MARD and MOIT. Each ministry has its own network of food safety related laboratory systems consisting of ministry or department laboratories, research institutes, professional centres and university laboratories. Some large provinces have their own experimentation and analytical service laboratories, for example, the Centre for Preventive Health Care and Technical Scientific Services on food safety. In addition, there are private laboratories that provide experimentation and analytical services. The Vice Prime Minister through MOH is in charge of the overall laboratory structure in Vietnam as shown in Figure 4.

The **National Food Safety Laboratory (NFSL)** network is the main diagnostic arm of MOH and plays the role of reference laboratory in food safety in Vietnam. It consists of laboratory units working at national, regional, provincial and district levels.

NIFC is the national reference laboratory in the area of food safety under MOH. It is based in Ha Noi and serves as the highest authority for food safety testing in Vietnam. The results from the institute help to make the final conclusion in case of a dispute. It provides training for regional and provincial laboratories in advanced testing methods, supports provincial laboratories in developing and implementing

ISO 17025 requirements and provides proficiency testing programs and reference material for food testing laboratories in order to evaluate the performance of laboratories.

There are four regional laboratories, namely:

1. National Institute of Nutrition in Ha Noi: covering 28 northern provinces
2. Institute of Hygiene and Public Health in Ho Chi Minh City: covering 18 southern provinces
3. Pasteur Institute in Nha Trang: covering 11 coastal provinces
4. Tay Nguyen Institute of Hygiene and Epidemiology in Dak Lak: covering four provinces in the Central Highlands

At the provincial level, each of the 63 provinces has a preventive medicine centre. The centres generally have limited capacity and lack sophisticated instruments to test for residues and contaminants. At district level, there are laboratories in each district with limited test facilities. MOH also uses quick test kits for some tests and is considering providing more of such kits for quick testing for boosting consumer confidence. The food safety laboratory system of MOH is given in Figure 5.

The testing parameters are classified into groups based on the type of food and the technique used. Overall group categories are provided in Annex 9. Under MOH, the

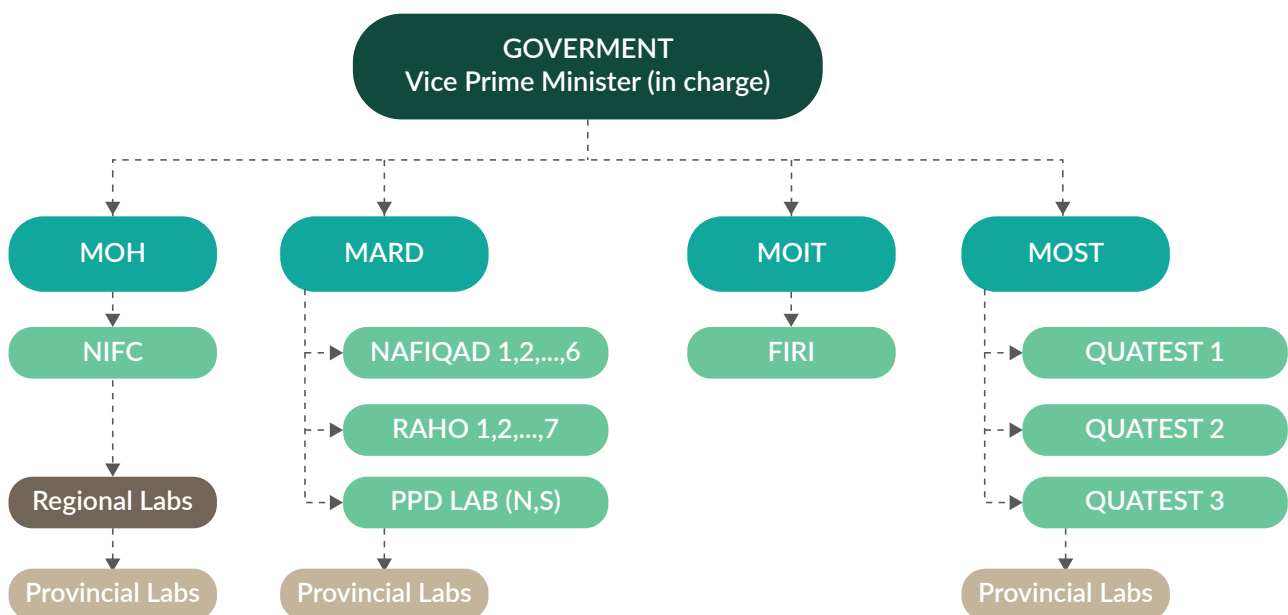


Figure 4: Food safety laboratory structure in Vietnam

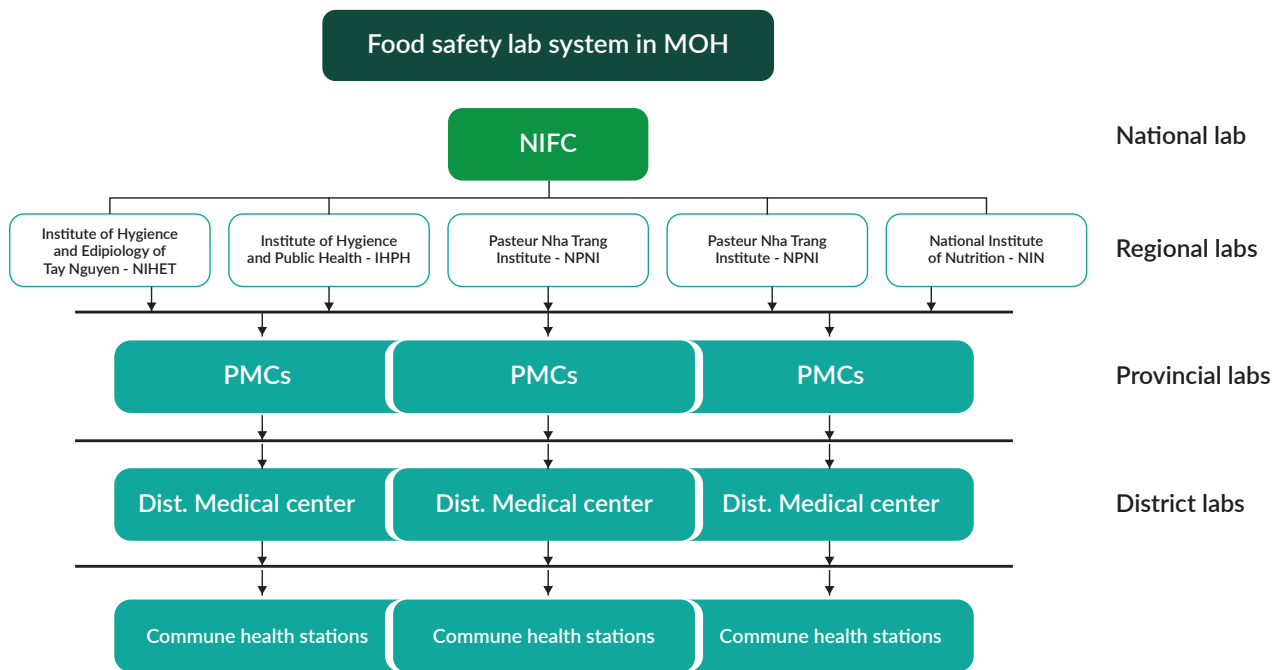


Figure 5: Ministry of Health food safety laboratory system

provincial laboratories do not regularly perform the tests for contaminants and residues. They may perform the tests in groups on organic micronutrients, inorganic minerals and heavy metals but not frequently. There are also various projects and initiatives for upgrading the laboratory system in Vietnam. However, the effectiveness of the investment is not always fulfilled. Too many laboratories allocated to certain ministries do the same tests, resulting in the spread of investment especially at provincial level. Examples of MOH-related laboratories are given below:

- National laboratories: Well-funded by the government and other bilateral programs, good laboratory facilities and equipment and ISO 17025 accredited.
- Regional laboratories: Well-funded by the government, adequate laboratory facilities and equipment and ISO 17025 accredited.
- Provincial laboratories: Adequate laboratory facilities, some good equipment but not used efficiently. About half of the laboratories are ISO 17025 accredited.

Details of the samples analysed at the NIFC in Ha Noi and the Institute of Public Health in Ho Chi Minh City by year are provided in Annex 10. An account of laboratories under other ministries, and the private sector, is in Annex 11.

2.6. Accreditation of conformity assessment bodies

The official accreditation body in Vietnam is the **Bureau of Accreditation (BoA)** under MOST. It was established in 1995 and offers accreditation programs for laboratories (ISO 17025), medical laboratories (ISO 15189), certification bodies (ISO 17065) and inspection bodies (ISO 17020). All BoA accreditation programs operate in accordance with relevant international standards with the aim of getting these programs harmonized and recognized internationally.

BoA is currently a member of the International Laboratory Accreditation Co-operation (ILAC), International Accreditation Forum (IAF), Asia-Pacific Laboratory Accreditation Co-operation (APLAC) and Pacific Accreditation Co-operation (PAC) and has signed agreements on mutual recognition of ILAC, IAF, APLAC and PAC. By the end of 2015, BoA had accredited 713 laboratories (including testing and calibration laboratories) as per ISO 17025. About one-third of accredited laboratories perform tests on food safety.

Accreditation Office for Standards Conformity Assessment Capacity (AOSC) is a third-party accreditation body in Vietnam established in 2009 and belongs to the Vietnam Union of Science and Technology Associations. It

offers accreditation programs for laboratories (ISO 17025), medical laboratories (ISO 15189) and certification bodies (ISO 17065). AOSC is currently not accepted by APLAC, ILAC, IAF or PAC but is working to fully implement its quality management system following ISO 17011, including completing the necessary procedures for being recognized regionally and internationally for accreditation. So far, AOSC has accredited only a few laboratories.

To get accreditation, laboratories are required to implement quality management systems in compliance with ISO 17025. This will require the laboratory to report its policy, organization, training activities, facility, equipment, method selection, standard operating procedures, sample treatment and competence assessment. However, there is a great difference between laboratories in the same category with respect to staffing, qualifications of staff, equipment available and the amount of laboratory work performed.

Proficiency testing is an important aspect for accreditation. Currently, there are some organizations in Vietnam that have established and developed proficiency testing programs and have provided them for several years; these include NFSL of MOH, the QUATEST 3 of MOST and the Reference Testing and Agri-Food Quality of MARD. However, although there is high demand for proficiency testing, the number of proficiency testing providers is limited and that of accredited providers even lower. It should be noted that according to ISO 17025, proficiency testing is a basic requirement and should be carried out by all laboratories. This, however, is currently not adequately implemented. The capacity on proficiency testing is also limited.

2.7. Food safety training programs at academic level

Foodborne diseases and food poisoning are important public health challenges in many countries including Vietnam. In the health sector, there are a number of universities, schools and faculties currently providing training programs on food hygiene and safety for both undergraduate and postgraduate students. These include Ha Noi School of Public Health, Hai Duong Medical Technical University, Preventive Medicine and Public Health Training Institute (Ha Noi Medical University), Hue Medical Pharmacy University, Thai Nguyen Medical and Pharmacy University and Thai Binh University of Medicine and Pharmacy. These universities and faculties have departments of food hygiene and safety which conduct research and deliver training courses on different aspects of food hygiene and safety for undergraduate and postgraduate students. See Annex 12 for further details of the provision in Vietnam of academic training in food safety.

Very few universities currently provide specific training courses on food safety risk analysis (including food safety risk assessment, food safety risk management and food safety risk communication). Among those universities are the

Ha Noi School of Public Health which offers a three-credit undergraduate training course on foodborne diseases and food safety risk analysis and the Vietnam National Agriculture University which offers a two-credit course on risk analysis.

In order to improve food safety risk analysis, public health, medical and agricultural universities and institutes should develop and implement official compulsory training courses in this field. In addition, these universities should promote and strengthen research capacity to provide science-based evidence to inform policymakers in developing food safety policies and programs in Vietnam, to inform risk communication activities regarding food safety as well as to be used in training programs and/or case studies.

For the private-sector businesses in Vietnam working on food safety, it would be useful to use and adapt the International Finance Corporation (IFC) Food Safety Toolkit which is a tool to help food business organizations in developing countries manage food safety and comply with food hygiene regulations (IFC 2011). The toolkit is essentially a food safety management system plan or roadmap as to how the food business organizations can manage food safety. It aims to guide and assist the organizations throughout the various elements of the manual in a motivational and informative manner. It also contains examples of case studies, one of which investigates the challenges and limits of the ‘single agency’ approach on food safety.

2.8. Key messages from this section

- Vietnam has been an early mover in the region in terms of modernising its food safety regulatory system and has laid the formal foundations for an effective and efficient system. However, the government itself recognises that the major reforms of five years ago have still to be made to work and is itself revising both the Food Safety Law and the Food Safety Strategy. The great progress made in terms of institutions and regulation need to be matched by progress in creating a culture that will make these changes work at an operational level.
- There is a need to strengthen coordination to ensure a comprehensive food control system. Although MOH has been assigned the lead responsibility for the Food Law, it does not have authority to ensure the implementation of the food safety strategy and target program and is just able to collate information rather than implement a comprehensive food control program.
- The Food Safety Law is a modern framework that aligns with international standards and approaches to food safety management, however cannot ensure food safety in itself (as described in the WGB Toolkit Pillar 2). The food laws and regulations are generally prescriptive with the aim being to implement the processes and

procedures. It is important that these are made more food safety outcome-based with flexibility in the manner of achieving outcomes. Similarly, targets need to be more outcome-based.

currently provide specific training courses on food safety risk analysis (including food safety risk assessment, food safety risk management and food safety risk communication).

- At the national level, technical and human capacities are comparatively strong. In contrast, capacities at regional and provincial levels for implementing nationally determined policies and for securing food safety are uneven and exhibit major gaps. At provincial and local levels particularly, capacities are either weak or very weak and have constrained operational funding.
- Although risk-based food control management is being implemented in some areas, it is not being done uniformly across ministries, departments and provinces. It is recommended that a risk-based approach be followed across the board to ensure best utilization of resources and lead to an effective food control system in the country.
- Currently, the focus is more on end-product inspection and testing for ensuring food safety rather than implementing preventive approaches by food business operators. It should be recognized that end-product testing cannot build safety into a product, nor is it cost-effective. It is important for the government to build in preventive approaches for food safety and use testing to validate the effectiveness of preventive measures put in place by the food businesses.
- Each ministry has its own network of laboratories (including research institutes and university laboratories) with different capacities while NIFC acts as the reference laboratory for food safety. National and regional laboratories are usually better equipped and funded than provincial laboratories. The concept of networking of laboratories at national level is needed. There is also need to use the private sector to strengthen the governmental food control activities.
- There remain significant weaknesses with regard to implementation of quality management, differences in validation procedures and parameters covered, while testing skills and experience among staff are insufficient.
- Currently, data available from governmental and research institutions are not harmonized. Further, the same is not scientifically collected, analysed and used for development of standards and other risk management activities. It is important to organize for better collection of data and its use in a systematic and planned manner. It is also important to implement national residue and contaminant monitoring programs across the country.
- There are a number of health sector related universities providing training in food hygiene and safety and seven main public agriculture universities providing training in veterinary, food and animal sciences. Although this significant academic asset exists, only a few universities

3. Key pork and vegetable value chains in Ha Noi and Ho Chi Minh City

3.1. Rationale for value chain selection

The rationale for selecting pork and leafy vegetables value chains is explained in Section 1.4 (Scope of the study). This section summarizes the key features of the analysis of the two value chains. The full description can be found in Annex 17. The purpose of the value chain analysis is to illustrate the findings and statements made in the following sections (hazards and risks, institutions, trade notably) with concrete examples taken all along these two value-chains (see Pillar 1 of the WBG toolkit). It will document the description and analysis of the strengths and weaknesses identified in the Vietnamese Food Safety system and serve as evidence-based to justify the findings and related recommendations.

3.2. Pork value chain in Ha Noi and Ho Chi Minh City

The pork value chains in Ha Noi and Ho Chi Minh City are similar (Figure 6). However, these two cities are differentiated in terms of pork volume flow between players in the chain and their levels of food safety risk. The implementation of food safety management in Ha Noi and Ho Chi Minh City, therefore, has to be tailored to specific local contexts of each city in order to be effective.

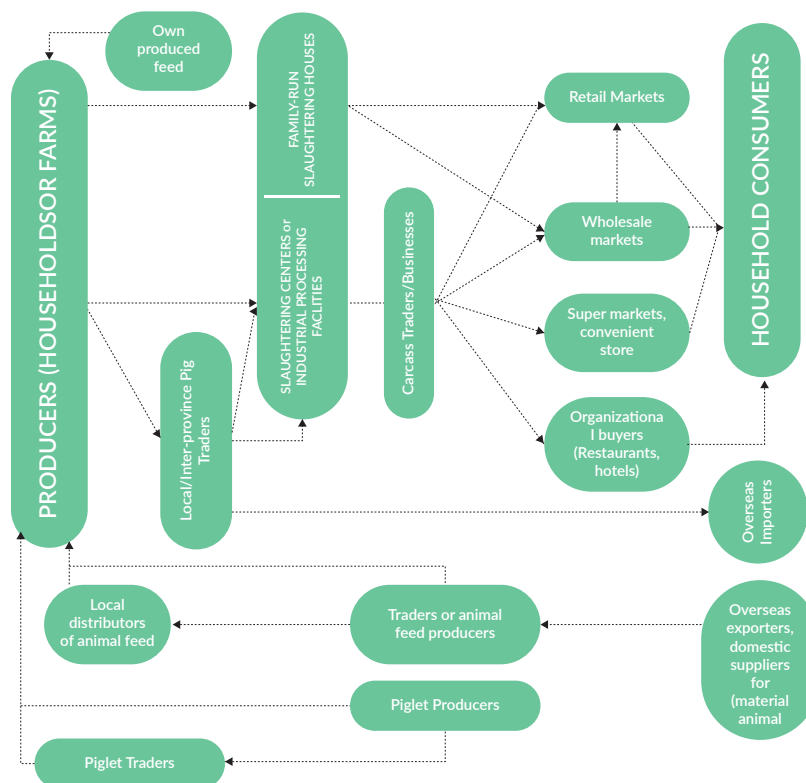


Figure 6: Pork value chain supplying Ha Noi and Ho Chi Minh City

3.2.1. Consumption

With an average annual pork consumption of 27 kg per capita in Vietnam⁵ and population of 7 million in Hanoi and 8.2 million in Ho Chi Minh City, the total demand for pork is estimated at 630 tons per day in Ha Noi and 730 tons per day in Ho Chi Minh City. This does not include demand from the significant number of daily visitors to the city; hence, in reality, the actual pork consumption may be even higher. Moreover, most studies show that meat consumption is higher in urban areas so we would expect urban Ha Noi to have higher per capita pork consumption than the country average. Consumption of pork outside the home is increasing. In 2012, it was estimated that Vietnam had 430,000 street stalls/kiosks, 7,000 fast-food restaurants, 80,000 full-service restaurants and 22,000 cafeterias/bars. Ha Noi also has a large number of institutional food providers including government, educational, medical and industry canteens.

3.2.2. Production

As at October 2014, Ha Noi had more than 1.4 million pigs, accounting for 5.3% of the national herd (26.5 million pigs)⁶. This contributes more than 500 tons of pork per day for the capital's residents. Thus, deriving the 630 tons demand per day, Ha Noi should be importing more than 100 tons per day from other provinces. In terms of geographical production organization, Ha Noi has four major specialized production zones with 120,000 pigs. By production organization, there are 802 pig farms which are normally outside residential places and contribute 30.9% of the whole city's production. Farm businesses (as opposed to pig rearing in the family backyard) are increasing but many would be considered of small or moderate scale⁷. Organized production based on value chains, in which traceable linkages between players are systematically set, has been strongly encouraged. By the end of 2014, the supply from this model was estimated at 11,000 tons, 30 tons per day or 5% of the total consumed in Ha Noi.

According to DARD, pork production in Ho Chi Minh City is 85,000 tons per year, equivalent to 227 tons per day. To cover the demand gap, supplementary supply is sourced from other provinces, that is, 65,085 tons per year or 178 tons per day. We estimate a daily amount of 100–



Meat inspector in performance



A small-scale slaughterhouse in Ha Noi in operation.
Photo courtesy of Donald Macrae/WB

150 tons are also provided by some large companies from their own value chains; Vissan (Vietnam Meat Industries Limited Company), for example, sells 70 tons per day to the Ho Chi Minh City market. Thus, in light of 730 tons per day consumption as estimated above, it appears that around 100–150 tons are being consumed without going through a known or reported channel. One of the major issues of pig production in Vietnam is that the cost of feed is high and the sector relies on over 70% of feeds imported from other countries (Viet Nam Alliance for Agriculture 2015).

3.2.3. Pig processing system

While it is now estimated that 93% of the pork meat consumed in Ho Chi Minh City has been slaughtered in large slaughterhouses (17 slaughtering centers processing 682 tons per day), the situation in Hanoi is different and remains challenging to control with (i) 14 semi-industrial processing 152 tons per day (24%), (ii) five manual processing sites with multiple slaughter places for each (93 tons per day, 15%) and (iii) an estimated 2,490 family-run slaughterhouses with capacity of 1–5 pigs a day at each household processing 385 tons per day (61%).

⁵ IFC Report, Pork and Broiler Chicken Industry

Development in Vietnam

⁶ Vietnam Statistics Office

⁷ DARD, Ha Noi

3.2.4. Distribution system

From the slaughterhouses, pork reaches the end consumers through (i) supermarkets or convenience stores, (ii) retail markets, (iii) wholesale then retail markets or (iv) organizational buyers. Here again, the model is different. In Ho Chi Minh City, most pork is distributed via the wholesale market channel: 522 tons per day (72%), which is divided between Binh Dien (36%) and Tan Xuan (64%)⁸. In this channel, the wholesalers at wholesale markets sell to other agents who retail the meat to end users in retail markets. There are no data reporting the pork sold at supermarkets and convenience stores. Compared to Ha Noi, the modern trade system in Ho Chi Minh City is more advanced and hence may be more important. We estimate that the pork sold in this system may be 20% of the city’s daily consumption (about 146 tons). The amount of pork supplied directly from slaughterhouses, inside or outside the city, to retail markets is about 50 tons per day.

On the contrary, in Ha Noi, the pork that goes directly from slaughterhouses to retail markets is estimated to be at least 518 tons (82%). The four major wholesale markets (Minh Khai, Phung Khoang, Den Lu and Van Quan) only channel

about 7.5 tons a day (1.2%)⁹. There are no data reporting the flow of pork via supermarkets or convenience stores; nevertheless, it is generally estimated that 15% of all foods are sold at modern trade outlets, suggesting 94.5 tons per day.

In summary, key features of the value chain structure in Ha Noi and Ho Chi Minh, although with important differences are:

- Increasing modern trade outlets such as supermarkets and convenience stores
- Significant demand from organizational buyers, such as hotels, restaurants and schools
- Insufficient production requires supplementary supply of pork from other provinces
- Retail (wet) markets dominate sale of pork
- Small-scale producers and small slaughtering facilities dominate the value chain

While the two first bullet points create a strong demand for traceability the last three create unfavourable conditions for this to be carried out.



Wholesale market, meat section in Ha Noi,
 Photo courtesy of Donald Macrae/WB

⁸ Data provided by DARD

⁹ On average, there are 60 outlets at each market; each outlet trades one pig of 73 kg per day.

3.2.5. Food safety risks

Food safety control is supposedly more manageable in supermarkets or convenience stores and semi-industrial and manual processing slaughterhouses as concentration in one place can enable better monitoring and evaluation of pork safety. In comparison to Ha Noi, the pork value chain in Ho Chi Minh City is theoretically more favourable to food safety control because:

- Small-scale processing at residential houses is almost replaced by slaughter centres where the monitoring, control and inspection activity can be conducted more effectively and efficiently.
- The installed capacity of modern slaughtering businesses can well capture the current demand of 8,000 pigs per day. The additional facilities planned to be launched in 2016, which cover six factories for 10,000–15,000 pigs per day, can also accommodate the demand growth in the medium term¹⁰.

- There is an increasing share of large companies that have built up their own value chains to ensure traceability and pork quality.
- Seventy-two per cent of pork is traded at wholesale markets under monitoring and evaluation of the local government.

However, there is limited evidence that the management of food safety in one location is more effective at reducing food hazards (Grace 2015) and there are some aspects of concentrating production, processing and retail that can increase contamination. During its visits, the team found little evidence that workers and stakeholders in these larger scale infrastructure adopted better practices to ensure safer food, or that real enforcement of these practices was conducted by the government’s inspectors. Building up and maintaining business credibility creates incentives for supermarkets to develop traceability for products on shelves. However, in Southeast Asia, fresh foods sold in supermarkets often do not have traceability as they are sourced from wholesale markets and not from farms.



Traditional Meat Market,
Photo courtesy of Donald Macrae/WB

¹⁰ The growth in consumption of Pork in Vietnam is estimated at 3% per year [...]

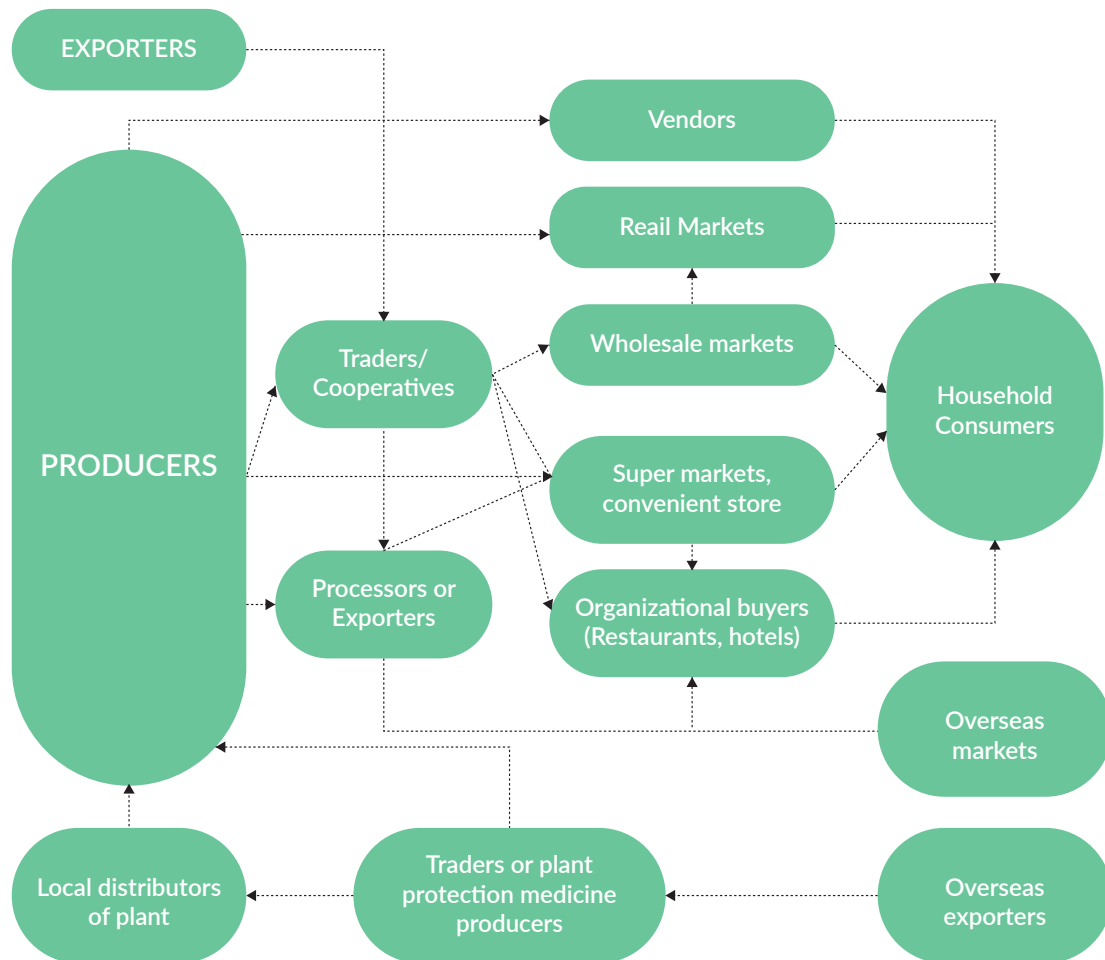


Figure 7: Vegetable value chain supplying Ha Noi and Ho Chi Minh City

3.3. Vegetable value chain in Ha Noi and Ho Chi Minh City

The vegetable value chain supplying Ha Noi and Ho Chi Minh City is depicted in Figure 7. As for the pork value chain, actors involved in the vegetable value chain are similar in Ha Noi and Ho Chi Minh City although they can be differentiated by the volumes channelled through different stakeholders and sourced from outside the provinces.

3.3.1. Consumption

Because of the unavailability of data on the specific market demand for vegetables in Ha Noi and Ho Chi Minh City, the levels of consumption of vegetables in the two cities was estimated. We assumed an average Vietnamese would consume 0.4 kg of vegetables per day. Therefore, the total consumption of vegetables in Ha Noi and Ho Chi Minh City is projected at 2,800 tons per day and 3,290 tons per day, respectively.

3.3.2. Production

The level of production of vegetables in Ha Noi is nearly 600,000 tons per year or 1,644 tons per day¹¹. With a consumption level of about 1 million tons per year, Ha Noi has to import a substantial amount of vegetables from other provinces. The supplementary supply is mainly from provinces in the Red River Delta (Vinh Phuc, Hung Yen, Hai Duong, Bac Ninh, Bac Giang and Hoa Binh). This is expected to increase in future because of the rapid urbanization process that will further shrink agricultural land in the capital. Notably, it is widely reported in the media that a considerable amount of vegetables originate from China, without being confirmed by official data.

Unlike the pork business where the farm model is becoming popular, vegetable plantations are dominated by thousands of households. Due to historical reasons, an average plantation per household is less than 2,000 m², divided into four to five

¹¹ Source: DARD Ha Noi

slots scattered at different places on the field¹². Given around 12,000 hectares of vegetable land and an average of 2,000 m² per household, about 60,000 households are probably participating in vegetable production in Ha Noi.

With 14,500 hectares of land, Ho Chi Minh City generates 366,704 tons of vegetables yearly, reaching 30% of the total consumption of 1.2 million tons. The balance (over 800,000 tons, 70%) is sourced from other provinces. Ho Chi Minh City has signed some inter-provincial agreements with five provinces (Lam Dong, Long An, Tay Ninh, Tien Giang and Cà Mau) for trading of vegetables and fruits to improve food safety during transport of food between provinces. Safe value chains have been particularly targeted and set up, providing 20,914 tons of safe vegetables and fruits for Ho Chi Minh City¹³. In addition, concerted efforts have been made to expand VietGAP-certified plantations, but uptake has been rather limited to date. The VietGAP vegetable output achieves 50,929 tons per year, equivalent to only 4% of the total consumption.

In both cases, though co-operatives have been formed by farmers to address the weakness of small-scale production through strengthened horizontal linkages and other collective actions, the capacity of such co-operatives generally remains weak.

3.3.3. Distribution

Here again, in Ho Chi Minh City, and unlike Ha Noi, the available data suggest that vegetables sold at retail markets are almost all from wholesale markets (85%). Supermarkets and modern stores start playing an important role to distribute vegetables to end consumers, as 15% of the vegetables consumed appear to transit through them.

The situation is different in Ha Noi where only 33% is channelled through wholesale markets, and an additional 15% distributed through supermarkets (although there could be double counting as some supermarkets get supplied by wholesale markets). It means that a balance of over 500,000 tons per year of consumed vegetables appears out of control and is believed to be sourced from (i) direct supplies from producers/vendors (inside or outside Ha Noi) to local markets or retail markets somewhere else and (ii) imports from China.

3.3.4. Food safety risks

Ha Noi and Ho Chi Minh City share common risks at household level. These include the issues associated with micro- and small-scale production generating risks related



to (i) lack of capacity to invest in infrastructure, equipment and training for good practices to produce safe food, (ii) challenges in inspection of farms for the government and (iii) the misuse of plant protection products and pesticides. VietGAP-certified production is used as a tool to ensure food safety, but remains marginal (only 4% share of Ho Chi Minh City's consumption, for instance).

In addition, control of supply from other provinces is difficult, notably for Ho Chi Minh City which imports 70% of its vegetable needs, involving coordination between different agencies on the ground. Tracing of vegetables, in the event a sample tests positive for a specific hazard, is almost impossible. Supply from China is not officially recorded, although the high frequency of media reports on China-sourced vegetables and fruits suggests a significant import volume from China. Public doubt of food safety is always cast over Chinese products. However, this is not well backed by the available data and test information.

While the flow through wholesale markets can be presumably better controlled, the flow that goes directly from vendors or producers to retailers in open markets cannot be properly monitored. In Ha Noi, 491,609 tons of vegetables per year are estimated to flow directly from producers or vendors to retail markets where the inspection is fairly loose in comparison with wholesale markets. This is consistent with the findings from a recent study of the vegetable supply chain in Ha Noi that 42% of vegetables in Ha Noi are supplied by small vendors¹⁴ whose products do not pass through the state monitoring system.

¹² Denis Sautier, D., Dao, T.A., Nguyễn, N.M., Moustier, P. và Phạm C.N. 2013. Enjeu de l'agriculture périurbaine et croissance urbaine a Ha Noi. Metropoles aux Suds, Paris, Edition Ketharla. pp. 271-285.

¹³ Report of DARD, Ho Chi Minh City

¹⁴ Nguyen Thi Tan Loc and Do Thi Kim Chung, 2015. Vegetable industry development and solution. Journal of Science and Development 13(4): 850-858



Vegetable market in action.
Photo courtesy of Donald Macrae/AFB

3.4. Some implications for the value chains in the case of Ha Noi

An example of an inspection and monitoring scheme of an agriculture value chain (fresh fruit, vegetables and meat) which describes ‘what, who, how and when’ is presented in Annex 8. Pork production is 500 tons per day and supply from other provinces is 100 tons per day. Out of 500 tons produced in Ha Noi, large farms produce around 30% and organized value chains produce 30 tons per day. At the processing level, there are 14 semi-industrial slaughterhouses producing 152 tons per day (24.1%), 93 manual processing slaughterhouses producing 93 tons per day (14.8%) and 2,490 family-run slaughterhouses producing 385 tons per day (61.1%). Distribution is through 103 supermarkets (94.5 tons or 15%), four wholesale markets (17.5 tons or 3%) and 426 retail markets (516.6 tons or 82%). Based on the assessment of the value chains in relation to the institutional infrastructure, some further analysis and recommendations are provided below by sub-sections discussed in this section.

3.4.1. Responsibilities of different ministries and departments

- MARD: Responsible for pig production, inspection and slaughter; post-harvest handling including processing and wholesale wet markets. It also implements a residue monitoring program (started very recently), development of VietGAP standards and scheme and its implementation.
- MOIT: Responsible for wholesale and retail markets including supermarkets and food stores.
- MOH: Safety in restaurants and canteens including

serving of pork and its products, policy coordination and coordinating implementation of food safety measures. Development of standards for pork and pork products and overall labelling requirements.

- The smaller businesses are the responsibilities of provincial level agencies while the larger businesses are generally addressed at national level.

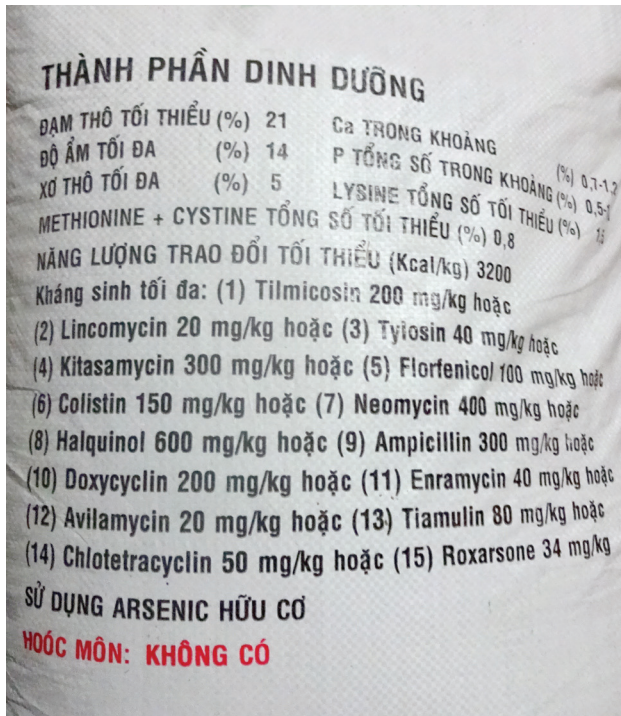
Issue: At the market level, both MOIT and MARD have a responsibility. At restaurants and canteens, the responsibility lies with MOH but strong coordination is needed with the MARD veterinary service. Regarding labelling, again, strong coordination is required. At the provincial level, coordination is needed not only among the inter-ministerial departments but also within MARD and its local departments: NAFIQAD which operates the residue control program, DAH and DARD.

Recommendation: Targets under the Food Safety Strategy will need to focus on food safety outcomes and not only on processes and process controls. As such, coordination should center on those outcomes. Ho Chi Minh City has been granted the pilot of a single food safety management unit/board, reporting directly to City People’s Committee. It is critical that this pilot is to be carefully monitored, documented, and analysed for lessons.

3.4.2. Laws and regulations

In Vietnam, food laws and regulations are generally prescriptive with the aim being to implement the processes and procedures. Often, laws are not implemented in a true spirit to ensure safe food. In the pork value chain, levels of veterinary drug residues need to be within the criteria prescribed; generally, these should not be permitted in feed inputs or should be restricted to the bare minimum levels essential for the purposes of treatment of animals. However,

it was observed that the use of antibiotics in animal feeds is the norm and in certain cases farmers were using as many as 15 veterinary drugs in the feed. Targets under the National Strategy for Food Safety need to be more outcome-based; however, these are generally in terms of the numbers of units implementing HACCP, irrespective of their effectiveness.



*Bag of pig feed as seen on field visit
 Credit: Stephane Forman/World Bank*

3.4.3. Surveillance, inspection and preventive approaches

With the large number of household farms producing pigs, the 2,490 family-run slaughterhouses processing 61% of pork consumed in the city and the 518 retail markets distributing 82% of the meat, even a single visit a year will require a large workforce. Even then, the quality and safety of pork are not guaranteed. It is, therefore, absolutely essential to look into preventive approaches and risk-based surveillance and inspections with responsibilities shared between ministries and departments.

Although risk-based food control management is being implemented in some areas, it is not being done uniformly across ministries, departments and provinces. It is recommended that a risk-based approach be followed across the board to ensure best utilization of resources and lead to an effective food control system in the country. It may also be useful to synergize private-sector initiative in this area.

Currently the focus is more on end-product inspection and testing for ensuring food safety rather than implementing preventive approaches by food business operators. It should

be recognized that end-product testing cannot build safety into a product, nor is it cost-effective. Although VietGAP has been initiated, the numbers seen are very limited. It is important for the government to build in preventive approaches for food safety and use testing to validate the effectiveness of preventive measures put in place by the food businesses.

3.4.4. Available data

As discussed in Section 4 on food safety hazards and health impact, the most prevalent microbiological hazard in pork is Salmonella and a number of studies are quoted in the report. Antibiotic residues and growth promoters are also being used in the pig farms, as evidenced from literature. The data currently available from governmental and research institutions are not harmonized. However, the data are also not scientifically collected, analysed and used for development of standards and other risk management activities. Data linking public health and foodborne illnesses to the food are neither scientifically collected nor coordinated between ministries and departments. There is a need for better data collection including the implementation of national residue and contaminant monitoring programs across the country and use of data in a systematic and planned manner. There is also a need for a focus on hazards and impacts on public health, as well as the development of comprehensive and joint national surveillance programs.

3.4.5. Food safety laboratories

Each ministry has its own network of laboratories with different capacities. The government is now looking at procurement of rapid test kits for testing of products at markets so that immediate results may help to allay the fears of consumers and the government. However, this will require significant testing both in terms of products and parameters to determine their safety. Further, testing should not be used for food control but to confirm that the implemented activities deliver safe food. It is important to implement the National Residue Control Plan and to consolidate the test facilities in both government and private-sector laboratories for better resource utilization and management. The concept of networking of laboratories at national level is needed. There is also need to use the private sector to strengthen the governmental food control activities.

3.4.6. Training

As seen from the analysis, small-scale producers and processors produce 70% of the pork supplies. It is important to train and increase awareness of producers and processors. Training is also needed for government agencies, especially at local levels. Consumers also need awareness on food safety to be able to understand foodborne hazards and risks and demand hygienic and safe products which will then lead to safer production and application of hygienic practices.

3.5. Food safety production models

High public concern over unsafe foods has clearly indicated an unsatisfied demand on the consumer side. Many players in agricultural value chains adopt safety as a core selling point for their products. Emerging models are briefly discussed below with more details available in Annex 17.

Vertical integration: Large firms manage all stages in the value chain to enhance traceability and quality assurance.

Linkages: In the context of resource constraints to expansion, linking with firms that require high quality is perhaps the best currently available option. A typical linkage is between well-known distributors, co-operatives and processing companies. For example, many VietGAP-certified products can be now obtained from Saigon Coop Mart, a prominent modern distributor that has well established relationships with many co-operatives and companies in Ho Chi Minh City and many other provinces in Vietnam.

Co-operatives: Multiple households come together to use standardized GAP. This can address issues associated with small-scale production at households and improve marketing capacity. This is the model promoted by MARD through the Livestock Competitiveness and Food Safety Project (LIFSAP) supported by the World Bank with the Good Agricultural Husbandry Practices certification.



Wet market upgraded through WB-funded LIFSAP
 Credit: Stéphane Forman/WB

VietGAP: In this ‘field-to-table’ model, good farming practices in producing vegetables and good manufacturing practices (GMP and HACCP) in packaging, processing, transport and storage with hygiene and management standards are applied to ensure strict control at all stages of food value chains. At production level, farmers have to comply with GAP standards and among these is VietGAP, a process of GAP established and issued by MARD from 28 January 2008. Many supermarkets, canteens and safe vegetable stores now require vegetable products originating from certified safe agricultural zones or produced under VietGAP principles.

Basic GAP: With technical support from JICA, a project on improving crop productivity and quality developed and evaluated Basic GAP which is specific, simpler and more accessible for farmers to deliver good farming practices without having to use the term ‘towards VietGAP’. In 2014, MARD issued a Decision No. 2998/QĐ-BNN-TT, Basic GAP Guidance for Vegetable Production in Vietnam.

Community-based certification: As an alternative to VietGAP, in which registration through a certification organization or body is required, food safety monitoring could be a community-based model. Such community-based models are effective in many countries, especially in small-scale production that involves a quality management system such as Participatory Guarantee System (PGS). In Vietnam, PGS has been used by the Agriculture Development Denmark Asia and VredesEilanden Country Office Vietnam for safe organic vegetable production.

Safe Agricultural Zones: Branding of specific production areas as ‘Safe Agricultural Zones’ is intended to assure production of safe agricultural food products in terms of uncontaminated locations, primary processing and trading. Sustainable Safe Agricultural Zones could ensure (i) food safety risks in agro-production are avoided, (ii) production activities are organized and efficiently linked with processing and marketing, (iii) efficiencies from investments in processing and marketing infrastructure are attained and (iv) the climate for encouraging greater investments by farmers and agribusiness is conducive. The ADB QSEAP supported 16 provinces to establish and plan Safe Agricultural Zones.

3.6. Key messages from this section

- The food safety related issues and weaknesses vary from one value chain to another. Development interventions to address such are to be tailored to local contexts to be effective.
- Ha Noi and Ho Chi Minh City are the largest markets for pork and vegetables. The value chains are characterized by an increase in modern trade outlets such as supermarkets and convenience stores and significant demand from organizational buyers such as hotels, restaurants and

schools. Insufficient production requires supplementary supply of pork from other provinces.

- Eighty per cent of pork and 85% of vegetables are marketed mainly in retail (wet) markets and small-scale producers dominate the value chain. Even though the control of food safety has been improved as a result of increasing intensification of pork production and rapid development of the supermarket system, small-scale production and the flow through traditional/informal markets still dominates in most agricultural value chains and so the food safety risk remains high.
- Seventy-six per cent of pigs are processed mainly in small slaughtering facilities with generally poor hygiene conditions.
- Characterized by considerable participation of small-scale players along pork and vegetable value chains, a multi-dimensional approach that covers a wide range of various actions, for example, technical training of producers, promoting best practices and government control, is strongly recommended for these value chains (see pillars 3 and 8 of the WBG toolkit).
- Given that consumers have a strong preference for fresh animal-source food and fresh fruit and vegetables and most do not store purchased food for long periods, focus should be placed on (i) identifying technological solutions and associated management procedures to enable quick and efficient testing of fresh products, (ii) promoting business models with lean and efficient value chains to deliver fresh products to consumers within a short time and minimizing food safety risk and (iii) raising awareness among end consumers and producer groups.

4. Food safety hazards, risk and health impact

4.1. Risk-based approach: hazards and risks

Foodborne disease is a significant public health issue in Vietnam. The contamination of popular foods such as pork and vegetables can occur all along the food value chain. It is important to understand how and where food safety issues arise to mitigate and prevent foodborne diseases. Risk analysis is an approach to managing food safety that answers the questions of concern to policymakers and the public: Is our food safe? If there are safety risks, how significant are they (risk assessment), what are the best ways of reducing the risks (risk management) and how do we communicate these risks to food safety stakeholders (risk communication)? Risk assessment identifies the critical control points and management strategies that need to be applied to eliminate or minimize the risks. Therefore, it is important to differentiate between hazards and risks in food safety.

However, risk analysis is still not well understood and not much applied in the developing world, including Vietnam. In Vietnam, the national regulation imposes the application of risk assessment in high-risk products for both domestic and export products, but capacity is still lacking in practical application due to limited resources (financial and human). The situation is especially urgent in Vietnam's huge informal market sector, where most domestically produced food is supplied. Therefore, developing a risk-based approach to food safety is crucial to improve food safety management in Vietnam and will help generate evidence for policymakers on how risk assessment can be used for food safety management.

The current enabling environment is supportive for development and application of risk-based approaches to food safety. The Food Safety Law (in effect since July 2011) mandates the application of risk assessment to high-risk food products intended for both domestic consumption and export. In May 2013, the Government of Vietnam announced its support for the development of a rapid detection system for food safety and MARD issued a circular on using risk assessment in food safety management. However, in reality, risk assessment is rarely applied due to the above stated constraints.

What is the actual capacity in risk-based approaches to food safety in Vietnam? This capacity is spread among universities, research institutes, ministries (MOH, MARD and the Ministry of Natural Resources and Environment [MONRE]) and the National Codex Committee. Training has been done with international assistance. However, to the best of our knowledge, except for the export sector there is low systematic application of risk-based approaches to food

Hazards are things that have potential to cause harm. In the context of food safety, a hazard can be classified as a substance (biological: viruses, bacteria and parasites; chemical: growth promoters, antibiotics and pesticide residues; or physical) present in food that has the ability or the potential to cause an adverse health effect in consumers.

Risk is the chance that a person might be harmed if exposed to a given hazard. Risks in food safety are usually referred to as having short-term or long-term effects on human health.

Risk analysis is a process composed of hazard identification, risk assessment, risk management and risk communication

safety due to the lack of capacity, resources and an enabling environment.

One of the recent and more coordinated efforts to develop risk assessment for food safety in Vietnam is the Taskforce for Food Safety Risk Assessment. It consists of researchers working on risk assessment and food safety as well as representatives of MOH and MARD. A series of hands-on training courses with a focus on case studies of risk assessment for food safety were organized to strengthen the risk assessment capacity of taskforce members and policymakers. Case studies of food safety risk assessment were conducted and published. The next steps are to enable risk-based approaches to be easier to use and adaptable to the local context. The taskforce could benefit from the support of ministries, for example, in its institutionalization.

4.2. Food safety hazards

Vietnamese food safety hazards and origins of food hazards can be categorized either from each step of the food production chains or each specific food type. Food production chains involve various actors who play particular roles in terms of eliminating or introducing the hazards. Depending on the type of hazard (biological, chemical or physical), their potential presence or absence along the food production chain is low, medium or high. On the other hand, those hazards are also specified for each food type. Food types (commodities) are either ready-to-eat or raw food which can be further categorized as of animal or plant origin. The dynamics of the

value chain actors and of the hazards themselves along the food chain might result in complex challenges related to food safety risk management. Furthermore, the perceptions among food chain actors of hazards are also diverse. Therefore, it is important to associate the food hazards with either food production chains or food commodities.

Input suppliers and producers mainly deal with the quality of primary products, such as live animals or on-field vegetables, whereas traders and collectors play a role in maintaining the good quality of the products. Slaughtering or harvesting steps help to separate the eligible parts and subsequent processing steps enhance the quality of the products. During slaughtering, harvesting and processing, contamination with hazards can occur if food safety measures are not well implemented. The distribution stage maintains appropriate storage practices and conditions for either raw or processed food sources. The end node at consumption is aligned with preparation and cooking steps which could further result in hazards and contaminated food, with potential risks for consumers.

4.2.1. Biological hazards

Foodborne pathogens (hazards) which have been recorded in reports as well as described in literature are varied and geographically specified. Biological hazards in food chains include parasites, fungi, bacteria, viruses and prions. Among these causative pathogens, infection mechanisms can be further classified by predominant clinical features (upper or lower gastrointestinal, neurological, allergic type or infectious features) or pathogenic mechanism (intoxication, toxin-mediated infections and infections) (WHO 2008; IAFP 2011). Based on data from literature reviews conducted by ILRI covering tens of thousands of food samples, it appears that a not negligible proportion of food is contaminated with microbes and parasites. However, direct correlation with human diseases cannot be currently established and risk exposure studies should be conducted. Annex 14 provides an overview of biological food safety hazards in the food chain. While various hazards are listed, only little information is available for most of the hazards. However, an important hazard is Salmonella in meat with a prevalence level in some specific studies of 33–43% in pork sold at markets. Campylobacter was recorded as an important hazard in chicken. Among various studies on Salmonella contamination in pork, details from two studies conducted in Ha Noi are provided below:

- **Prevalence/contamination in pig carcasses in a Ha Noi slaughterhouse** (Phu Thai 2007): Of 356 samples, 49% of meat swabs and 35% of lymph nodes were Salmonella-positive. There was some association between farm type and Salmonella prevalence in pig carcasses (lymph node cuts) with higher prevalence levels in pigs from backyard farms.
- **Salmonella in minced pork sold at Ha Noi retail markets** (Pham Thi Thu Hien 2009): Of 251 samples, 37% were Salmonella-positive. There was a correlation

between the season and Salmonella contamination with higher contamination in spring (21%) than in winter (63%).

For the purpose of comparison, figures from zoonoses monitoring in Germany indicate Salmonella prevalence of 1.4% in pork and 7.6% in chicken (BVL 2010) with a decreasing trend since 2006. An estimate by the European Food Safety Authority (EFSA) based on data from 2010 concluded that 10.6%, 17.0% and 56.8% of the human salmonellosis cases in Europe are attributable to broilers, laying hens and pigs, respectively (EFSA 2012).

Both *Giardia* spp. and *Cryptosporidium* spp. were found contaminating vegetables at the same level, 15.4%. Concentrations of *Cryptosporidium* in samples ranged from 100 g vegetable samples with a median number of 100 oocysts per 100 ml/g (Tram Thuy Nguyen et al. 2016). An earlier study in Ha Noi found *Cyclospora* spp. in 34/288 (11.8%) of market water and herb samples and 24/287 (8.4%) of farm samples. All varieties of herbs sold at the market and grown in farms were contaminated with *Cyclospora* spp. oocysts. A marked seasonal increase in *Cyclospora* spp. contamination was observed before the rainy season from November to April (39/288) compared to the rainy season from May to October (19/268) ($p = 0.006$) (Tram et al. 2008). Moreover, water used to moisten vegetables is a source of *E. coli* and protozoan parasite contamination at markets in Ha Noi (Tram and Dalsgaard 2014). Water spinach grown on Nhue River was contaminated with *E. coli* O157:H7 and washing reduced contamination from 3.23 ± 1.64 to 1.42 ± 1.77 colony-forming units (CFU) per gram. The average count of *E. coli* O157:H7 in river water was 4.77 log CFU/100 ml (Kieu Thanh Truc et al. 2014).

Analysis of microbial quality of safe vegetables produced by VietGAP in Lam Dong province from 2012 to 2014 revealed that among 1100 samples, 3% were contaminated with Salmonella and 16% with *E. coli*. This contamination rate was lower in samples from safe vegetable production farms, varying from 1–1.08% (MARD 2015). Results from zoonoses monitoring in Germany found the absence of Salmonella in leaf lettuce (confidence interval [CI]: 0.0–0.4) (BVL 2014).

Water used for food production—for example, for livestock production or irrigation—is an important element for food safety. Generally, ground water from wells, tube wells or taps is commonly used for livestock production and surface water from open water bodies for crop production and the water quality would be expected to be acceptable. Vietnam achieved the Millennium Development Goals for water and sanitation in 2015 (Government of Vietnam 2015). However, in the case of wastewater, reuse for vegetable production or use of unsafe water to clean or moisten vegetables poses a health risk to producers and consumers (Toan et al. 2014; Tram and Dalsgaard 2014). Table 3 summarizes the food sources of biological hazards. Most of the hazards are related to consumption of raw/fresh or undercooked products.

Table 3: Summary of food sources of major microbial hazards and health effects (in order of the magnitude of health burden in the WHO Western Pacific region B (which contains Vietnam)).

Organism	Food sources	Health effects
Viruses		
<i>Noroviruses</i>	Raw products, contaminated drinking water, uncooked foods, contaminated water	Diarrhea, throwing up, nausea, stomach pain; fever, headache, body aches, urinate less, dry mouth and throat, and feel dizzy.
<i>Hepatitis A virus</i>	Raw products, contaminated drinking water, uncooked foods, contaminated water	Mild "flu-like" symptoms, such as fatigue and loss of appetite, or more serious symptoms: jaundice, nausea, vomiting, diarrhea, fever, stomach pains
Bacteria		
<i>Salmonella Typhi</i>	Food or drink beverages that have been handled by a person who is shedding or sewage contaminated with <i>S. Typhi</i>	Typhoid fever is a life-threatening illness, high fever (39° to 40°C), stomach pains, headache, or loss of appetite; rash of flat, rose-colored spots
<i>Campylobacter jejuni</i>	Raw and undercooked poultry, unpasteurized milk, contaminated water	Diarrhea and bloody diarrhea, some cases develop arthritis, Guillain-Barre syndrome/paralysis (immune-compromised person)
<i>Non-typhoidal salmonella spp.</i>	Eggs, poultry, meat, unpasteurized milk or juice, cheese, contaminated raw fruits and vegetables	Diarrhea, fever, and abdominal cramps; some cases, the diarrhea may be so severe that the patient needs to be hospitalized
<i>Escherichia coli O157:H7</i>	Undercooked beef (especially hamburgers), unpasteurized milk and juice, raw fruits and vegetables (sprouts) and contaminated water	Diarrhea (often bloody) and abdominal cramps; more severe, kidney failure-hemolytic uremic syndrome (HUS): fever, abdominal pain, pale skin tone, fatigue and irritability
<i>Shigella spp.</i>	Raw products, contaminated drinking water, uncooked foods, contaminated cooked foods due to infected food handler	Diarrhea, fever, and stomach cramps; some people who are infected may have no symptoms at all
Protozoa and parasites		
<i>Giardia</i>	Untreated or improperly treated water, ice; uncooked food (fruit, vegetable) contaminated with <i>Giardia</i>	Diarrhea, gas, greasy stools that tend to float, stomach or abdominal cramps, upset stomach or nausea/vomiting, dehydration (loss of fluids)
<i>Entamoeba histolytica</i>	Fresh fruit, ice or vegetables; milk, cheese, or dairy products contaminated with <i>E. histolytica</i>	Diarrhea, stomach pain, and stomach cramping, amebic dysentery, fever
<i>Taenia solium</i>	Undercooked or raw infected pork, pig blood; drink water or eat food contaminated with tapeworm eggs	Lumps under the skin, which can sometimes become tender; seizures and/or headaches, neurocysticercosis, stroke or death
<i>Ascaris spp</i>	Contaminated food, vegetable and water by <i>Ascaris</i> egg due to poor personal hygiene, poor sanitation	Often no symptoms, abdominal discomfort, intestinal blockage and impair growth in children, lose weight
<i>Clonorchosis/ Opisthorchosis</i>	Undercooked fish and raw fish	Abdominal pain, nausea, jaundice, diarrhea (acute); Liver cirrhosis cholangitis, cholelithiasis, pancreatitis, and cholangio carcinoma (chronic)
<i>Paragonimus spp.</i>	Raw or undercooked infected crab or crayfish, freshwater crustaceans	Diarrhea, abdominal pain, cough, discomfort, and low-grade fever, mimic meningitis

Source: US Centers for Disease Control and Prevention, US Department of Health and Human Services (2016) and Havelaar et al. (2015).

4.2.2. Chemical hazards

Chemical hazards in foods, especially in vegetables and meat, are the most common hazards of public concern which can negatively affect human health. Toxic chemicals in food can be environmental contaminants, natural toxins, allergens, mycotoxins, pesticide residues, veterinary drugs and feed additives, intentional food additives, substances formed during food processing, substances derived from food contact materials and adulterants. Chemical hazards in most foods generally arise at the farm or during slaughter/harvesting, storing and processing. Chemical hazards that arise at the farm level are the most important and most difficult for

consumers to control and identify in contaminated foods (Andrée et al. 2010; Tran Thi Tuyet-Hanh et al. 2015). Figure 8 describes the process from farm to fork where chemical contamination may occur; the figure shows there are various potential chemical hazards that can arise at different stages of the food production chain.

Some common potential chemical hazards in foods are discussed below:

- **Heavy metals:** lead, cadmium, arsenic and mercury
- **Antibiotic residues:** β-lactam (penicillin, cephalosporin), aminozid – AG, macrozid, n lincosamid

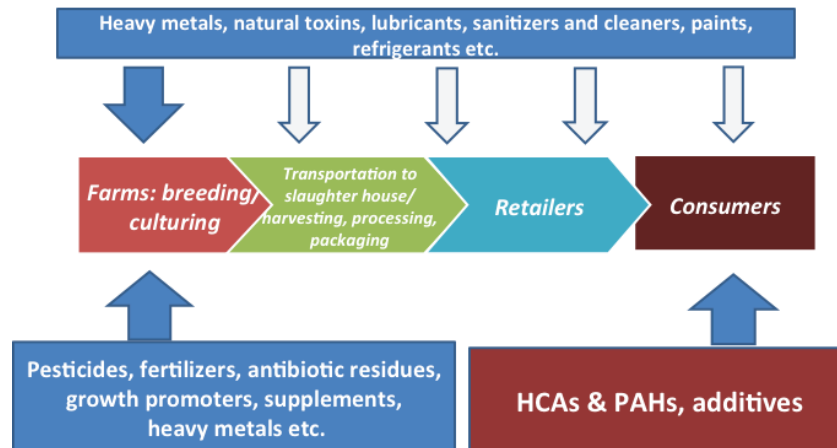


Figure 8: Potential chemical hazards from farm to fork

and chloramphenicol. Vi Thi Thanh Thuy (2011) found relatively high proportions of antibiotic residues in meat products, pig kidney and pig liver samples collected in Thai Nguyen, ranging from 10.2% to 39.7% with an average of 27.4%. La Van Kinh (2009) reported that chlortetracycline antibiotic was widely used in pig feed in Binh Duong (53.9% of samples) with an average concentration of 140 parts per million (ppm) and the highest level was 275 ppm, five to six times higher than the recommended level for disease prevention and growth stimulation.

- **Carcinogens** (sulphamethazine, oxytetracycline, furazolidone)
- **Growth promoters:** β -agonists (salbutamol, clenbuterol) in pork. According to a study in Binh Duong province, 4.61% of pig feed samples were positive for β -agonists with the concentration ranging from 2.12 to 28.4 parts per billion (ppb). The proportion of positive samples in farm-mixed feed tended to be higher than that in products from markets. In this province, 7.5% pork samples were positive for β -agonists with the concentration ranging from 1.15 to 3.42 ppb (La Van Kinh 2009).
- **Dioxins and other persistent organic pollutants:** A study by Tran Thi Tuyet-Hanh et al. (2015) found elevated levels of dioxins/furans in potentially high-risk local foods in Bien Hoa and Da Nang dioxin hot spots, including free range chicken meat (4.6–95 pg Toxic Equivalent [TEQ] per gram), freshwater fish (14.4–86.6 pg TEQ/g), freshwater snails (53.6 pg TEQ/g), free-range duck meat (8.2–19.6 pg TEQ/g), free-range chicken eggs (7.3–29.7 pg TEQ/g), free-range duck eggs (15.7 pg TEQ/g) and beef (3.8–24.6 pg TEQ/g), which were many times higher than the standard levels.
- **Additives:** sodium nitrate, sodium nitrite, potassium nitrate and potassium nitrite
- **Heterocyclic aromatic amines and polycyclic aromatic**

hydrocarbons (Tran Thi Tuyet Hanh et al. 2015)

- **Antimicrobial residues:** 5.5% positive for tetracycline residues (Duong Van Nhiem 2005). Antimicrobial resistance analysis by Chu Van Tuat (2007) in retail pork sold in Ha Noi found 93% of *E. coli* isolates were resistant to at least one of 12 tested antibiotics. Both authors reported an increased content of residues (tetracycline) or antimicrobial resistance (of *Escherichia coli* isolates) in meat from suburban versus urban districts (Duong Van Nhiem 2005) or from neighbouring provinces versus Ha Noi (Chu Van Tuat 2007).

In addition, a detailed overview of selected chemical hazards in crops and their origins is shown in Table 4.

In Lam Dong province, 3.07% (534/10999) of vegetable samples collected from 2012 to 2014 had exceeded the MRLs of pesticides (MARD 2015). A 2012 survey in five provinces by the Department for Plant Protection found that farmers who produced vegetables in a traditional manner used 48 types of pesticides including nine that were banned (Nereistoxin, Imidaloprid, Fenobucarb, Carbosulfan, Cartap, Profenofos, Acetamiprid, Propiconazole and Isoprothiolane). Farmers applying safe vegetable production procedures also used 48 types of pesticides but only three were banned for vegetable production (Cartap, Acetamiprid and Nytenpyram). In general, the compliance of farmers using safe vegetable production procedures was higher than that of farmers using traditional methods. For instance, 99.8% of farmers in the safe vegetable group did not use pesticides before a certain time prior to harvest as compared to 45.5% of farmers in the traditional group. Data from 2014 showed that 6.2% (22/350) of vegetable samples had exceeded MRLs of pesticides. Herbs tended to have a higher prevalence of pesticide residues (19%), followed by beans (4.3%) and rau ngot (3%) (MARD 2015).

Table 4: Origins of selected chemical food hazards in vegetables

Hazards	Causes of contamination
Pesticide residues higher than the permitted levels (MRLs)	Use of not authorized pesticides by farmers are not permitted Pesticides are of poor quality The isolation time is not followed Misuse of devices, not tested before use Pesticide residues in soil from previous crop season Throwing away or dumping excess pesticides into the soil and water
Contamination by lubricants, sanitizers and cleaners, paints, refrigerants, fertilizers, adhesives and plastics	Use of inappropriate chemicals to clean and disinfect Leakage of oil, grease and paint on the equipment in contact with product Use of containers of chemicals, fertilizers and petroleum from the previous season Pouring chemicals (lubricants and detergents) near the products and packaging materials
Concentrations of heavy metals (cadmium, lead, copper and mercury) in the products exceed the allowed maximum	Continuous use of chemical fertilizers, including manure with high levels of heavy metals Use of inappropriate manure (containing high concentrations of cadmium and mercury) Lead pollution from car fumes if the farm is near a highway High levels of heavy metals in water High levels of heavy metals in soil from previous crop or near industrial zones Use of contaminated irrigation water
Natural toxins – allergens, mycotoxins, alkaloids and enzyme inhibitors	Storage condition is not suitable Prolonged storage in poor conditions resulting in mouldy products Storage of potatoes in the light
Allergens	Some substances that consumers may be allergic to, such as sulphur dioxide used against grape rot
Supplements	Colourings for ripe fruits, disinfectants

Antimicrobial use and resistance

Antimicrobial resistance is a multi-dimensional threat to human survival, public health, trade, the economy and overall regional and global sustainable development. This is also the case for Vietnam with increasing and uncontrolled use of antibiotics in the health system and veterinary medicine and for growth promotion and disease prevention in agriculture, horticulture, livestock and aquaculture (Newman et al. 2016). If no actions are taken to address the global antimicrobial resistance threat, it will cost an estimated 10 million lives every year worldwide by 2050, that is, more than the present annual death toll from cancer. Antimicrobial resistance not only impacts human health today, but can also lead to serious economic implications such as the loss of workforce. Emerging resistance in Gram-negative bacteria (extended-spectrum beta-lactamase, *Klebsiella pneumoniae* carbapenemase, New Delhi Metallo-beta-lactamase-1, OXA-48-like, Carbapenam-resistant and, very recently, Colistin-resistant bacteria) is now posing a serious threat to human and animal health. New antibiotics under development will, at least for the time being, not be fully effective against these ‘superbugs’.

Thu et al. (2012) carried out a point-prevalence study with the use of standard published guidelines to evaluate the appropriateness of the indications for antibiotic prescriptions. A survey of 7571 in-patients in 36 hospitals provided the following results. The surgery wards had the highest rate of antibiotic prescriptions (93.2%) and medical wards the lowest (48.2%). Among 5,104 patients using antibiotics, three types of antibiotics were most commonly used, namely, cephalosporin (70.2%), penicillin (21.6%) and aminoglycosides (18.9%). Additionally, almost one-third of the patients (n = 1,573) had an inappropriate indication for prescription. Surprisingly, risk factors associated with inappropriate indication for antibiotic prescription were seen in hospitals at the national level, obstetrics and gynaecology departments and even surgical wards.

High prevalence of antibiotic resistance in commensal *Escherichia coli* has been reported by Dyar et al. (2012) in a study of children in rural Vietnam. Isolates of *E. coli* from faecal samples from 818 children aged 6–60 months in Bavi, which is near Ha Noi, were tested. All the daily antibiotic use data of these children were collected three weeks before sampling and analysis. Numerous antibiotics were found

with high prevalence of resistance: tetracycline (74%), co-trimoxazole (68%), ampicillin (65%), chloramphenicol (40%) and nalidixic acid (27%). Two isolates were resistant to ciprofloxacin and 60% of isolates were resistant to three or more antibiotics. Recent sulphonamide use was associated with co-trimoxazole resistance (Odds Ratio [OR] 3.2, 95% CI 1.8–5.7) and beta-lactam use with ampicillin resistance (OR 1.8, 95% CI 1.3–2.4). Isolates from children aged 6–23 months were more likely to be resistant to ampicillin (OR 1.8, 95% CI 1.3–2.4) and co-trimoxazole (OR 1.5, 95% CI 1.1–2.0). Besides that, there were relationships between geographical areas and tetracycline and ampicillin resistance. In a multi-centre study on antibiotic resistance of *Staphylococcus aureus*, 235 strains of *Staphylococcus aureus* isolates were used for the antibiotic resistance surveillance. These isolates were obtained by seven clinical laboratories from a variety of specimens collected from in-patients in seven hospitals in Danang, Cantho and Ho Chi Minh City.

A 2010 report titled Situation Analysis, Antibiotic Use and Resistance in Vietnam found that the country had the highest prevalence of penicillin-resistant (71.4%) and erythromycin-resistant (92.1%) *Streptococcus pneumoniae*, a very common cause of respiratory infections. Seventy-five per cent of pneumococci are resistant to three or more classes of antibiotics. During 2000–01, 57% of *Haemophilus influenzae*, another common respiratory bacterial human pathogen, isolated from children in Ha Noi were resistant to ampicillin. A study published in 2009 reported 42% of Gram-negative bacteria were resistant to ceftazidime, 63% to gentamicin and 74% to nalidixic acid in the hospital and the community.

Antimicrobial resistance is increasing. In the early 1990s in Ho Chi Minh City, 8% of *Pneumococcus* isolates were resistant to penicillin. By 1999–2000, this had risen to 56%. Similar trends were seen in northern Vietnam (GARP – Vietnam National Working Group 2010).

In animals, the wide use of antibiotics in agriculture (for example, in feed and as preventive/curative drugs) has also contributed to antimicrobial resistance (Nguyen et al. 2013). Although data on antimicrobial use for livestock are limited, a first attempt to estimate the overall consumption of in-feed antimicrobials in Vietnam found that chicken production



A private firm producing probiotics for animal feeds
Photo courtesy of Nguyen Viet Hung/WB

would use 42.2 tons [95% CI = 26.2–58.2] and pig production, 981.3 tons per year [95% CI = 616.5–1346.0] giving a total of 1023.5 tons per year [95% CI= 642.8–1404.2] (Carrique-Mas 2015).

MARD recently issued Circular No. 06/2016 dated 31 May 2016 on promulgating the list of antibiotic content permissible to use in animal feed for the purpose of growth stimulus in Vietnam. The circular took effect on 15 July 2016, replacing the regulations on antibiotics used in animal feed provided in Circular No. 81/2009/TT-BNNPTNT dated 25 December 2009. According to this circular, 15 antibiotics are permitted for use as growth stimulants in livestock and poultry feeds. In addition, the circular contains some principles that should be applied when using these antibiotics in livestock and poultry feeds (MARD 2016).

A promising innovation to replace antibiotics in feed pre-mixes is the application of live bacterial supplements, referred to as probiotics (Viet 2016). For example, such an advanced technological solution has been recently developed by Biospring Vietnam in conjunction with international research institutions.



A small-scale slaughterhouse in Ha Noi in operation,
Photo courtesy of Donald Macrae/WB

4.2.3. Physical hazards

Physical hazards in foods are foreign objects from the environment (for example, soil, stones, sticks, weeds or seeds), foreign objects from damaged equipment, buildings or workshops (for example, glass, wood, metal, plastic, hair or bones) and foreign objects handled or worn by people (for example, jewellery, hair clips or pens).

Contamination of food with radioactive substances makes it harmful to those who eat it. Radioactive contamination of the food chain (animals and plants) and the environment can occur through accidental leaks at radiation research centres and nuclear power plants or through lapses in food preservation by irradiation.

Origins of potential physical hazards in foods

- Environmental hazards can be mixed into products during harvest or post-harvest processing
- Unclean harvesting containers, equipment and packaging materials; packing and transportation equipment containing foreign objects
- Light bulb breakage above exposed food products during packing
- Damaged equipment, buildings or workshops
- Careless or untrained workers

4.3. Foodborne disease outbreaks

4.3.1. Overview of available information

Foodborne disease outbreaks appear in official reports and can provide insights into the type of risks present but it must be kept in mind that reported outbreaks represent only a very

small proportion of all foodborne disease. For example, in China, reporting of sporadic foodborne diseases is voluntary but not required. A population-based study in Gansu Province estimated 30 million cases of acute intestinal illness occur each year, requiring 22 million medical consultations and 20 million courses of antibiotics. Just 400 cases were sent to the health reporting system (Sang et al. 2014).

On the other hand, in Malaysia, it is a requirement by law to notify all cases of cholera, typhoid, paratyphoid, dysentery and food poisoning. During 1990–2006, annual notifications for these diseases ranged from 2,934 to 10,416 cases. In contrast, a community study estimated at least 13 million episodes of acute diarrhoea annually, most of which are likely to be the result of these notifiable diseases. The figures indicate that cases of acute diarrhoea in Malaysia are grossly under-reported, with less than 0.1% of cases being captured by the national surveillance system annually (Gurpreet et al. 2011; Ngo Thi Hoa et al. 2011).

In Vietnam, the food safety situation remains difficult despite substantial efforts of agencies at different levels. Statistics show that in 2012, VFA registered 167 outbreaks of food poisoning involving approximately 5,500 infections and 34 deaths (VFA 2016). In 2013, there were approximately 5,300 cases of food poisoning reported and the causes of many of these were unknown. A summary of the numbers of food poisoning outbreaks from 2006 to 2013 is presented in Table 5.

The MOH reporting system is generally believed to under-report the number of cases of food poisoning outbreaks in the country as most of the reported cases come from large catering centres like industrial zones, schools and festive events. Many sporadic cases in the communities have not been reported and no clinical evidence is found after the fact.

Discussions with officers from MOH assume that the estimated number of food poisoning cases in Vietnam is highly under-reported. Under-reporting (discrepancy between

Table 5: Numbers of food poisoning outbreaks, cases and deaths in Vietnam, 2006 to 2013

Year	Outbreaks	Cases	Deaths	Outbreaks with more than 30 cases
2006	165	7,135	57	Na
2007	247	7,329	55	Na
2008	205	7,828	61	Na
2009	152	5,212	35	Na
2010	175	5,664	51	Na
2011	142	4,500	27	Na
2012	167	5,508	34	38
2013	163	5,348	28	39

Source: VFA (2016)/na: not available

reported and estimated cases in the population) is even common in developed countries with an expected stronger surveillance system in place, for example, only 1/47 cases of campylobacteriosis and 1/58 cases of salmonellosis are expected to be reported in the European Union (Havelaar et al. 2013). The level of under-reporting differs widely between European Union countries with estimated 1/7 for Germany and 1/62 for Poland for Salmonella cases reported annually between 2001 and 2005 (Haagsma et al. 2013).

Studies from other countries (including the United States of America, China and Malaysia) also suggest only a small proportion of foodborne disease is ever recorded as outbreaks, for example, less than 0.1% of cases being captured by the national surveillance system annually (Gurpreet et al. 2011). In another example from Australia, there were an estimated annual 4.1 million (90% CI: 2.3–6.4 million) cases of foodborne gastroenteritis acquired in 2010, along with 5,140 (90% CI: 3,530–7,980) cases of non-gastrointestinal illness and 35,840 (90% CI: 25,000–54,000) cases of sequelae. Approximately 25% (90% CI: 13%–42%) of the 15.9 million episodes of gastroenteritis that occurred in Australia arose from contaminated food. This equates to an average of approximately one episode of foodborne gastroenteritis per person every five years.

Data on the number of hospitalizations and deaths represent the occurrence of serious foodborne illness. Including gastroenteritis, non-gastroenteritis and sequelae, there were an estimated annual 31,920 (90% CI: 29,500–35,500) hospitalizations due to foodborne illness and 86 (90% CI: 70–105) deaths due to foodborne illness in 2010¹⁵. Therefore, it is largely accepted that in Vietnam the under-reporting of foodborne diseases is important and perhaps captures only a low percentage of what actually happens.

During 2014 and 2015, there were almost 370 food poisoning outbreaks in Vietnam involving over 10,000 cases and resulting in 66 deaths. In 2014 alone, VFA reported 194 food poisoning outbreaks involving over 5,000 people, almost 4,000 of whom were hospitalized and 43 died. The numbers of food poisoning outbreaks reported in 2015 were lower than those in 2014; however, the numbers of cases and of people hospitalized were higher (Table 6).

During four years of reporting (2012 to 2015), the highest proportion of foodborne disease outbreaks was traced back to micro-organisms (42%), followed by natural toxins (28%) and chemicals (4%) while for 26% the causal agent remained unknown (Table 7).

Table 6: Numbers of food poisoning outbreaks, cases, hospitalizations and deaths in Vietnam in 2014 and 2015

	2014	2015	Comparison; percentages in parentheses
Outbreaks	194	179	-15 (7,7%)
Cases	5.203	5.552	+349 (6,7%)
Hospitalizations	4.160	5.147	+987 (23,7%)
Deaths	43	23	-20 (46,5%)
Outbreaks ≥ 30 cases	40	44	+4 (10%)
Outbreaks < 30 cases	154	129	-25 (16,2%)

Source: VFA (2016)

Table 7: Numbers of foodborne disease outbreaks in Vietnam from 2010 to 2015, by cause of outbreak

Cause of outbreak	2012	2013	2014	2015	Total
Micro-organisms	76	82	72	67	297
Chemicals	12	8	4	3	27
Natural toxins	43	26	65	63	197
Unknown	36	47	53	46	182
Total	167	163	194	179	703

Source: VFA (2016)

¹⁵ [http://www.health.gov.au/internet/main/publishing.nsf/Content/E829FA59A59677C0CA257D6A007D2C97/\\$File/Foodborne-Illness-Australia-circa-2010.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/E829FA59A59677C0CA257D6A007D2C97/$File/Foodborne-Illness-Australia-circa-2010.pdf)

4.3.2. Commodities, affected groups, time and locations

Regarding the geographical area of food poisoning outbreaks in 2014 and 2015, the northern mountainous provinces of Vietnam accounted for the largest proportion (about 30%). Food poisoning outbreaks in other regions of the country were distributed relatively equally (Table 8).

Most of the reported food poisoning outbreaks occurred at households (about 60% of outbreaks in 2010-14 and about 40% in 2013-15). Food poisoning outbreaks at households accounted for 50–65% of all cases of food poisoning reported. Collective kitchens (canteens and industrial kitchens) accounted for 10–20% of food poisoning outbreaks. Comparatively fewer reported outbreaks of food poisoning (in many years less than 10%) have been related to the consumption of street foods (Table 9).

Table 8: Numbers of foodborne disease outbreaks in Vietnam in 2014 and 2015, by geographical area

Geographical area	2014	2015	Comparison
Northern mountains	72	56	-16
Red Delta river	27	22	-5
North central	16	19	+3
Central coast	27	18	-9
Highland	14	18	+4
South East	14	20	+6
Mekong Delta river	24	26	+2
Total	194	179	-15

Source: VFA (2016)

Table 9: Numbers of foodborne disease outbreaks in Vietnam from 2012 to 2015, by location

Location	2012	2013	2014	2015
Household	95	70	106	85
Collective kitchen	24	23	41	41
Restaurant or hotel	10	12	6	8
Event (wedding)	15	30	16	12
Street	3	12	8	12
School	10	7	7	8
Others	10	9	10	13
Total	167	163	194	179

Source: VFA (2016)

The types of food responsible in the food poisoning outbreaks were relatively diverse. However, a large proportion of the food poisoning outbreaks were caused by food mixes (about 60%), followed by seafood and mushrooms (about 15%). Other food types (meat, milk, cereals and vegetables) accounted for a very small percentage of events (Table 10).

With respect to the reported causes of death due to food poisoning in 2014 and 2015, natural toxins in seafood (puffer fish, oysters and sea snails) accounted for about 50% of deaths followed by natural toxins in mushrooms (17–30%). Alcohol, chemicals and unspecified causes accounted for a very low proportion of deaths from food poisoning (Table 11).

Table 10: Numbers of foodborne disease outbreaks in Vietnam from 2012 to 2015, by food type

Food type	2014	2015	Comparison
Seafood	28	29	+1
Meat and meat products	13	14	+1
Eggs and egg products	2	2	0
Milk and milk products	2	0	-2
Cereals and cereal products	4	1	-3
Vegetables	3	1	-2
Fruits and fruit products	4	1	-3
Mushrooms	24	26	+2
Wine	4	5	+1
Food mixes	105	94	-11
Unknown/others	3	6	+3
Total	194	179	-15

Source: VFA (2016)

Source 11: Numbers of deaths due to foodborne disease outbreaks in Vietnam, by cause of death

Cause of death	2014	2015	Comparison (number)
Traditional alcohol (high levels of methanol)	3	3	0
Natural toxins in mushrooms	13	4	-9
Natural toxins in toads, puffer fish, oysters, sea snails	22	15	-7
Chemicals	0	0	0
Other/unknown	5	1	-4
Total	43	23	-20

Source: MOH/VFA [no date]

4.4. Food safety risks and health impact

4.4.1. WHO 2015 report and other sources on foodborne disease burden

Information on health impacts expressed in burden of foodborne diseases is incomplete; detailed information is not available or limited to selected developed countries, for example, the United States of America, Canada and the Netherlands (Scallan et al. 2011; Thomas et al. 2013; Havelaar et al. 2015). To address this gap, an initiative was launched by the WHO Foodborne Disease Burden Epidemiology Reference Group (FERG) in 2006. Based on almost a decade of work by various experts and expert panel groups, the group launched its report in December 2015. Apart from the first ever global estimate of foodborne diseases, the initiative also aimed to strengthen the capacity of countries to assess foodborne diseases. This resulted in a set of national foodborne disease burden studies for Albania, Japan, Uganda and Thailand. Other objectives included increasing awareness and commitment to meet food safety standards as well as encouraging countries to use foodborne disease burden estimates for cost effectiveness studies on potential interventions and control measures.

The approach included comprehensive data collection on estimates of foodborne diseases through the established FERG and in-depth country studies. More specifically, FERG used a hazard- and incidence-based approach to estimate foodborne diseases. One key challenge was to attribute proportions of disease incidences to a specific foodborne transmission route as those transmission routes may differ based on the epidemiology of the disease-causing agents. Source attribution is also important for identification of effective interventions. While some studies exist, in particular related to water and transmission of diarrhoeal diseases, studies on other potential transmission routes such as soil or direct contact with animals or humans are lacking. The report indicates that for most countries and at the global level, relevant data to attribute foodborne diseases to major transmission routes do not exist and concludes that source attribution studies are still lacking and if available, only for a few hazards which are mainly Salmonella and/or Campylobacter and countries or regions (Pires et al. 2010; Pires et al. 2012; Painter et al. 2013). To address these challenges and data gaps, FERG used a structured elicitation of scientific judgement which consisted of expert panels combined with various mathematical models. Overall, 72 experts were involved across 115 panels. Provided estimates of global foodborne disease incidence, mortality and disease burden were calculated in terms of Disability Adjusted Life Years (DALYs).

Out of a longer list of potential foodborne hazards, which was reduced for practical reasons, the study finally included 31 foodborne hazards consisting of 11 diarrhoeal disease

agents (one virus, seven bacteria and three protozoa), seven invasive infectious disease agents (one virus, five bacteria and one protozoan), 10 helminths and three chemicals. Refer to Annex 15 for further details on the specific hazards studied, key findings and study limitations.

Conclusion from a country perspective (Vietnam)

- The FERG study provides foodborne disease burden estimates on a sub-regional level but not for Vietnam specifically at country level. The closest region would be Southeast Asia Region B which includes Thailand, Indonesia and Sri Lanka. Diarrhoeal disease agents were a major cause of foodborne disease burden for the Southeast Asia sub-region.
- Countries aiming to build their national food safety strategies are advised to combine global estimates with existing national data.
- There is a strong need for foodborne disease studies including disease burden and source attribution on a country level.
- Food safety issues, studies and policies should be addressed in a holistic or One Health approach.

Other burden of disease estimates (partly foodborne) include what has been published by the Global Burden of Diseases Initiative (Murray 2012), the Institute of Health and Metrics Evaluation and the WHO Mortality and Burden of Disease Unit. More details on those two estimates are provided in Annex 16.

4.4.2. Current knowledge on health impact of foodborne diseases in Vietnam

While the latest WHO report provides highlights on health impacts of foodborne diseases, mainly at global and regional level, information on the health impact of foodborne diseases is rather limited at country level including Vietnam. We report here information from research conducted in Vietnam and from the literature on the health impact of foodborne biological, chemical and physical hazards. The round-table discussion of the World Bank and partners in January 2016 identified the lack of information on health impacts of foodborne diseases as a key point to help prioritize food safety interventions.

Public health impacts of biological hazards in foods

The impact of biological hazards in foods is important. At global level, the greatest health problem associated with food is infections which result from food contaminated with bacteria, viruses and parasites. The first ever report of the global burden of foodborne disease recently released by WHO shows that foodborne disease burden is at the level of the 'big three' (HIV/AIDS, tuberculosis and malaria) (Havelaar et al. 2015). The Western Pacific region, which includes Vietnam,

ranks second in the world in terms of foodborne diseases. In this region, at least 50,000 people die from food contamination and more than 125 million people become ill from food each year (Havelaar et al. 2015). Vietnam should be in the group of countries having a large number of foodborne diseases caused by microbial hazards. In fact, Vietnamese foods have a higher prevalence of microbial contamination.

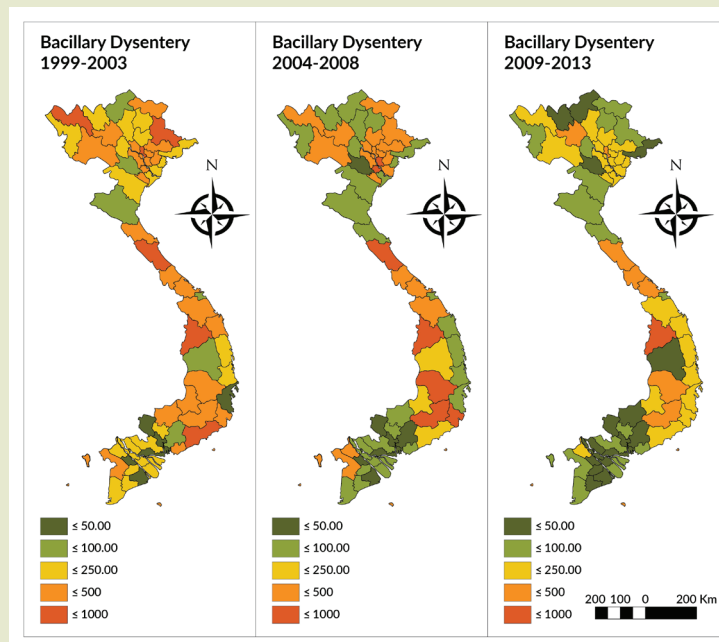
For example, retail raw pork in Vietnam is often contaminated with high levels of foodborne pathogens, including Salmonella spp. (Botteldoorn et al. 2003; Phan et al. 2005; Ha and Pham 2006; Van et al. 2007a), Escherichia coli (Ha and Pham 2006; Van et al. 2008), Toxoplasma gondii (Huong and Dubey 2007), Taenia spp. (Dorny et al. 2004) and Campylobacter (Ha and Pham 2006). Many isolates of E. coli and Salmonella spp. were found to be resistant to one or more antibiotics (Van et al. 2007a; Van et al. 2007b). Contamination of pork by harmful micro-organisms may occur at any stage from production to consumption.

A study using Quantitative Microbial Risk Assessment (QMRA) estimated the annual risk of salmonellosis from eating pork in Hung Yen was 17.7% (90% CI 0.89-45.96) (Dang-Xuan et al. in 2016). Another QMRA assessed the health risk of pork contaminated with Salmonella spp. in Ha Noi by analysing 72 pork samples collected from four formal markets in Long Bien District and a survey consisting of self-

administered structured questionnaires in 210 households to determine consumption of pork and examine cooking and eating habits. A health risk assessment was performed for four scenarios of cross-contamination of Salmonella spp. from raw meat to cooked food: via hands, knives, cutting boards and full cross-contamination. Salmonella spp. was detected in 25% (18/72) of pork samples. The concentration of Salmonella spp. varied from 100 to 27,500 per 25 grams of pork (mean: 673 per 25 grams). Pork consumption, a component of exposure assessment, was estimated by amount and frequency. The mean pork consumption was estimated at 86.1 grams per person per day and the mean frequency of pork consumption was estimated at 219 days per person per year. The risk of infection with Salmonella spp. ranged from 2.1×10^{-4} to 4.9×10^{-4} by single exposure (per consumption). The annual risk ranged from 4.3×10^{-2} to 9.5×10^{-2} . Although this study considered only one stage of exposure in the ‘farm to fork’ chain, the findings show that this stage is critical and represents a potential health risk for consumers. Appropriate practices for pork preparation and consumption at the household level need to be targeted as risk management measures (Toan et al. 2013).

Vietnam’s annual per capita pork consumption in 2015 (29.1 kg) is among the highest in the world and pork is the most widely consumed meat in the country, making up 56% of the total meat intake (OECD 2016). Up to 80% of

Figure 9: Shigellosis distribution in eight regions in Vietnam every five-year period from 1999 to 2013



Source: Lee et al. (accepted)

The boundaries, colors, denominations and other information shown on any map in this work do not imply any judgement on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

the pork produced is estimated to come from smallholder farmers and open wet markets are the preferred channels for purchase among consumers (Lapar and Tiongco 2011). While pork production can support food security and improve the livelihoods of many smallholder farmers, pork production can also have substantial health risks.

Microbial contamination of vegetables occurs if they are grown from waste water or washed with contaminated water (Tram et al. 2008; Kieu Thanh Truc et al. 2014; Tram and Dalsgaard 2014). A study of the health risks related to consumption of raw spinach estimated the mean amount consumed at 40.22 grams per person per meal and the mean frequency of consumption was 1.39 meals per person per year. The diarrhoea risk associated with *E. coli* O157:H7 when consuming raw water spinach washed three times was 0.25; the diarrhoea risks due to *G. lamblia* and *C. parvum* were 0 and 0.23, respectively (Kieu Thanh Truc et al. 2014).

According to MOH, 40.6% of foodborne disease outbreaks recorded between 2012 and 2015 were caused by micro-organisms. In addition, more than 50% of deaths from food poisoning are due to toxins produced in seafood (puffer fish, oysters and sea snails) and toxic mushrooms (MOH/VFA [no date]). Food poisoning outbreaks follow a clear pattern with two peaks, one from April to July and another from September to November. Most of the cases are acute diarrhoea (85%) and poisoning (15%). The causes of identified food poisoning are mainly microbial pathogens (bacteria, virus and parasites; about 70%), chemicals (10–50%) and natural toxins.

Consumption practices are responsible for a portion of the foodborne disease incidents. For example, *Streptococcus suis* was found to be the predominant cause of acute bacterial meningitis in adults in Vietnam. This pork-based pathogen is mainly associated with consumption of particular dishes such as *tiết canh*, a popular cooked pudding dish containing, among other ingredients, raw blood. Although risks might be occupational or behaviour-bound, those frequently exposed to pork were found to be more susceptible to *Streptococcus suis* infection (Ngo Thi Hoa et al. 2011).

MOH has 30 years of data records on infectious diseases including shigellosis. An ongoing study examined the seasonality, trend and statistics of shigellosis (bacillary dysentery) in eight regions in Vietnam. Preliminary results show that the central regions (highlands and north/south central coast) show relatively high incidence rates compared to North and South regions (Figure 9).

Episodically, threats to poultry farmers and consumers arise. The H5N1 virus, in other words, the highly pathogenic avian influenza (HPAI), was indicated to be a cause of the continuous occurring outbreaks in poultry and humans in Vietnam. In 2007, this was highlighted by a serious epidemic, affecting 88 communes within Vietnam. Even though the Government of Vietnam has recognized the need for prevention strategies, by responding with vaccination programs, a number of incidences remain (Desvaux et al. 2014).

Public health impacts of chemical hazards in foods

Chemical hazards in foods present an important public health challenge in many countries including Vietnam. Descriptions of the health effects of some groups of chemical hazards are discussed below.

Veterinary drugs are compounds used for prevention and treatment of animal diseases and include pharmaceuticals, chemicals, vaccines, hormones, some probiotics and micro-organisms used in veterinary medicine. Antibiotic residues in foods of animal origin are an important public health concern; they can cause antibiotic resistance in humans, affect the immune and respiratory systems and cause cancers (carcinogens such as sulphamethazine, oxytetracycline and furazolidone), kidney disease (Gentamicin), liver toxicity, reproductive disorders, bone marrow toxicity (chloramphenicol) and allergies (penicillin and tetracycline).

Food additives are nutritive or non-nutritive ingredients that are added to food during processing, handling, packaging or transportation to maintain or improve the food's character. Sodium and potassium nitrates and nitrites are commonly used to preserve foods. Nitrite is an important precursor of nitrous compounds, which can cause cancer and mutation. Nitrate salt in the human body is deoxidized in the stomach and intestines to produce nitrite which reacts with haemoglobin to form methaemoglobin, resulting in reduced oxygen-carrying capacity of haemoglobin. However, consumers may not know of the damaging effects of these salts if consumed at levels that exceed the permissible standard. Due to the harmful health effects of nitrates and nitrites, the determination of their levels in food is necessary to ensure the safety of consumers.

β-agonists are a group of chemicals that have been classified as toxic and though banned worldwide for use in livestock production, they have been used extensively in pig production in Vietnam in recent years. Chronic exposure to salbutamol can cause nervousness, tachycardia, muscle pain, headache, dyspnoea, hyperglycaemia, hypokalaemia, leukocytosis, cramps, nausea, indisposed body, appetite loss and hypertension.

Harmful chemical substances formed in food processing: Heterocyclic aromatic amines and polycyclic aromatic hydrocarbons are formed during cooking of grilled meat products. Numerous studies have shown that frying, baking or smoking of meat results in generation of some hazardous components including mutagens and carcinogens. Epidemiological studies have also shown that the risks of colorectal, breast, bladder, prostate and pancreas cancers are higher in people who regularly consume fried or grilled meat.

Heavy metals in foods can have severe impacts on health. At elevated concentrations, heavy metals like lead, cadmium, arsenic and mercury can form chronic complexes with protein and accumulate until they exceed the threshold of toxicity. Consequently, this long-term accumulation of heavy metals can cause numerous severe illnesses such as cancers

and neurological conditions. The increasing concentrations of heavy metals in foods are caused by contamination via vegetable growing, animal husbandry, seafood aquaculture, slaughtering environment or from packaging and other production processes.

Thus, the main reasons for chemical hazards in foods are misuse of veterinary drugs, misuse of food additives during processing, poor storage of food products and the method of cooking of some animal-source foods. These chemical substances may lead to dangerous acute poisoning if ingested at high levels or chronic effects if ingested over a long time (Andrée et al. 2010; Fahrion et al. 2014; Tran Thi Tuyet Hanh et al. 2015).

Public health impacts of physical hazards in foods

Physical hazards in food may negatively affect human health through, for example, broken teeth, bone swallowing, choking, damage to mucosa of the mouth, stomach or intestines, and lung cancer. Therefore, farmers need to minimize this danger during harvesting and post-harvest handling in order to ensure food safety. Radioactive contamination in food has become a priority issue among consumers in recent years. The tsunami in Japan in 2011 is a typical example of this risk. The imported food, called ‘Fukushima food’, met with consumer resistance. The consumers wanted to trace the origin of the food to know if it had been imported from the disaster area. Recently, there were thefts of radioactive sources in Vietnam from Vung Tau province and Cao Bang province. This also created a risk of radioactive contamination in food.

4.4.3. Gaps: Contamination data versus health risks

As mentioned above, there have been several studies on foodborne hazards in Vietnam, covering both chemical and biological contamination of food. However, there are few studies on the impact of food contamination on health. This is an important gap that limits the evidence for consumers to select safe food and policymakers to take action for food safety risk management. The main official data on health risks come from the MOH reporting system as shown in Section 2.4.2. However, the reporting data largely under-estimate what actually happens, and this is even happening in developed countries. Research data on health risks related to food safety remain scarce and this will need to be strengthened. For example, Dang-Xuan et al. 2016 estimated that the annual incidence rate of salmonellosis was 17.7% (90% CI: 0.89-45.96), mainly influenced by pork handling practice at the household and prevalence in pork sold in the central market. More studies are needed to provide evidence of health risk and complement data on food contamination.

4.5. Key messages from this section

- Levels of micro-organisms, parasites, pesticides and antibiotic residues in food in Vietnam appear to be much higher than those in developed countries.
- Various studies indicate that the prevalence of biological hazards such as Salmonella in food and pork is considerable (30% and 15–69%, respectively).
- Majority of biological hazards are related to consumption of raw/fresh or undercooked products.
- The status of antibiotic residues and reported resistance is alarming with an increasing trend over time.
- Consumers can play a key role in reducing exposure to hazards e.g. reducing of risky consumption habits (eg. raw blood dish) or improved hygienic measures when preparing food.
- During 2014 and 2015, there were almost 370 food poisoning outbreaks in Vietnam involving over 10,000 cases and resulting in 66 deaths. This is almost certainly a large under-estimation. Most outbreaks were caused by microbial pathogens (42%), followed by natural toxins (28%) and chemicals (4%); in the remaining 26% of outbreaks, the cause was unknown. Where a single food source was implicated, this was most commonly seafood followed by mushrooms and meat.
- Heavy under-reporting of foodborne disease outbreaks is expected as only a small proportion of foodborne diseases is ever recorded as outbreaks due to sporadic food inspection, limited notification of foodborne diseases by health professionals (mainly restricted to severe outbreaks) and capacity shortages in particular at district or commune level.
- Based on discussions with officers from MOH, we can assume that the estimated number of food poisoning cases in Vietnam might be 100 times higher than the reported data.
- The WHO FERG report concludes that data on the health impact of foodborne diseases in Vietnam are not available at country level.

5. Food safety risk communication and management: Challenges, confidence, trust and priorities

5.1. Current risk communication challenges: Lack of confidence and trust of consumers

As described in the pillar 4 of the WBG toolkit, the role of consumers must be strongly emphasized. Food safety, especially regarding chemical hazards, is a growing concern for consumers in Vietnam as incidences of unsafe foods and an increasing trend of cancer cases are frequently reported in the media. For example, a Google search carried out on 5 April 2016 with the Vietnamese search term “chất cấm trong chăn nuôi heo” (meaning “prohibited veterinary drugs in pork”) resulted in over 526,000 hits within 0.28 seconds (Tran Thi Tuyet Hanh et al. 2016). Consumers have become scared and they panic as they frequently encounter information from different sources about banned chemicals in foods, such as the most recent food safety scandal over β -agonist (salbutamol) and some incidences where environmental police officers and inspectors investigated and discovered feed companies using salbutamol and other banned chemicals in pig feeds. The media brought food safety issues in Vietnam to a high level of attention when famous people recently died from cancer at a young age. The country’s top leaders also have discussed food safety issues at meetings of the National Assembly .

Consumers normally do not think about risk in the same way that experts do. People filter risk information through a variety of lenses that affect what they hear, how they process and come to understand the information, what they conclude and what they actually do. For example, biological hazards in some foods may cause more morbidity and mortality burdens than chemical hazards, but consumers are usually more concerned about chemical hazards as these are commonly mentioned in the media. Therefore, for consumers, risk is highly subjective and in Vietnam in recent years, the public have considered the risks associated with chemicals hazards in foods to be extremely high. An unofficial statement that is commonly made by people is: “We are dying because of these unsafe foods, but we have no other choice. If we eat them, we die

slowly and if we do not eat them, we die immediately”. This attitude, however, has been affected by only a few incidents of unsafe food reported in the newspapers, on television and Facebook, but does not really reflect official assessment of the food safety situation in the country. Risk assessment of chemical, biological and physical hazards in foods is crucial to provide scientific information on actual risks and to inform official risk communication activities (Tran Thi Tuyet Hanh et al. 2016). This helps to bridge divided perceptions between expert analysis of the risk equation on one hand and public reaction and action on the other. We anticipate that the public can learn about food safety from a variety of sources, ranging from social networks and television to specific government programs (Hallman et al. 2009). Use of these sources varies by consumer circumstances.

5.2. The phenomenon of food scares

Public concern over food safety is a major problem in itself and should be treated as a major element in the topic of food safety. Food scares are common in many countries because the public are generally sensitive to what they eat¹⁶. They feel vulnerable because they have to eat but largely have to trust that what they eat will not poison them. Losing that trust in one product can lead to a more general loss of trust in food and so the concern increases.

It is easy for commentators to dismiss food scares as just an irrational public reaction to something that has little scientific justification or statistical significance (“The public has just got it wrong”). But the government still has to respond and its response can make a big difference to the level of concern. It can increase it and there can be occasions when the government’s handling of a crisis then becomes a new issue in itself. In 2008, the Hellenic Food Authority (EFET) overreacted to a food scare involving Ukrainian sunflower oil which damaged the sector and worried the public over claims that the oil would cause cancer. The Chairman of EFET was forced to resign for the mishandling of the incident. However, there is still a much wider issue, which is economic.

¹⁶ The seminal work on this is: Slovic, P. 1987. Perception of risk. *Science* 236(4799): 280–285. <http://heatherlench.com/wp-content/uploads/2008/07/slovic.pdf>

¹⁷ <https://www.sott.net/article/157293-Greece-recalls-imported-sunflower-oil-in-contamination-scare>

5.3. Economic impact of food scares

The public are also consumers so their concerns are not only expressed as public anxiety but as buying choices. The consequences are not just a flurry of media activity but are also economic. Consumers will stop buying that product almost immediately. How widely they view the threat will affect how drastically they change their buying decisions. If the scare was about a brand or a specific company, it could affect all products of that company and not just the one that was central to the incident. A study by ILRI found that when pig diseases were reported by the media, the majority of consumers stopped eating pork, shifted to chicken or went to outlets that were perceived to be safer; in Ha Noi, 35% of consumers stopped eating pork¹⁸.

The economic consequences of consumers deserting a market sector can be immediate and sustained long enough to cause damage. They are also unforeseeable, given that they are a response to an incident which itself is unforeseeable. Nobody knows where the next food scare will come from, therefore, the phenomenon is a risk to all food products. The Chinese ‘melamine in milk’ scandal is still affecting the dairy sector in China although it occurred in July 2008. The infant formula sector in China has barely revived but the scandal affected more than just infant formula and spread to the whole dairy sector, by association. The impact was also amplified globally through economic effects¹⁹. There may also be health consequences in the substitution of products, for example, a switch away from infant formula.

When Vietnam is more exposed to international markets under the Trans-Pacific Partnership (TPP), the European Union Vietnam Free Trade Agreement and the ASEAN Economic Community (AEC), domestic food scares may result in trade barriers being imposed by trading partners. This could amplify the economic consequences considerably. Under the SPS Agreement, there needs to be scientific evidence to support trade barriers but a domestic scare can cause an immediate response from trading partners that can have an impact even if the barrier has to be removed later.

It is conceivable that a country can face greater economic impact from the consequences of a food scare than from days lost through foodborne illness. There are no direct comparative studies and there is not the same consistency to the impact of food scares as the impact of endemic foodborne illness but there are enough examples to show that the effect and the handling of food scares should be an integral part of the study of food safety (Grace and McDermott 2015).

¹⁸ ILRI. 2010. Demand for pork by Vietnamese consumers: Implications for pro-poor livestock policy and development agenda in Vietnam. Project brief 1. Nairobi, Kenya: ILRI.

¹⁹ See http://irgc.org/wp-content/uploads/2012/04/Emerging_risks_Melamine.pdf for an interesting article on risk amplification in relation to food safety scares.

5.4. Strategic response

The government needs to develop a communications strategy to build consumer trust in government advice on food safety issues. A strategic response is needed because perceptions and prejudices need to change and that takes time. The government cannot switch quickly from one position on food safety to another. The public will not believe it and it will make it all the more difficult to change the message later.

This is a long-term and slow change but it can be done. The United Kingdom provides good examples:

- On 16 May 1990²⁰, the United Kingdom’s Minister for Agriculture fed his daughter a burger at a media event to emphasise that the public was in no danger from bovine spongiform encephalopathy (BSE) (‘mad cow disease’). This has become a classic example of disastrous government messaging, as became clear when the BSE crisis deepened and spread. The damage to the government’s credibility was so bad that a new food safety agency, the Food Standards Agency, was created and the agriculture ministry was dissolved into a new ministry.
- However, the Food Standards Agency was focused wholly on consumers and it gradually gained their trust. For example, in 2003 it started a campaign against levels of salt in processed food²¹ which was followed by consumers to the extent that the big food producers had to change their approach to salt levels in their processed food products. There were no regulations covering levels of salt in processed food but the Food Standards Agency based its actions on science and took the public with it. From the fiasco of BSE, the United Kingdom government had learned the importance of consumer trust and had managed to build it.
- When the United Kingdom experienced a nationwide outbreak of foot-and-mouth disease in 2001, millions of cattle were culled and burned resulting in damage to the rural economy. In 2007, it experienced another outbreak of the disease which was contained within a few kilometres and the media coverage reduced rapidly. It used risk communication techniques it developed in the two previous years in dealing with avian influenza scares²².

In the short term, government messaging in a food crisis should avoid strengthening negative perceptions. It would be too early to move straight to positive messages but the first step has to be to avoid making the situation worse. The more the government’s response reinforces negative messages

²⁰ http://news.bbc.co.uk/onthisday/hi/dates/stories/may/16/newsid_2913000/2913807.stm

²¹ <http://collections.europarchive.org/tna/20100927130941/http://food.gov.uk/healthiereating/salt/>

²² <https://www.gov.uk/government/publications/foot-and-mouth-disease-2007-a-review-and-lessons-learned>

about the context of the issue, the more difficult it will be to change. These scares usually relate to specific incidents and are not necessarily representative of a wider context of hazard. The government may not want to be positive in any way about the actual incident but it can try to avoid the effect spreading to the rest of the sector. Reactions such as saying that it will impose harder penalties on food businesses that provide unsafe food damages all food businesses by joining them in the blame for the one incident and it further reduces public trust in food.

5.5. Techniques of risk communication

Risk communication is the process of exchange of information and opinion among risk managers, risk assessors, communicators, researchers and other parties. There needs to be good evidence on which to base future communications in order to be trustworthy but being trusted involves other skills as well. It is not just about evidence. In addition, interactive exchanges about consumer understanding and food risks and benefits can help consumers make informed decisions (Fischhoff 2009).

There have been various projects in the past to find a better way of managing a crisis.

- In 2008, the United Kingdom's Better Regulation Commission was re-formed as the Risk and Regulation Advisory Council²³, leading an 18-month project to learn how to manage 'public risk'. This term was defined as "those risks that may affect any part of society and to which the government is expected to respond" which includes food scares.
- It was succeeded by a more ambitious four-year program under the Government of the Netherlands, the Risk and Responsibility Program, which tried to deal with the 'Risk Regulation Reflex'²⁴. Again, it was concerned with reactions to critical incidents and it developed a toolkit for policymakers and politicians for managing response. Half of the program was focused on this phenomenon at local government level and not just at national level. One of its proposals was the use of a 'concern assessment'²⁵, to run in parallel to a risk assessment, which would analyse the factors in the public concern.

- FAO and WHO have worked together on risk communication since 1998²⁶ and have developed training courses in risk communication specifically for food safety²⁷. They have now produced a new joint handbook on risk communication applied to food safety²⁸ which is also available in Vietnamese and was used at a training course organised by WHO in Ha Noi on 12–13 May 2016. FAO also organized a training program on risk communication in May 2015; the report of the same covering the training material is available at <http://www.fao.org/3/a-i4850e.pdf>
- The International Risk Governance Council has pioneered a lot of work on 'emergent' risk and in 2010 at a Scientific Colloquium hosted by the European Union, the Food Safety Authority presented a study on risk governance of emergent food safety risks²⁹.

There is no shortage of material for training courses on risk communication for food safety but that is different from preparing a strategic approach for how to move government messaging from one that reinforces the negative perception of food safety to one that is trusted and can calm concerns. The General Department of Preventive Medicines of Vietnam has been applying a strategy for risk communication in relation to emerging diseases since 2013, as part of a three-year strategy.

Both the public and media specialists in Vietnam are important audiences for food safety education and risk communication. Risk communication on food safety issues should be integrated into the recommended risk-based food safety management system as specified in Vietnam's Food Safety Law of 2010.

5.6. Communications strategy

The communications strategy should also link with an economic strategy for the role of consumers in strengthening markets. The main economic impact of a food scare is the negative buying decisions made by consumers. The first objective of a strategic approach to the problem is to reduce that impact by having fewer consumers withdrawing their support from part of the market. As mentioned earlier, the first stage is to avoid widening the negative effects from the specific product, brand or establishment to the rest of the sector. If the scare is justified, there is no need to defend those responsible for the incident but if the scare is a misunderstanding, it should also be an objective of the strategy to reduce damage in that case also by removing the misunderstanding.

²³ <http://webarchive.nationalarchives.gov.uk/20100104183913/http://www.berr.gov.uk/deliverypartners/list/rrac/index.html>

²⁴ <https://www.government.nl/documents/reports/2015/01/21/understanding-and-addressing-the-risk-regulation-reflex>

²⁵ <https://www.government.nl/documents/publications/2014/06/19/managing-a-political-crisis-after-a-disaster>

²⁶ <http://www.fao.org/docrep/005/x1271e/x1271e00.HTM>

²⁷ <http://www.fao.org/documents/card/en/c/c8eb9bcd-afb9-47d8-a89f-0297725ea694/>

²⁸ http://www.auv-ks.net/repository/docs/2016_01_28_141028_Final_version_Handbook_28-11-2014.pdf

²⁹ <https://www.efsa.europa.eu/sites/default/files/event/documentset/colloque101012-ax5.pdf>

But the strategy can also move beyond these objectives to developing enough trust with consumers to be able to guide their buying decisions in positive ways. The example mentioned earlier of the campaign by the Food Standards Agency against salt levels in processed food was a case of the regulatory agency guiding consumers to demand lower salt content. In Vietnam, as with many other low- and middle-income countries, consumers are reluctant to pay a premium for safer food (although they are also angry when the food turns out to be unsafe, as in these food scares). The absence of a readiness to pay that premium is a key reason for a lack of incentive on the part of small-scale producers to adopt better food practices.

Indeed, these small-scale producers not only lack incentives to adopt better practices but current consumer behaviour also acts as a perverse incentive to adopt or maintain bad practices, such as accelerating growth or adding colouring. Many consumers are suspicious of innovative methods in traditional settings, such as metal or ceramic tables in markets instead of wood (or even just the ground). If consumers see food business operators wearing a hat or gloves, they often think they are suffering from a medical condition. In many hot countries, there is a suspicion of food kept in chilled compartments. So consumers can also weaken food safety measures by making it difficult for businesses to adopt better practices.

The risk communication strategy, therefore, in addition to communication within ministries and departments, also needs an element of public education in food safety, hygiene and nutrition issues. Before being able to guide consumers towards purchasing decisions that will shape markets for the better, they need to reduce the damage to good practices already being done by consumers. Ultimately, it should be consumers and not enforcement agencies that drive food safety.

5.7. Challenges within government

Another set of behaviours that a risk communication strategy will need to tackle is those of the staff in ministries and other agencies. Above all, messages from ‘government’ have to be totally consistent. Any differences will be picked up and built on by the media. This means that the current government bodies will have to have genuine collaboration and coordination to communicate in one voice with all affected parties during food safety crises so that the public and all related stakeholders receive timely, clear and accurate information from recognizable sources to avoid unnecessary panic due to miscommunication (Tran Thi Tuyet Hanh et al. 2016). There are enough challenges in communicating at high speed across both horizontal and vertical organizations in order to get the necessary information and evidence about what is really happening in the incident without doing it in parallel and even in competition. Managing risk

communication effectively will be a real test of collaborative working and trust between ministries if the government is to keep pace with fast-moving crises. The rise of social media has made the pace even harder to manage.

There is a saying in crisis management that you should stick with peacetime practices but do them faster. Having a totally different set of practices for a crisis is artificial and can be confusing. Speeding up good normal practice is usually seen as the answer. But that means developing good normal practices. It means that information exchange, collaboration and transparency have to become the norm. Risk communication should be this normal exchange of information and analysis of risks and not reserved to describe crisis techniques. This is also tested in social media where employees are also individuals on social media and find it difficult to avoid being dragged into discussions. This endangers a strictly top-down approach to messaging, where there are potentially thousands of spokespersons. What this should lead to is internalising the good practices in normal work across all the organizations so that the messaging from individuals in a Facebook discussion is consistent with the overall approach. Because of the increasing exposure to global markets, it must be recognised that the audience for future food scares will be international. That means being able to communicate in English, with good quality websites in English.

At present, there are a few strategic decisions being made in relation to food safety, with a review of the Food Safety Law, a review of the Food Safety Strategy and a proposal for a new National SPS Action Plan. A risk communications strategy should be added to these activities. The first key decision is where to locate it.

5.8. Key messages from this section

- Public concern over food safety is a major problem in itself and should be addressed as a major element in the topic of food safety through appropriate risk communication (pillar 4 of the WBG toolkit).
- Messages from the government related to food safety risk should be consistent, based on genuine collaboration for communicating in one voice. A communications strategy is needed to build consumer trust in government advice on food safety issues.
- While this requires a long-term change, in the short term, government messaging in a food crisis should avoid strengthening negative perceptions.
- The communications strategy should link with an economic strategy for the role of consumers in strengthening markets (instead of weakening them).
- The risk communications strategy also needs an element of public education in food safety, hygiene and nutrition

issues. Ultimately, it should be consumers that drive food safety.

- It is important to meet the needs of the media. In addition, risk communication messages to the mass media and reporters must be timely and clear to avoid misunderstanding, distrust and miscommunication, which may lead to severe consequences.

6. Food safety impacts on trade

6.1. Current trade situation and long-term trends

Globally, there has been an increase in world agricultural trade; this is likely to continue. Trade in animal-source foods, produce and processed foods is growing at a faster rate than for other food, mainly as the result of rapid growth in consumption of these foods, especially in developing countries. This in turn is driven by increasing global incomes and changing dietary preferences (Popkin et al. 2012).

Vietnam's import and export has been growing rapidly since major economic reforms were launched in 1986. Agricultural products are an important part of exported goods; Vietnam is one of the world's top exporters of seafood, rice, cashew nuts, coffee and pepper. In 2014, agricultural and aquatic goods made up 17.6% of the value of total exports and 11.5% of the total value of imports (WTO 2016). Animal feed and feed ingredients are major imports.

In the agribusiness sector, Vietnam is known for producing large volumes of low-value products. It lacks its own brands and instead provides bulk products which are incorporated into other brands. For example, Vietnam is the world's second largest exporter of coffee but Vietnamese coffee brands have no international impact.

6.2. Food safety and trade issues

Food safety has implications for trade and trade has implications for domestic food safety (see pillar 7 of the WBG toolkit). The implications of trade liberalization on food safety are both negative and positive. On the negative side, increased food trade may introduce new safety hazards, revive previously controlled risks and spread contaminated food widely (Hawkes et al. 2015). On the positive side, food that is legally imported from high-income countries is usually of high safety levels and may indeed be safer than food sold on the domestic markets. In the case of Vietnam, Australia and France are important exporters, often of high-value foods. However, if food is illegally imported it will by definition escape rigorous inspection and may be unsafe. For example, there is concern in Vietnam about food imports from China, but little solid data on hazards and risks associated with this trade.

Improvements in food safety also have implications for trade. Improving export food safety, alongside improvements in quality and reputation, could allow Vietnamese products to penetrate new and maybe higher-value markets.

Improvements in safety of food intended for domestic markets could be driven by perceptions of higher safety of imported foods and improve the competitiveness of domestic food vis-à-vis imported food.

6.3. Major food exports

Vietnam's major food exports are seafood, rice, cashew nuts, fruits and vegetables. Cassava exports are substantial—worth 1.1 billion United States dollars (USD) in 2014 and growing in importance—but they are intended for manufacture of feed and starch rather than for human consumption and thus will not be discussed in this report. In overall terms, Vietnam consistently produces impressively large volumes but low-value products. It is also facing increasing challenges to sustain and improve competitiveness in an integrated global economy. Across a broad range of commodities, Vietnamese exporters realize prices ranging from 15% to 50% lower than peers from other countries. Farmers are not fully benefitting from Vietnam's overall export success due to high production costs and low prices and they are very vulnerable to changes in market prices. Finally, increased agricultural exports have come at a cost to the environment due to the extensive use of natural resources including inefficient water use as well as over-reliance on fertilizers, chemicals and growth promoters.

6.4. Safety of exported food

Safety of exported food is verified by importing countries, but only a proportion of food is checked. Some countries have higher standards and more rigorous checks than others (countries in the European Union are typically more rigorous than Japan and the United States of America, which in turn are more rigorous than the Middle East and other Asian countries). A global analysis in 2013 of 3,400 food safety events ranked Vietnam sixth, being responsible for 5% of events. The top offenders were India, China, Mexico, France and the United States of America and the most problematic food was seafood (23%), a major Vietnamese export (Food Safety News 2014).

In the European Union, detailed information is available from reports to the Rapid Alert System for Food and Feed (RASFF). A published analysis of food safety notifications between 2006 and 2010 found that Vietnam ranked eighth in the number of food alerts (the top five were China, Turkey, the United States of America, India and Iran, in that order); however, adjusting for the value of food exported, Vietnam was not in the top 10 (Committee on Strengthening Core Elements of Regulatory Systems in Developing Countries et al. 2014). For this report we analysed data from January 2005 to April 2016 (Table 12).

As for the other analyses, seafood, fruits and vegetables were the most problematic foods in terms of notifications. Fish and fish products are intrinsically prone to contamination and this is augmented by the high levels of chemical contamination and bacterial loads found in Vietnamese waters (Chea et al. 2016).

Detailed records are also available for Japan. These cover the number and total weight of food shipments, the proportion and weight of shipments that are inspected and the proportion of these for which violations are found. In terms of shipments, 25% of exports from Vietnam are checked. This is a much higher rate than for shipments from Europe (7%) or Oceania (4%) but similar to India (17%). Of those checked, 0.43% of Vietnamese shipments were in violation; this was again higher than for Europe (0.38%) and Oceania (0.26%) but lower than India (1.15%). The inspection records for commodities exported from Vietnam to Japan are given

in Table 13 (MOHLW 2015). As in the case of exports to Europe, these are dominated by seafood.

Although Vietnam has a better food safety record than some competitors, its food safety performance is worse than that of most high-income exporters. Poor safety of exported food can act as a barrier to higher value markets and result in exports being rejected from markets that are accessed. In addition, foodborne disease can jeopardize established export trade. For example, the 1991 cholera outbreak in Peru caused by consumption of water and seafood contaminated by *Vibrio cholerae* resulted in losses of exports of fish and fish products worth over USD 700 million. More recently, in 2005, malachite green was found in Chinese eels resulting in export losses worth at least USD 860 million. In several cases, once trade markets were lost they were never fully regained, even after safeguards had been put in place to prevent recurrence of food contamination (Grace 2015).

Table 12: Value of major food exports from Vietnam to the European Union and number of food safety notifications (2005-15)

	Billion USD exported in 2014	Number of RASFF notifications	RASFF notifications per billion USD exported in 2014
Seafood	7,8	608	80
Rice	3,0	5	1,7
Cashew nuts	2,0	9	4,5
Fruits and vegetables	1,5	90	60
Pepper	1,2	33	28
Other		105	

Source: European Union RASFF alerts between January 2005 and April 2016 (RASFF 2016)

Table 13: Number of shipments from Vietnam to Japan inspected and in violation

	Number of shipments	Number of inspected shipments	Number of shipments in violation
Frozen fish	6.030	5.665	18
Fresh fish	3.314	2.996	11
Coffee	1.254	87	5
Seasoning	727	30	0
Alcohol	735	33	0

Source: MOHLW (2015)

6.4.1. Major food safety hazards in food exported from Vietnam

In food exported from Vietnam to Europe from 2005 to 2016, biological hazards were the hazards most commonly notified and most of these were due to bacteria (Table 14). Next in importance were alerts over chemicals and antibiotic residues. Chemicals are relatively more important in processed foods, antibiotic residues in fish, biological hazards in fish and herbs and spices, agricultural chemicals in fruits and vegetables, and mycotoxins in nuts.

A similar picture emerges for Japan in the 2014 inspection records (MOHLW 2015), except that antibiotic residues were relatively more prominent. There were 28 violations because of antibiotic residues (all fish), 18 because of microbial contamination (15 in fish and three in fruit), five because of decay or mould (all coffee), three because of pesticides (all vegetables), three because of chemicals (two aquatic and one starch), two because of food additives (processed food) and one because of biotoxins (fish).

6.4.2. Trends in food safety performance

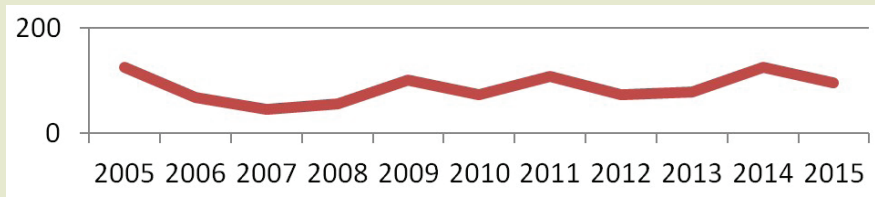
The records from MOHLW in Japan show that while food exports from Vietnam have risen considerably between 2004 and 2014, the proportion of shipments and weight of food products inspected remains the same. There is a trend of decreasing number of shipments found in violation, but no marked change in weight of products found in violation. The data from RASFF are similar. Despite a strongly rising trend in exports, notifications have remained relatively stable over the last 11 years, indicating that while food safety performance for exported foods is improving, a similar number of violations are detected each year. This finding of stable or decreasing number of notifications and weight of food in violation implies that export food safety performance is improving (Figures 10 and 11).

Table 14: Hazards found in food exported from Vietnam to the European Union (2005-15)

Type of hazard	Number of alerts	Main hazards detected
Biological	293	Salmonella, Listeria, E. coli
Chemical (processing or other)	119	Food colours, polycyclic aromatic hydrocarbons
Antibiotic residues	117	Tetracycline, nitrofurans
Metals	131	Mercury, cadmium
Agricultural chemicals	69	Insecticide, fungicide
Bad hygiene/abnormal appearance	54	Spoilage, damage
Illegal preservation	54	Carbon monoxide irradiation
Biotoxin	37	Histamine
Process violation	36	Incorrect certificate labelling
Mycotoxins	26	Aflatoxin, ochratoxin
Physical hazards	20	Suffocation risk, glass
Mould	17	
Novel food/genetically modified food	11	
Insects	7	

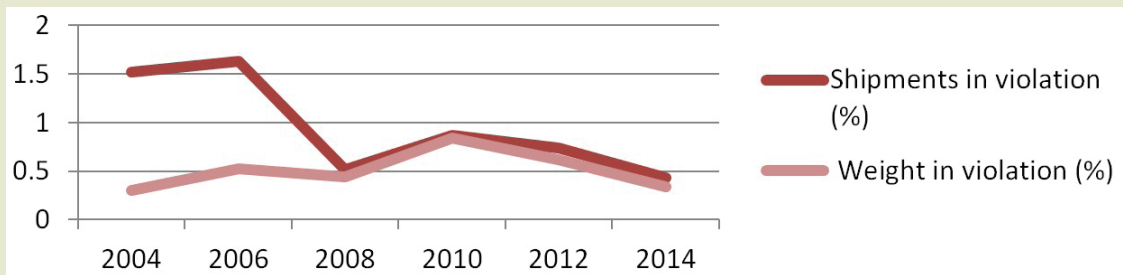
Source: European Union RASFF alerts between January 2005 and April 2016 (RASFF 2016)

Figure 10: Number of food safety alerts for food exported from Vietnam to the European Union (2005-15)



Source: RASFF 2016

Figure 11 : Food safety violations for food exported from Vietnam to Japan



Source: MOHLW 2015





A fish processing factory.
Photo courtesy of Donald Macrae/WB

6.4.3. Divergence between export and domestic food safety

In general, exported food is probably safer than food in the domestic market. Deficiencies in domestic market food safety may affect exports in three ways:

- The new trading environment being created by free trade agreements (see Section 6.7) is likely to be one where safety and quality demands ratchet up. As such, perceptions of the domestic food safety system may adversely affect export. This will be particularly important when there are highly publicized scandals about bad food practices or environmental damage causing food contamination. Already, trade organizations in some countries draw attention to food safety issues with imports from Vietnam (www.shrimpalliance.com).
- While export chains are to some extent isolated from domestic chains (a two-tier system), it is difficult to avoid any spillover. Assuming food safety continues to decrease in domestic markets (as may be the case) while safety demands continue to increase for export markets (likely to be the case), there is increasing risk that hazards from the domestic market may be detected in exports resulting in bans and reputation loss.
- As markets expand, so do the rewards for shifting to markets of higher value. However, these markets are more likely to apply strict testing for food safety and labelling.

These are not barriers to trade but are justified under the SPS chapters of the free trade agreements

For these reasons, if Vietnam is to progress from exporting volume to exporting quality, it needs to build confidence in export markets that it has an effective food safety control system.

While poor food safety in domestic markets is a threat to export markets, theoretically, improved food safety for export markets could also benefit domestic markets if higher standards for exports catalyse improvements in the domestic industry. However, this is a difficult aim to realize for simple economic reasons. For example, Vietnam has been successful in some specific markets, such as prawns in the Australian market, but export markets provide premium prices that cannot be obtained in the domestic market. Without that premium, it is difficult for the practices used for export products to spill over into production for domestic markets.

This is also the finding from research studies on spillover health benefits of participating in export markets in other countries. For example, one study in Kenya found that farmers who had been given training in food standards and monitored for compliance used safer chemicals and had fewer reported health problems. In contrast, a study found that workers participating in export seafood chains in Brazil did not receive any health benefits (Unnevehr and Ronchi 2014).



A fish processing factory,
Photo courtesy of Donald Macrae/WB

6.5. Major food imports

In Vietnam, food imports are less important than exports. Most beef and milk are imported, as are temperate fruits such as apples and oranges. Dairy products (worth USD 448 million) and frozen meat (worth USD 141 million) are mainly imported from prospective TPP partners. Vietnam also imports unprocessed seafood, pepper and cashew nuts for processing and export.

Significant quantities of beef, nuts and frozen poultry are exported to Vietnam but much is believed to be trans-shipped to other countries. For example, poultry from the United States of America faces high tariffs in China stemming from anti-dumping duties while beef products are prohibited because of BSE. While these products from the United States of America also face tariffs in Vietnam, they may find market access to China via the border-trade route through Vietnam. Much of the global beef exports to Vietnam likely go to China. In one such example, 40% of India's beef exports are reported to be sent to Vietnam, but the majority of that beef is believed to ultimately end up in China (Arita and Dyke 2014).

Vietnam imported over USD 3 billion worth of animal feed in 2014. Imports include energy sources (corn, wheat and tapioca) and protein sources (soybean and fish powder). Imports related to animal feed are growing by 20% per year. Various expert groups have considered hazards in feed and there is a broad (although not exact) consensus on the contaminants most important to food safety (FAO 2008; Codex Alimentarius Commission 2013). These include:

- Fungal toxins: aflatoxin and other mycotoxins
- Microbiological hazards: Salmonella and Brucella
- Persistent organic pollutants: dioxins and organochlorines
- Veterinary drug residues: antimicrobials
- Heavy metals: lead, cadmium and arsenic

In terms of risks to human health, the most important appear to be Salmonella, aflatoxins, dioxins and heavy metals, in decreasing order of importance. However, there is little

information on the prevalence of hazards in imported feed. If there are no effective controls in place, there is a risk that sub-standard feed could be targeted to Vietnam.

6.6. Safety of imported food

Setting and implementing standards for food imports and improved agricultural practices in countries may prevent dumping of sub-standard food in developing country markets. Inspection for import and export are discussed in Section 2.4.1.

Box 3: Illegal trade in poultry between China and Vietnam

By its nature, illegal trade is difficult to study and assess, but concerns over avian influenza led to a relatively robust characterization of poultry trade between China and Vietnam. Each year, hundreds of millions of spent hens and tens of millions of day-old chicks and ducklings are imported from China. Spent hens are imported because of the higher price fetched in Vietnam whereas chicks and ducklings are imported because Vietnamese farmers believe they have better performance (higher genetic potential). Another driver is consumer demand, which at certain times of the year—such as the Têt celebration (Lunar New Year)—cannot be satisfied by the national supply.

Nguồn: Desvaux et al. (2014)

The long border with China makes import control challenging and even the border posts are subject to leverage by the Chinese in ways that are not covered by the bilateral agreement, such as leaving perishable products too long in the sun while processing paperwork. There are concerns about dumping

of products by China and much of the agri-chemicals that have damaged the quality of Vietnamese products have been dumped from China. Other low-income countries that border China, such as Mongolia and Kyrgyzstan, have similar experiences and share a widespread perception of imported Chinese food as being unsafe, yet they continue to buy it because it is cheap. There is no evidence from any of these countries that imported Chinese food is generally unsafe, but there is little reliable data on the quantity or quality of imports.

Implications of imported agricultural inputs for food safety

There is concern over imports of agricultural inputs that may compromise food safety or create other risks to human health. For example, salbutamol is illegally used to increase the ratio of lean to fat meat in pork. One study found that only 10 kg out of the total 6,000 kg salbutamol sold in the market in 2015 was for the correct medical purposes while the rest were presumably sold to be used in pig feeds (Duan and Huong 2016). Because just a few active ingredients of pesticides are produced domestically, most pesticides used in Vietnam are imported, amounting to around half a billion dollars a year; China, Singapore and India are the main suppliers (Pham et al. 2011). MOIT estimates around 30–35% of pesticides used are imported illegally (Pham Thi Thu Hien 2009). The high levels of imports are related to high levels of use and this in turn to high levels of residues in marketed foods. Whereas many other countries have greatly reduced pesticide use in the last decades, use in Vietnam remains high (FAOSTAT 2015). According to one source, around 23% of antibiotics used in animals are imported; there is little information on the type or quality of imports. However, use of antibiotics in livestock and fish production seems to be high in Vietnam relative to other countries (Van Cuong et al. 2016) and this may contribute to the high level of antimicrobial-resistant infections in Vietnam.

6.7. Membership in trade agreements

Vietnam has been a member of WTO since 2007 and ASEAN since 1995. The ASEAN Food Safety Network was established in 2003 to be a channel for ASEAN member states to exchange information relevant to food safety. The AEC is intended as a single market within ASEAN and was launched on 31 December 2015. It is expected to increase trade and economic growth.

In recent years, Vietnam has pursued free trade agreements and 16 have been signed between 1995 and 2016 (including ASEAN, ASEAN–China, ASEAN–Japan, ASEAN–Australia and New Zealand, ASEAN–India, Vietnam–Japan, Vietnam–Chile, Vietnam–Laos, Vietnam–Korea and Vietnam–European Union). Some will be superseded by the new AEC

and others by the TPP which includes the United States of America and 11 other Asia-Pacific partners including Canada, Japan, Australia and New Zealand (but not China). The TPP will create the world's largest free trade area accounting for nearly 40% of global gross domestic product and 25% of global trade (VEPR 2015). Negotiations have been concluded and the agreement is awaiting ratification by the parties, with an aim of starting in 2018. Negotiations are also complete on the European Union–Vietnam Free Trade Agreement and it is also planned to take effect in 2018. It will eliminate 99% of tariff barriers imposed by the European Union within seven years and Vietnam will similarly eliminate its tariff barriers within 10 years.

When completed, the TPP would eliminate tariff barriers across the parties, which will present Vietnam with both an opportunity and a threat. While Vietnam is expected to be one of the largest overall beneficiaries of the proposed agreement, the gains may be more limited for agriculture (Arita and Dyke 2014). This important agreement is likely to greatly expand exports, boosting fish, horticulture and nut exports.

However, Vietnam may face competition from imports from other TPP countries. The production price of meat and milk is higher in Vietnam than in several export-oriented TPP countries and Vietnam experts believe that, as a result of trade agreements, exports of pork and chicken may increase from the United States of America, Brazil and Canada (current tariffs are 45% for frozen pork and 40% for frozen chicken) while Australia and New Zealand may be competitive for beef and dairy products (current tariffs are 7% for frozen beef and 10% for milk). Although animal industries depend on imported feed, import tax is relatively low (around 5%) so feed costs will not be greatly reduced (Khoi 2016). On the other hand, Vietnam's domestic livestock industry may benefit from easier access to genetic resources, technologies and production models as well as increased foreign direct investment as a result of a generally improved environment for trade.

The combination of AEC, TPP and the European Union–Vietnam Free Trade Agreement over the next 10 years will expose Vietnam to far greater competition than at present but will also allow unrestricted access to these important markets. This is not something that happens only at international level since Vietnam has to bring its regulations in line with those of its partners, including the very stringent European Union food safety regulatory system. These agreements will also limit economic interventions in domestic production systems if they are disguised barriers to trade through preferential treatment. The agreements have some scope for genuine geographical differences and it is easy to overstate the extent of the limitations but the government will have slightly less room to design interventions to support domestic production.

Improving food safety standards imposes costs on exporting firms; in some cases, adoption of standards leads to improved efficiency that can partially offset costs (Unnevehr and Ronchi 2014). International trade studies have found evidence that

the fixed costs of meeting standards tend to favour established exporters and lead to a greater reduction in developing-country exports relative to those in developed countries (Unnevehr and Ronchi 2014). Participation in export markets benefits some farmers but many do not benefit and there is a tendency for smaller farmers to drop out, as they lack the human and financial capital needed to participate in highly demanding markets. In the 2000s, both Kenya and Uganda saw major declines (60% and 40%, respectively) in small-scale farmers participating in export of fruits and vegetables to Europe under Global GAP (Graffham et al. 2007).

To maximize the benefits and minimize the risks associated with a changing trade environment, IFC advises that Vietnam will need to focus on, among others, the following:

- Improving the performance of domestic markets. Strengthening market institutions for a more productive domestic private sector with stronger linkages to foreign direct investment. This will include removing unnecessary sector regulations, ensuring a level playing field for all types of businesses regardless of their ownership and improving regulatory transparency and predictability.
- Promoting and attracting high-value-added and environmentally sustainable investments, both foreign direct investment and domestic investment, which can help improve food system performance including food safety.
- Diversifying into high-value products to increase the range of exports and increasing sustainable productivity and value addition in the agribusiness sector. A key counter to the perceived low value of agricultural outputs is, for instance, a focus on third-party certification and standards work such as the Rainforest Alliance.
- Identifying appropriate project interventions with private-sector players to demonstrate the business case for adopting practices that increase quality, safety and sustainability.
- Developing strategies to leverage global integration/trade agreements, including TPP and other free trade agreements, and to monitor their benefits and risks.

6.8. Key messages from this section

- The next 10 years will see a significant increase in competition in global markets.
- Food export is important for the Vietnamese economy and there is potential for growth but there are also threats to current exports as meeting importers' safety and quality standards will most likely become increasingly important (pillar 7 of the WBG toolkit).
- Food importers face complex and changing regulations, some related to food safety and quality.
- Food safety issues are especially salient for aquaculture and produce export; the main problems are biological and chemical hazards, veterinary drug residues and heavy metals.
- Food safety issues associated with import include not only dumping and illegal imports but also the legal import of agricultural inputs which may jeopardize the safety of Vietnamese products.
- Food imports and exports are trending upwards, along with increasing urbanization, which may change diets and domestic markets.
- Vietnam food exports need to move from providing quantity to ensuring product quality.

7. Recommendations

Given the widespread failure to develop effective, sustainable and scalable models of improving food safety in domestic markets, these are strategic directions ('directions of travel') rather than firm recommendations for actions that will deliver solutions. It will be important to institute an experimental and learning approach to changes in the food system, with frequent assessments of progress and consequent adjustments.

The recommendations are also provided keeping in mind two important points:

- Safe food should be delivered by the private sector, whether micro- or large-scale, and by all actors in value chains, from input suppliers and producers to processors and food distributors, through the use of good practices and adapted technologies (pillars 1 and 3 of the WBG toolkit). The mandates of public authorities are to (i) provide an enabling environment so that safe food can be delivered, entailing proper legislative and policy framework, institutions/incentives to empower the private sector to deliver safe food, promoting good practices and offering compliance support and (ii) establish and implement a well-designed and balanced control and enforcement system to ensure that food is safe and build confidence among consumers while minimizing undue interference with market functions; this includes a network of well-trained food inspectors; proper, coordinated and science- and risk-based food safety surveillance plans; recognized laboratory networks (public and private) providing timely and quality-assured tests and risk communication capacity and strategies. The recommendations below attempt to address both functions of the public authorities.
- The current food production system in Vietnam, mainly relying on a multiplicity of micro- and small-scale producers, operators or businesses, makes it challenging to assure the delivery of safe food in the very short term. Consolidation of production systems to reduce reliance of the supply chain on micro-producers will facilitate the process but will take time. However, that should not prevent the government and private sector from taking measures immediately. Therefore, these recommendations are structured around interventions that can start immediately and those that must be envisaged in the medium to long term.

Below are the recommendations.

The National Strategy for Food Safety sets out five major objectives, with which these recommendations are aligned:

1. Improve knowledge and practice on food safety
2. Strengthen capacity of the food safety management system

3. Significantly improve food safety at facilities for producing and processing food
4. Significantly improve food safety at retail
5. Effectively prevent acute food poisoning

The **overall recommendation** is to develop a risk-based system using the principles of risk assessment, risk management and risk communication as set out by WHO/FAO Codex Alimentarius framework and pillar 5 of the WBG toolkit.

Risk assessment is the scientific evaluation of known or potential adverse health effects resulting from human exposure to foodborne hazards. Current, credible information on food safety is a prerequisite for risk management and communication. Actions to improve risk assessment could include:

1. *Strengthen national food safety monitoring and surveillance:* This should cover domestic markets and specifically address the imbalance in surveillance and control for export versus domestic market. As efforts in surveillance by different agencies are fragmented and insufficiently coordinated and integrated, a comprehensive and joint National Surveillance Plan should be developed, keeping in mind that foodborne diseases are preventable and because prevention starts at the farm, surveillance needs to cover the entire value chain.
2. *Improve data management:* There is a need to develop better evidence on risks, impacts, and costs of foodborne disease and the efficacy and cost benefit of interventions. Evidence from the ministries is still limited and it is advisable to use independent available data, notably from research and academics as well as from the private sector, in order to help understand and manage risks.
3. *Create a culture of evidence-based decision making:* This will require strong leadership and capacity building to build a culture whereby decision makers proactively seek and use evidence. There is also a need to establish a database system, collection of data from province/district, for the purpose of more effective and targeted surveillance planning, trace-back and trace-forward capacity – including investing in technologies and equipment.

Risk management is the process of selecting appropriate prevention and control options for improving food safety. It is based on risk assessment.

4. *Establish a performance management system:* This should set, implement and monitor delivery of Food Safety outcomes by the three ministries. This would require jointly agreeing outcomes, plans and targets, regularly reporting on progress, and adjusting actions in response to information on outcomes. Redirect some of the resource from inspection of imports of product from reputable countries and operators to its domestic supply.
5. *Develop a “farm to fork” food chain approach:* This should include inputs, production, transport, processing, retail and waste. This can start with higher value “safer and trusted” products building on current initiatives (e.g. LIFSAP, VietGAP, PGS, Fresh Studio “TracePigs”, etc.), with an emphasis on providing incentives for adoption of better practices.
6. *Prioritise farm inputs:* Misuse and overuse of pesticide and antimicrobials is a key concern in Vietnam, and the legislative framework on this remains very permissive. It is recommended to start immediately developing a results-oriented, participatory and progressive plan aiming at (i) decreasing the overall use of chemical inputs in production (notably antibiotics in animal production), with targets; (ii) removing antibiotic as growth promoters in animal feed. Innovations, such as the recently introduced replacement of antibiotics (e.g. by probiotic bacteria) could be promising approaches currently promoted by the private sector, if science-based and well documented; (iii) optimizing the use of pesticides and antimicrobials at the farm level, using Good practices such as GAP, GAHP, GVP; and (iv) promoting farming systems, other integrated pest management techniques (IPM), encouraging organic production that are resilient to low use of pesticides and antimicrobials.
7. *Improve traceability along the chain:* Traceability is an essential part of “farm to fork” approaches. Again it can start with high-value and high-risk products, e.g. vegetable, indigenous pork products. The methods, application, and awareness of all value chain actors on traceability should be adapted to context and expanded gradually. First attempts, already made by some large or medium scale business in Ho Chi Minh City and Hanoi, should be monitored in terms of challenges, and lessons learned.
8. *Align Infrastructure upgrading with practice change:* Research and lessons learnt from experience bring caution in assuming that provision of upgraded and modern infrastructure will necessarily reduce foodborne disease and deliver safer food. Current national policy on slaughterhouses network consolidation and use of Gates Wholesale Markets must prioritize good practices and behaviour change of related actors towards hygienic practices including incentives rather than focusing on infrastructure only.

In addition ‘appropriate’, intermediate technologies (e.g. at slaughterhouse) should be also considered, as most expensive practices will be more difficult to maintain.
9. *Strong consumer preference for fresh animal source food:* Given that preference and that most of consumers do not store purchased food for long periods, focus should be placed on identifying technological solutions and management procedures to enable quick and efficient tests of fresh products, promoting business models with lean value chains to deliver fresh products within shorted time and awareness raising on end-consumers and producer groups.
10. *Training efforts:* Training of actors, e.g. farmers, on good practices and food safety is recommended but noting that evidence has shown this to be most useful when there are clear incentives for changing practices.
11. *In the long term, the progressive consolidation of production systems* to reduce reliance of the supply chain on micro-producers could facilitate all interventions listed above. At the same time, consolidation can also multiply the hazards and spread illness more effectively, and hence requires more careful and effective monitoring than the traditional sector. It is also associated with less healthy diets and rise in non-communicable disease. The current efforts undertaken by the Government of Vietnam to promote cooperatives, and build their capacity goes in the right direction. However, there are many roads to food safety and innovative approaches based on upgrading value chains, empowering small holders and small-scale retailers, and farmer’s markets should also be considered.
12. *Complement end-product testing with a focus on process quality:* Testing of products at the downstream end of the food chain is important to ensure consumer’s confidence but, alone, will not necessarily deliver safer food. Efforts should be refocused towards (i) promoting good practices and creating incentives to sustain them, (ii) testing at different points of the product chain based on risk-based approaches; and (iii) end-products testing only used cautiously and ultimately to check if the food safety system is reliable and integrated into the proper food safety National Surveillance Plan mentioned above. At the same time, hazard testing of food is an important part of building and maintaining consumer trust and providing incentives to the private sector.
13. *Develop risk -targeted recommendations:* Performance improvement plans should be developed for major agri-food sectors taking into account their characteristics and risks
 - a. The large-scale private sector has significant experience in meeting food safety criteria through

‘farm-to-fork’ approaches. Efforts should be made to leverage the potential of large scale national and foreign companies to contribute to attaining food safety. This may entail reconsidering the current legal framework (through Circulars) limiting foreign companies to link directly with producers. However, careful monitoring is required to ensure the benefits of this do not exceed the costs, including jeopardizing employment and food security benefits of the small-scale private sector.

- b. Trade and export: Vietnam has been very successful in exporting food products but these products predominately pertain to low risk commodities. Expanding its export portfolio to include more high quality, branded products alongside the mainly lower value and undifferentiated products which currently dominate exports could increase foreign earnings and decrease the risk inherent in a narrow portfolio. This needs to be aligned with not only effective food safety systems but with visibly safe systems that start to build more international confidence in Vietnamese food products.
- c. Address the informal sector context: Seek to upgrade rather than replace the informal food sector. Consider other models e.g. the farmer’s market approach rather than the supermarket approach and pilot these. Some approaches may be better suited to large scale farms but given the predominance of small producers and the importance to livelihoods and nutrition in Vietnam, it is also important to develop “light” approaches suited to small farmers and processors. In particular approaches that are based on working with the existing situation and gradually improving it, have shown success. Continue to develop interventions but place more emphasis on understanding what works and what doesn’t such as develop lighter approaches to GAP which may have greater uptake. .

Risk communication is the interactive exchange of information and opinions among risk assessors, risk managers, consumers, industry, the academic community and other interested parties, including the explanation of risk assessment findings and the basis of risk management decisions. Actions to improve risk communication include.

14. Improve risk communication: To address public concerns over food safety and the problem that risk perception is often not well aligned with reality there is an imminent need to educate the public and decision makers not only on risks but on the psychology of risk perception which means they are often worrying about the wrong thing. This should include that messages from the “government” related to food safety risks have to be consistent based on genuine collaboration and coordination. To support this the government needs to develop a communication strategy to build

consumer trust in government advice on food issues. While this requires a long term change, in the short term, government messaging in a food crisis should avoid strengthening negative perceptions. As already mentioned above there is a need for good evidence on which to base future communications in order to be trustworthy. The communications strategy should link with an economic strategy for the role of consumers in strengthening markets (instead of weakening them). Consumer education and awareness also needs to be imparted so that they are aware of food safety practices at the consumer end but also better understand common risk.

15. The communication strategy’s development will require a mix of international expertise and local knowledge about the Vietnamese context. It should have the following key features:

- a. It should use means, instruments and channels adapted to the targeted beneficiaries and that are mostly country-specific. For instance, in Vietnam, the role of social media and web-based communication is fast growing and therefore may be a good medium to use (i.e. the MoH website has specific pages on Food Safety, FAQ sections, use of Facebook and other social media, etc.).
- b. It should cover, and set the framework for, the three following aspects: (i) day-to-day communication aimed at rebuilding enough trust with consumers to be able to guide their buying decisions in positive ways (see Chapter 5.6 for more details and examples); (ii) guide reactions and responses for regular food safety criticisms/issues that are sometimes biased and not necessarily documented and/or backed with evidence, to re-establish the truth; and (iii) crisis communication when legitimate food safety issues arise that does not hide facts, nor defend those responsible for the incident, but highlight the actions being taken by the Government and other stakeholders, including all the efforts undertaken to mitigate the event’s impacts (including allaying the public concerns).
- c. It should increase the Government and other stakeholders’ preparedness with pre-designed protocols and procedures that will increase responsiveness, and ensure that they are country-specific and adaptable to the Vietnamese context.

16. Use successful examples to motivate change: Vietnam food exports are rapidly growing as the result of uptake of general modern processing. These follow GMP, HACCP, ISO and other standard processes. Despite existing challenges for some commodities in meeting international standards there are also successful examples (e.g. 95% compliance for prawns exported to Australia). Over time, compliance has improved. Efforts

should be made to replicate these also domestically. The recent decision to give authority to NAFIQAD to scale up its residue monitoring system to pork and poultry value chains is a good first step. Leveraging on private sector initiatives to improve food safety and government giving better and formalized recognition to such controls by private sector should be further promoted (eg. TracePig by Fresh Studio and De Heus LLC, VinGroups and other large Vietnamese Groups investing in agriculture).

Optimising risk assessment, risk management and risk communication can be facilitated by building capacity and improving co-ordination between actors. This may be facilitated by the following actions:

17. *Build capacity in risk-based approaches* including risk assessment, risk profiling and risk categorization to ensure that limited resources are used most effectively for monitoring and control of foodborne disease. The capacity in risk assessment is spread across universities, research institutes, ministries (MOH, MARD, MONRE), CODEX. Training has been carried out with international assistance. However, more focus must be put on systematic application of a risk-based approach to food safety in which the private sector should take a leading role – while the Government keeps its core function of regulating and enforcing the legal framework given the insufficient capacity, resources and enabling environment for successful application.
18. *Institutional re-arrangement*: Although undertaking a major reform of the legal and regulatory framework is not considered to be an urgent priority, it is recommended to continue to identify mechanisms by which to enhance implementation arrangements and overall coordination to ensure greater food safety outcomes. In light of the decision by HCMC municipality to move forward with piloting a “Board” constituted by some fulltime staff from DOH, DARD, DOIT, among others, and that reports to the Chairman of the People’s

Committee and works as “coordinator” for food safety in the city, it would be important to establish a strong monitoring and evaluation system of this pilot. It will be crucial to learn from this experience to assess the pros, cons, and unexpected bottlenecks and analyse its suitability and replicability in the Vietnamese context. Indeed, as demonstrated in the Module 4 of the WBG Food Safety Toolkit³⁰ (and Table 15 below) there is no “perfect” institutional structure and the decision to go for single versus multiple agencies (both having several “sub-models”) will notably depend on (i) capacities of agencies (level of expertise, number of staff, equipment), (ii) constitutional organization of the country, (iii) level of decentralization, (iv) number of premises to be inspected, and (v) the level of development of the food safety system overall.

19. *Improve networking, consensus building and consistency* among institutions, relevant authorities and labs, in particular when attached to different Ministries, as well as strengthening the sampling capacity of lab personnel. Build capacity in diagnostics, and laboratory quality assurance, harmonization of standards and approaches among food testing labs and surveillance system (national and regional).
20. *Develop inter-connected food safety strategy and SPS action plans*: Begin a phased process by which to facilitate and ensure that the Food Safety Strategy and the SPS National Action Plan are closely coordinated and aligned. Given that the coordinating ministries are different, these two strategic documents must be written / updated synergistically to ensure that the proposed objectives, results and interventions are well aligned and complementary.
21. *Strengthen the implementation of food safety regulations and give more responsibility to food producers and retailers*. It is important to shift from a system where government has responsibility for food safety towards a system where the private sector is empowered and takes greater responsibility.

³⁰ <https://openknowledge.worldbank.org/bitstream/handle/10986/25204/911840WP0Box380od0Safety0Toolkit0IC.pdf?sequence=1&isAllowed=y>

Table 15: Roles and responsibilities of “food safety” institutional structure and comparison with Vietnam’s case

	Type of Reform	Examples	Vietnam’s Progress
1	Streamlining administrative structures	Creating a lead agency for Food Safety is the most common model and it comes in different variations. However, many countries fail to integrate at levels below national (e.g. UK).	In Vietnam, institutional responsibilities for food safety controls are divided between three ministries. While majority of OECD countries maintain several agencies in charge of food safety, the trend in emerging economies has been to consolidate food safety to one government agency (e.g. China, Kazakhstan). This reflects the desire to reduce barriers for collaboration between multiple agencies. Through such consolidation, governments expect to reduce institutional battles for spheres of influence. The other scenario in many countries is sharing of responsibilities on food safety control between ministries but with greater focus on strengthening the coordination mechanism with a view to developing a comprehensive food control system rather than independent systems within ministries (e.g. Philippines, Thailand and Mongolia).
2	Coordination across inspection bodies	Coordination can be an alternative to creating a lead agency (e.g. Germany). Nevertheless, it is also used to direct collaboration between all major inspection bodies (e.g. Dutch Inspection Council and “Domain” system). The UK has a looser system under a special government department, the Better Regulation Delivery Office. In China, the concept of a ‘Food Safety Commission’ is present at all levels from national to village, and it provides coordination rather than direction but engages with local communities. Joint inspections between relevant agencies are common.	In Vietnam, the concept of a food safety commission, namely Inter-sector Steering Committee for Food Hygiene and Safety (chaired by the Deputy Prime Minister and co-chaired by the Minister of Health, is present at the national level, headed by DPM and is being replicated at provincial level in all cities and provinces. The VFA serves as de-facto secretary of this commission. However, the coordination may still be a challenge as VFA capacity to effectively consolidate food safety related issues at higher level is challenging.
3	Risk profiling of businesses	Detailed risk criteria developed for both food products and types of business, and then combined with compliance record to form a risk assessment matrix to allow precise calibration of risk levels presented by any company. Some best practice examples can be found in the Netherlands and UK. The A/B/C/D system in Catering has been in use for many years in China, Singapore, US cities (New York, Las Vegas) but it is based only on the last inspection. China is trying to extend this system to processing level.	In Vietnam, a risk-profiling system seems to exist but it is relatively weak and is not applied across the board. The challenge is that most of the catering is done through micro-enterprises which are very difficult to monitor.

	Type of Reform	Examples	Vietnam's Progress
4	Risk-based planning of inspections	Inspections are targeted at High Risk businesses and even High Risk is then prioritized individually. Low Risk businesses are largely ignored. Unplanned inspections reduced through applying same risk criteria when responding to complaints. One of the best studies of problems of unplanned inspections is from Mongolia.	Frequency and order of inspections can be determined by business profile but not prioritized within each category. Frequency of inspection still high and unpredictable. Contrary to good practice, there the system of inspections is not planned, as demonstrated by a high ratio of unplanned to planned inspections.
5	Resource reduction	Risk-based targeting allows reduction in resources since only a small number of businesses need to be inspected. Also, political pressure to reduce the burden on businesses has driven the reduction in inspections in many countries. Poland has shown dramatic results in reduction without losing effectiveness.	Resource constraints are important factor for moving to a risk-based inspection system. There is significant resource constraint in NAFIQAD, after decision has been taken to charge it with new responsibilities for pork value chain.
6	Application of risk treatment strategies	Regulatory organization is focused on delivering public goods through managing risks on behalf of the public. Uses strategies other than enforcement to manage these risks (e.g. compliance assistance, co-regulation, consumer empowerment). The USA, Canada and Australia have good examples of compliance management systems.	This is at very rudimentary level and at times is not observable.
7	Performance management	Regulatory organization has clear strategic and annual objectives, with specific performance indicators linked to risk criteria. These are reflected in performance indicators for staff that drive staff behavior in line with the organization's objectives (e.g. raising compliance levels rather than imposing penalties). The UK is particularly strong on this approach but Estonia has shown how well it can be applied in recently developed economies.	Objectives and targets should be set annually in terms of inspection, sampling and testing plans, rather than outcomes in terms of public health results. Performance management at individual staff level not known and more research needed.
8	Providing assured advice on request	The accepted good practice is whereby regulator assist business through advice in order to ensure compliance. Can be at inspector level or at corporate level or telephone help line. Best examples in UK and Lithuania.	Inspectors do not assist businesses through compliance advice.

	Type of Reform	Examples	Vietnam's Progress
9	Personalized regulation	The UK's "Primary Authority" scheme approves a partnership between a regulatory body to a large company with many outlets and both agree on detailed compliance plans. The company ensures compliance with the detailed plan and all other regulators have to consult its partner before taking action.	So far, this model is unique to the UK but is being closely looked at by many countries. Could have some potential for development in Vietnam, especially in the context of large agri-holdings.
10	Export-led drive to raise standards and encourage compliance	Benefits of compliance seen as allowing access to new markets, especially foreign markets. Domestic inspection then becomes supportive to help meet foreign standards.	

Source: IFC, authors

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9. Annexes

Annex 1	Overview of food safety in Vietnam
Annex 2	Round-table discussion on food safety risk management in Vietnam and abstracts presented
Annex 3	People met during the technical missions
Annex 4	Matrix of laws, decrees, circulars and decisions related to food safety
Annex 5a	Food safety governing system in Vietnam
Annex 5b	Decentralization of MARD food safety responsibilities through province and district levels
Annex 6a	Further details on organizational structure of food safety management under MARD
Annex 6b	Additional material on surveillance and monitoring
Annex 7	Further details on inspection for domestic versus import/export market, inspection frequencies and violations
Annex 8	Fresh fruits, vegetables and meat inspection model
Annex 9	Classification of laboratory testing parameters under MOH in terms of food and technique used
Annex 10	Overview of samples analysed by year at NIFC in Ha Noi (2014-15) and IPH in Ho Chi Minh City (2011-15)
Annex 11	Laboratory organization beyond MOH
Annex 12	Provision of academic training in Vietnam related to food safety
Annex 13	Procedure of audit of VietGAP certification
Annex 14	Biological food safety hazards in the food chain
Annex 15	Food safety hazards included, key messages and limitations of WHO FERG burden of disease estimates from a global perspective
Annex 16	Burden of disease estimates (partly foodborne) other than those of WHO FERG
Annex 17	Pork and vegetable value chains in Ha Noi and Ho Chi Minh City
Annex 18	WBG T&C Food Safety Toolkit: Guiding Principles of Food Safety Reform

All the annexes are available at: <http://www.worldbank.org/en/country/vietnam/publication/food-safety-risk-management-in-vietnam-challenges-and-opportunities>



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