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The Role of Proximity and Standards in Guaranteeing Vegetable Safety in Vietnam¹

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In Asia, the growth of purchasing power, especially in cities, come together with rising consumers' concerns for food safety. We investigate two mechanisms of food safety assurance, i.e., proximity (between farmers and consumers), and certification based on standards. The literature suggests the following hypotheses: (i) proximity in food chains comes together with low farmers' cost for quality assurance, but also limited scope of operation; and (ii) "abstract" expertise systems that form the basis of standardization imply high costs at the expense of inclusion of small-scale farmers, but enable large scope of operation; the impact on consumers' trust is controversial. The paper is a preliminary attempt to test these hypotheses on the situation of vegetable safety assurance in Northern Vietnam. The authors' fieldwork brings to the fore a variety of standards and quality assurance systems: safe vegetable certification by the Plant Protection Department, based on—quite lax—public standards and control; it is in some cases supplemented by internal control systems; VietGap and AseanGaps based on good agricultural practices and HACCP (Hazard Analysis Critical Control Point); and participatory guarantee systems (PGSs) for organic vegetables. The hypotheses are partly confirmed. One interesting outcome relates to the combination of systems based on relational proximity, expert systems, and labeling on the origin of vegetables as enhancing consumers' trust and farmers' commitments. The paper concludes with recommendations in terms of policy and research.

Keywords: Food safety assurance, standards, proximity, vegetables, Vietnam

Introduction

The paper deals with the comparison of two major ways to increase consumers' reassurance about the safety of food: interpersonal trust and expert systems of quality control based

on standards. We will first present the growing concern of consumers for food safety in general and in Southeast Asia more particularly. We will then review the literature on interpersonal trust and expert systems as quality assurance devices with their respective strengths

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of weaknesses. Illustrations taken from the authors' work in Vietnam, and also on some secondary sources, will then be presented. The authors' experience is based on the study of domestic rather than export markets, and on vegetables rather than other commodities. The paper concludes with a summary of the main issues and some recommendations in terms of research.

Growing concern for food safety

Globally

The growing distrust of consumers in the safety of food is widely documented in both developed and transitional economies. This is related to the growing intensification (in terms of use of chemical inputs) or even industrialization of food production and processing, as well as to the growing distances between food production and food consumption sites.

As stated by Ménard and Valceschini (2005), "recent developments have encouraged consumers to adopt a 'suspicious approach.'" Technological innovations, combined with the diversity of product origins and the internationalization of trade, stimulate consumers' risk aversion, which has been exacerbated by recent events such as "mad cow" disease, the poultry flu pandemic, etc. (p. 427). "The costs and efficiency of alternative organizational and institutional answers in establishing credible commitments are at stake" (p. 428).

In Europe, food crises have been especially acute in the meat sector since the 1990s. Bovine spongiform

encephalopathy (BSE) struck in 1996, followed by the dioxin crisis in Belgium in 1999. Avian influenza started in Hong Kong and then moved to inland China and Vietnam in 2005. The response to food scares is a drop in food consumption, and recovery is always incomplete (Böcker and Hanf 2000). After the second crisis of BSE in 1999, three years were necessary for consumption to reach its previous level, despite very low real risk. Industrial production, as well as information brought to light by scientific experts, was made invalid by BSE (Allaire 2005). Organic agriculture is not spared from stigmatization. In 2011, *Escherichiacoli* that developed from germinated seeds produced in an organic farm caused the death of 38 people in Germany. The origin of the bacteria had been wrongly attributed to Spanish cucumbers by German food safety authorities, which led to more than 500 million euros in losses due to the drop in consumption (Wollman and Briat 2011). In 2003, Korea banned beef imports from the United States because of BSE. In early 2006, Korea and the United States resumed an import protocol. This resulted in what was considered as one of the biggest anti-government demonstrations in two decades.

Although it is less characterized by "de-territorialization" than other sectors, agriculture is being increasingly driven by international food chains. Internationalization and concentration are observed in the sector of agricultural inputs as well as retailing. These processes started to be documented in the 1990s (Goodman and Watts 1997; Morgan, Marsden, and Murdoch 2006). According to Friedmann (1994, 272), the dominant

tendency in agriculture as well as diets is “the suppression of particularities of time and place” and the disconnection of production and consumption.

The massive protests following beef imports suspected of BSE in Korea in 2008 are partly due to distrust in the behavior of retailers, some of whom were selling American beef as domestic beef. Due to the growing gap between producers and consumers, it becomes increasingly difficult for consumers to understand the way food has been produced. “Both the physical distance and the mental distance between producers and consumers have grown” (Brom 2000, 129). In the UK, publication in 2002 of the Curry Report demanding to reconnect production and consumption of food indicates a milestone in policy development (Wiskerke 2003).

The increasing marketing power of modern distribution is having mixed effects on these food safety problems. What is especially affected by food crises is consumer trust in the reliability of suppliers (Böcker and Hanf 2000). Food crises are commonly followed by strategies of differentiation through quality for all actors in food chains (Ménard and Valceschini 2005). On the one hand, promotion of food safety is a key communication strategy of supermarkets; thus, consumers associate purchases in supermarkets with enhanced quality assurance. On the other hand, these perceptions are not necessarily paralleled with genuine efforts on the part of modern distribution. Besides, consumers are made increasingly dependent on the information provided by a small number of retailers (Ménard and Valceschini 2005).

In Asia

In Asia, some authors consider that concern for food safety has emerged since food availability is no longer a concern (Changchui 2006). Sources of food contamination have also increased. This is because of the increase in industrial and domestic sources of pollution close to agricultural production areas, and also because of the rise in the use of chemical inputs by farmers. In China, consumers’ concerns include pesticides, heavy metals, and growth hormones contained in produce, as well as contamination from water and soil (Wei 2006). This is close to the concerns of Vietnamese consumers, who worry first about pesticide contamination in fruits and vegetables followed by antibiotics in meat (Figuié et al. 2004). In the Philippines, consumers are concerned first about the physical appearance of fruits and vegetables, followed by pesticide residues (Battet al. 2006).

With increased facility for regional trade, there are also new worries about food safety. As highlighted by a meeting of consumer protection associations in 2005, the benefits of economic integration are mostly discussed from the point of view of businesses rather than that of consumers (Consumers International 2005).

The rapid development of supermarkets in both developed and developing countries has been covered extensively in reports in the last decade, particularly by Reardon et al. (2003). In Asia, the first supermarkets emerged in the 1990s after their rapid development in Latin America. The westernization of Asian diets, the development of

supermarkets, fast-food chains, and exports in Asian countries are described by Pingali (2006) as the main drivers for change in the food systems. Private standards are developed by supermarkets as substitutes for nonexistent or inadequate public standards (Reardon, Timmer, and Berdgué 2008).

The following section investigates some literature insights on what are the ways for suppliers to answer consumers' concerns about food safety.

Literature insights on food safety assurance systems

Food safety refers to credence attributes, i.e., attributes not directly observable by the user, which create the most uncertainty concerning quality (Darby and Karni 1973), relative to search and experience attributes (Nelson 1970). Credence attributes generate information asymmetries between farmers and consumers, which cannot be entirely dealt with by trust and reputation, in contrast to experience attributes (Caswell and Modruska 1996). Labeling commodities with some mandatory information on the production processes is an answer to these issues. Monitoring by consumers or experts paid by consumers is another option (Darby and Karni 1973). The credibility of labeling is strengthened by third-party certification, which implies standardization and testing (Bonroy and Constantatos 2008). In addition to the literature on labels and standards as answers to food safety problems, there is growing documentation of "reconnection" or proximity of agriculture with food consumption as ways to reassure consumers in terms of

food safety. In what follows, we present what is stated to be the advantages and limits of two mechanisms of quality assurance: proximity between farmers and consumers, and standards.

In Asia

a. Definitions

In the literature, proximity between producers and consumers—be it geographical or relational (the two being partially related)—is said to be advantageous to transactions in various respects. Geographical or spatial proximity relates to the "kilometric distance that separates two units" (Torre and Rallett 2005, 49). Relational proximity—equivalent to organized proximity according to Torre (2000)—relates to the interactions between stakeholders. It has also been defined as a mutual alignment of interests based on combinations of power relations, trust, and management of social factors (Murphy 2012). It is said to rest on common representations and values (termed as cognitive proximity by Boubal Olga and Grossetti (2008)), a capital of trust and interpersonal relations.

b. The advantages of geographical proximity

The role of geographical proximity in the supply of perishable crops was modelled by Von Thünen in the first analysis of agricultural land use according to location done in 1826 (Huriot 1994). According to Von Thünen's model, land is allocated according to the use which brings the highest land rent, and can be sketched as concentric circles relative to the city

center. Land rent is defined as the share of the output by area after deduction of production and transport costs. The most profitable and intensive land use by unit area, and commodities with high value relative to transport costs, are found near the city center. This is typically the case for perishable fruits and vegetables. The validity of von Thünens model is being brought back into question in industrial societies where the share of transport cost in the total cost decreases, and dominant factors in the locating of production are soil quality, regional specialization, and competition between agriculture and urban development (Huriot 1994).

c. The advantages of relational proximity

Geographical proximity goes hand in hand with relational proximity, as it may favor more direct links between producers and consumers. Such direct links are efficient in the development of trust and loyalty, as well as some sense of responsibility on the part of farmers as regards food safety (Prigent-Simonin and Héault-Fournier 2005). According to Ellis and Sumberg (1998), the advantages in terms of quality gained by proximity between suppliers and customers—in particular trust—may be a transient consequence of quality regulations not being adequately enforced. But they may also be considered as an efficient substitute for costly and difficult public control of food safety in the context of small-scale agriculture.

Personalized relationships in market transactions play the role of minimizing transaction costs (Porath 1980). The role of vertical integration in reducing transaction costs was brought

to the fore by Williamson (1987). Transaction costs means all indirect costs incurred in setting up, conducting, and monitoring the transaction, i.e., the cost of searching out, selecting, agreeing to, implementing, and enforcing contracts (North 1990). Measurement costs of quality characteristics are specific types of transaction costs. The safety of food produce is a quality attribute that is especially difficult to observe and measure. The consequences of quality measurement constraints on the supply of low-quality produce (as good quality produce does not get a quality premium) and even disappearance of market transactions have been demonstrated by Akerlov (1970). Increased vertical integration is a response to a greater number of quality measurement errors (Barzel 1982). Transaction costs relate here to establishing mutual views about honesty, reliability, and skill, as well as rules and norms concerning contingencies. On the other hand, drawing from the game theory, the expectation of continuing exchange may provide a disincentive to cheat: the infinite repetition of a transaction can induce the parties to give up short-term benefits in order to realize future gains (Platteau 1994). Personalized relationships, which can also be termed as relational governance, are an intermediary mode between the two polar extremes of governance (Claro, Hagelaar, and Omta 2003), market and hierarchy (Williamson 1991). Trust reflects the extent to which negotiations are fair and commitments are sustained (Anderson and Narus 1984). Trust counterbalances the need for a costly safeguard mechanism against opportunism. Trust (inter-personal as

well as inter-organizational) favors two aspects of relational governance, joint planning, and joint problem solving (Claro, Hagelaar, and Omata 2003). Trust refers to the credibility (or reliability) of the partner, as well as to his/her benevolence. It is based on familiarity “developed either from previous interactions or derived from membership in similar social groups” (Battet al. 2006, 94). Personal relationships are at the same time an antecedent and a consequence of transactions as they are “continually assessed and reassessed with each subsequent exchange transaction” (*ibid.*96)

Direct sales from farmers to consumers take various forms in terms of location and method of transaction, including farmers’ markets, home-to-home delivery, and at-farm purchases (Cadilhon 2007). Community-supported agriculture (CSA) emerged in the mid-1960s, approximately at the same time in Japan and Germany, mostly in reaction to food industry scandals (Roos, Terragni, and Torjusen 2007). In CSA, consumers agree to prepay a certain amount of money to the producers, or to invest in the production system directly, in exchange for receiving fresh produce at their door or at a designated delivery station during the harvest season.

Direct sales reduce marketing risks for both sides: risks for farmers of not finding buyers, and risks for customers of not finding the suppliers they are looking for. These risks are especially important in the case of perishable produce. Consumers may also expect quality characteristics that are difficult to visibly observe, such as nonuse of pesticides and cleanliness during

processing and packaging. The building of regular, personal relationships, based on the seller’s reputation and buyer’s trust, can be termed as a “domestic convention,” enabling consumers to feel more reassured—in contrast with standards which refer to industrial conventions (Eymard-Duvernay 1989). The farmer-producer relationship is an opportunity to exchange knowledge on production methods, which fulfills the consumer’s needs for reassurance, because producers are perceived as the most competent persons to give this information. In return, direct farmer-consumer exchanges enable farmers to have a better appreciation of consumer demands (Prigent-Simonin and Héault-Fournier 2005).

Direct sales have also been described as a way to develop solidarity between farmers and consumers. Numerous advocates of “alternative distribution food chains” claim that citizens should be able to access local neighborhood small-scale retail points—if possible, run directly by farmers—rather than mass-scale, monopolistic and production-centered distribution, which disconnects agricultural output from its natural conditions of production (Morgan, Marsden, and Murdoch 2006; Friedmann 1994). Kirwan (2004) refers to social connectivity, reciprocity, and trust as dominant drivers of British consumers buying from farmers’ markets. “Forums where producers and consumers can come together to solidify bonds of community” (Lyson 2000) define civic agriculture, where producers are not only responding to wants expressed by consumers, but also share the sense of inhabiting the same place with resulting

joint opportunities as well as constraints and responsibilities (DeLind 2002). According to Hinrichs (2000), it is not necessarily easy to disaggregate the market interests gained by farmers and consumers through direct transactions, from more social and civic interests, as all are embedded.

In France, it is noted that producers in short chains choose practices that are meaningful with regard to the environment, allowing them to communicate more easily and that they can turn to greater advantage in their direct relationship with the consumer, such as diversification of fruit and vegetable varieties. In Britany, the proportion of organic farmers among producers selling to consumers is reportedly 30% compared to 15% for at-farm sales (Redlingshöfer 2008).

Finally, when the place of food production is close to where the food is consumed, farmers face more directly the recipients of the shaded health and environmental costs (i.e., externalities) of their actions. The consequences of unsustainable production will be more “visible” and easy to sanction by local institutions (Princen 1997).

d. The limits of proximity and the advantages of standards

Mostly by definition, there is a geographical limit to the efficiency of face-to-face interactions, even when it is supplemented by organized proximity, modern technologies of communication, and temporary geographical proximity at crucial stages of the transaction or innovation processes (Torre and Rallett 2005). Direct sales are commonly

associated with niche markets, i.e., for organic markets. Achieving success stories in terms of quality management, farmer, and intra-chain coordination for local produce (i.e., with geographical indications), without damaging the interpersonal relationships and commitments which guarantee long-term efforts in terms of quality, remains a challenge for many. In the European-funded project SUSCHAIN which worked in seven European countries (two cases per country) (Wiskerke 2003), it is stated that a small “sustainability” gain within the 95% (normalized and concentrated markets) may have a larger overall impact than a larger “sustainability” gain within the 5% (typified by producer cooperation and more direct interactions).

As mentioned above, the literature on labels indicates that credence attributes generate information asymmetries and suppliers’ risks of cheating, which cannot be satisfactorily tackled by trust and reputation, and which require credible labeling based on verifiable procedures and standards.

Even though studies comparing the cost disaggregation in short versus long food chains are scarce, the available ones show that specialization according to comparative advantage and economies of scale as regards production, processing, and logistics may actually lower the costs of food produced at a distance, even in terms of energy (Schlich and Fleissner 2005).

Besides, centering on geographical proximity and advocating short food miles (i.e., kilometric distance between producer and final consumer—see Weber and Scott 2008) has been criticized for the risk of defensive localism

that it may entail (Allen 1999), which may come at the expense of developing economies (Grolleau, Sirieix, and Schaer 2010; Kemp et al. 2010).

The first initiatives in the areas of organic agriculture and fair trade in the 1960s “were characterized by a high level of vertical integration that went all the way from marginalized producers and their organizations to dedicated retail shops,” involved regular interactions between producers and consumers, and were based on informal norms (Daviron and Vagneron 2011, 97). But in the 1980s for fair trade and the 1990s for organic agriculture, intermediaries between producers and consumers turned increasingly professional, formal standards emerged, as well as third-party certification, enabling these initiatives to spread into modern distribution. This shift also corresponded to growing consumer concerns for food scares and decreasing public support for agriculture. In Europe, responsibility for food quality control has shifted from government authorities to industry actors (Wiskerke 2003). Trust in persons is shifting increasingly into trust in abstract systems, which is “the condition of time-space distanciation and of the large areas of security in day-to-day life which modern institutions offer” (Giddens 1990, 113).

e. *The limits of standards*

Standards are “rules of measurement established by regulation or authority” ((quotation from Jones and Hill 1994) by Reardon et al. (1999)). They have been also defined as “norms selected as a model by which people, objects, and actions ...can be judged and

compared, and which provide a common language to evaluators, the evaluated and their audiences”(Ponte, Gibbon, and Vestergaard 2011, 1). Standards can be classified between performance (e.g.,maximum residue limits) versus process standards (e.g.,fair trade and GlobalGAP); private versus public; and mandatory versus voluntary (Reardon et al.1999). There are hundreds of organic private standards. Standards set by the government include 60 organic standards, pollution-free, or green vegetables for China, etc.

Labels and standards have something to do with trust, but of a different kind than inter-personal trust. While inter-personal trust is dialogical, i.e., it enables a bilateral communication and exchange, trust created through conformity assessment is monological and cannot replace the richness of dialogue and experience; standards are characterized by opacity (Busch 2011). “Trust in persons, as Enrikson emphasizes, is built upon mutuality of response and involvement: faith in the integrity of another is a prime source of a feeling of integrity and authenticity of the self. Trust in abstract systems provides for the security of day-to-day reliability, but by its very nature cannot supply either the mutuality or intimacy which personal trust relations offer” (Giddens 1990, 114). Formal standardization comes together with the substitutability of suppliers (Daviron and Vagneron 2011), which inevitably handicaps small-scale farmers with low assets in terms of capital and human skills.

Besides, standardization and certification generate costs that are difficult for small-scale farmers to bear.

Even though the empirical evidence is mixed, it suggests that small-scale farmers benefit from formal processes of certification only when there is government support (or the support of a benevolent private trading company with genuine concern for local development), in particular in terms of training and infrastructure, as well as fair contractual arrangements (Van der Meer 2006; Swinnen 2007; Blackmore and Keeley 2012).

Standardization and labeling is a partial answer to distrust about food safety because it gives consumers the responsibility for choices, although it does not take their political concerns seriously enough (Brom 2000). Concerns for food safety are mostly of an individualistic nature, but it is difficult to disentangle them from more collective or societal concerns, such as the environmental impact of chemicals or Genetic Modified Organisms (GMOs) used in food production.

Hence, the literature suggests the following hypotheses: (i) proximity in food chains comes low farmers' cost for quality assurance, but also limited scope of operation; the impact on customers' trust in food safety is in the form of mutual, dialogical trust, but at the same time, opportunistic risks are not completely dealt with; (ii) "abstract" expertise systems that form the basis of standardization imply high costs at the expense of inclusion of small-scale farmers, but enable large scope of operation and reduction of opportunistic risks. The rest of the paper is a preliminary attempt to test these hypotheses on the situation of vegetable safety assurance in Northern Vietnam. We consider here

quality assurance systems as mechanisms of coordination in the chain which ensure that quality is delivered according to the purchasers expectations (Holleran, Bredahl, and Lokman 1999; Renard 2005).

A preliminary comparative analysis of vegetable safety assurance systems in Vietnam

Source of data

The data is drawn from the authors' work in Vietnam in research and development projects. We focused on the following dimensions of vegetable safety assurance systems: their costs, the degree of interest or commitment of farmers (measured by the number of farmers involved, the trends in these numbers), and consumers' reliance on these systems. We used the results of various consumer surveys, in particular one conducted in 2006 on 707 consumers on the factors determining the perceived safety of purchased vegetables, including the place of purchase and the nature of labeling (Mayer 2007). We also conducted focus groups with members of the Women's consumer club. As regards the origin of produce in the wholesale and retail markets, surveys were made at seven times of supply variation, in 2002 and 2003. A total of 1,369 traders were interviewed in 2002, and 1,877 in 2003 with 180–350 traders surveyed each time. Besides we identified all the points of sale where vegetables have some indication of their safety, e.g., in the form of a label on the product, or a certificate. Then we carried out cascade interviews to trace back the suppliers

and the organization of chains up to the farmers. We interviewed around 40 leaders of farmer groups and 30 traders to assess their strategies and constraints in terms of vegetable safety. Besides, we were involved in development projects where we supported vegetable quality control and by this means had first-hand access to information on conditions to get quality control in Vietnam. This type of data is difficult to get for researchers not involved in direct actions of quality control. The data presented is nevertheless still patchy and need to be confirmed by a more systematic protocol of data collection.

The importance of geographical proximity

Geographical proximity is still important in the supply of perishable food commodities in Southeast Asia, especially for leafy vegetables, which play a strong role in the livelihoods of the poor, be they farmers or consumers. This is due to the high perishability of these vegetables, the quality of which diminishes after one day. From surveys conducted between 2002 and 2005, it was determined that leafy vegetables originated from less than 50 kilometers from the city centers in the capital cities of Vietnam, Laos, and Cambodia (Moustier 2007). This is in line with the findings of Von Thünen (Huriot 1994). Naturally, the situation may change with the development of transportation, cold chains, and packaging, but these innovations may also inflate vegetable prices. The geographical proximity between producers and consumers facilitates short chains, with generally zero or one intermediary, between these two

types of agents. For the mass distribution of fruits and vegetables, marketing chains are characterized by relatively competitive transactions combined with personalized relationships. Oligopolies of wholesalers-collectors and information asymmetries are more frequently observed in long-distance than in short-distance trade. Short-distance trade facilitates face-to-face interactions, but these were little used for information exchange on quality until the last 10 years.

A variety of quality assurance systems

Vietnamese consumers, especially urban ones, express growing concern for food safety, particularly as regards vegetables and fruits (for pesticides) and meat (Moustier and Nguyen 2010a). Tests on 144 samples of vegetables revealed that 12% exceeded the authorized limits for pesticide residues (Vietnam Ministry of Agriculture, Ministry of Health, and Cida 2009). In response to this problem, the government as well as farmers and retailers have been active in the development of quality assurance systems, with varying success. The characteristics of quality assurance of fruits and vegetables in Vietnam as regards costs, nature of trust, and farmers' interests are summarized in Table 1. The fieldwork brings to the fore a variety of standards and quality assurance systems. They have been put in place since 1995 by a combination of farmers' initiatives and the support of public administrations and international non governmental organizations (NGOs): safe vegetable (SV) certification by the Plant Protection Department (PPD), based on—quite

Table 1. Systems of quality assurance for fruits and vegetables in Vietnam

	Trust	Number of criteria	Cost	Farmers' interest
Direct sales (SVs)	Mutual		+	+
PPD certification (SVs)	Expert		+ (100 USD per hectare)	+
VietGAP	Expert	65	++ (500–800 USD per hectare)	-
GlobalGAP	Expert	300	+++	-
PGS (organic vegetables)	Mutual +expert	24	+ (<6USD per hectare)	+
Direct sales + ICS (Internal Control System) (SVs in Tien Le)	Mutual+ expert		+	+

lax—public standards and control; it is in some cases supplemented by internal control systems; VietGap and AseanGaps based on good agricultural practices and Hazard Analysis Critical Control Point (HACCP); and participatory guarantee systems (PGSs) for organic vegetables. When these three types of systems are applied, vegetables are always labeled with an indication of the place of production

and type of certification. As regards quality assurance based on relational proximity, it is observed that direct sales (DS) between farmers and consumers develop quickly and are combined with certification and labeling relating to safe or organic vegetable production. We give details below on the operation of the different systems.

a. SV certification by PPD

In 1995, public interest in the safety of vegetable produce led the Vietnamese Ministry of Agriculture and Rural Development (MARD) to implement an ambitious program called “safe vegetables,” which entailed training sessions about Integrated Pest Management (IPM), support to vegetable marketing by cooperative leaders in shops and market stalls, as well as subsidized public certification of SVs based on analyses of soil, water, and produce. NGOs (predominantly Agricultural Development Denmark Asia—ADDA) also trained farmers as regards IPM and later organic vegetable production.

The certification of the SV groups by PPD is based on the Ministry of health and MARD regulations—the possibility to term these regulations as “standards” is subject to debate. The regulations indicate the authorized and prohibited pesticides, maximum residue limits of pesticides and fertilizers, content of heavy metal, and infection of bacterial pathogens. The list of permitted, restricted, and banned chemicals in Vietnam is updated every year by PPD. The control is based on various documents to be issued by cooperatives, including a letter of commitment to implement rigorously the technical procedures and the good use of chemicals according to the law, training certificates on IPM, list of chemicals used in the local area, map of production area, and indicating in particular the location relative to the sources of water. Besides, some samples are collected for chemical and heavy metal residue analysis along the following modes: control of

nitrates, pathogenic microorganism (*E. coli*, *Salmonella*, Coliform), chemical residues (five types decided by experts); a minimum of three vegetable samples, the timing of which is decided without any prior notice to farmers. Unexpected inspections are planned by the PPD. The certificate is effective for one year. After one year, cooperatives have to renew the certificate by applying a new request. If the cooperatives are found to violate the regulations about SV production at the time of inspections, they are planned to be treated as follows: warning (if first and not serious violation); withdrawing certificate (if serious and repeated violation). This is in the text, but whether it is applied or not is unsure. From our discussions with cooperative leaders, it seems that certificates are renewed in many cases without new samples being collected.

In May 2009, in Hanoi province, 40 units (33 farmers cooperatives, representing 6,849 farmers, and seven individual firms), held the certificate. It had increased by 25% relative to three years before. The total certified area amounted to 243 hectares (out of a total of 12,000 hectares of vegetable production). In 2013, 179 units held the certificate, including 161 cooperatives (information given by Hanoi Plant Protection Department). A survey of 121 consumers of conventional vegetables shows that they do not buy vegetables sold as “safe,” because they have little trust in their safety as the inspections by the PPD are suspected (quite rightly) of being quite lax. As regards the 104 consumers of SVs interviewed in the same study, 75% have moderate trust in the safety of these vegetables (using a scale from

1 to 10). There is an indication that the number of such consumers will grow as 73% started buying SVs in the last five years (Pham, Mol, and Oosterveer 2009). It was estimated that vegetables that can be identified with PPD certification represented less than 5% of the Hanoi market (Moustier and Nguyen 2010a). But farmers selling through “safe” vegetable chains get higher incomes than farmers selling through ordinary chains, which explain a development of the former (Moustier and Nguyen 2010b).

In summary, PPD certification combined with the labeling as “safe vegetables” is an expert system which is of intermediate cost for farmers, and moderately trusted by consumers.

b. GAP (Good Agricultural Practices) Systems

The more rigorous the procedures, the more costly it gets for producers or the community group that supports them. The current VietGAP system of certification for vegetables is based on HACCP procedures. It has been issued by the Vietnamese ministry of agriculture in 2008, based on Aseangaps, which have been developed by Australian researchers to improve regional trade. It requires producers to record their practices and to inspect production and post-harvest activities (internal inspections) according to several food safety criteria (the pesticides used, the time between treatment and harvesting, the place where pesticides are stored, the organization of traceability, etc.). An external auditor checks these internal records using the producers’ registers and information from the field. The

government aims to ensure that VietGAP is respected in half of all vegetables—and tea-producing areas by 2015. A total of 65 criteria have to be checked in the VietGAP control, which costs between 500 and 800 USD per hectare, i.e., around 10 times more than the “safe vegetable” certification system, which it is due to replace. It is also found to be very constraining by farmers to record all their practices in terms of chemical use. Countrywide, in 2011, VietGAP covered 75,000 hectares for all crops, i.e., 60,000 hectares for coffee and cocoa, 15,000 hectares for fruits, tea, and vegetables (including 5,000 hectares for dragon fruit)(information from the Department of crop production of the Ministry of Agriculture and Rural Development). In Northern Vietnam, in the same year, for vegetables, VietGAP was only used by five state-subsidized enterprises and three SV cooperatives (information from Hanoi Department of Plant Protection). This is particularly so because the documentation procedures involved in VietGAP are rewarded with a low price premium (less than 10%) relative to vegetables sold as safe (certified or not).

GlobalGAP is mostly used by private exporters for fish and dragon fruit. The problem of incentives for farmers to adopt VietGAP or GlobalGAP for dragon fruit in southern Vietnam, in a context of lax control by importers of what is labeled as GlobalGAP, and irregular export channels, has also generated heavy losses for farmers who have decided not to renew their certification. GlobalGAP has 300 criteria to be checked and costs more than 3,000 USD per hectare (Vietnam News 2012). The standards set by the Chinese (organic, green,

and pollution-free), Thai (Q-Mark), and Malaysian authorities (Malaysia Best) are reported to have only limited adoption (Shepherd and Tam 2008). In Thailand, the Royal Project introduced GAP and certification for more than 2,600 mountain horticultural producers, but it is still heavily dependent on Royal funding, e.g., in terms of packaging, control, and marketing (Jayamangkala 2008). As regards GAP certification for pineapple in Thailand, it is adopted quite widely, the main factors of adoption being the price premium, contracts with buying companies and farmers' age. The Department of Agriculture monitors farmers' practices on a regular basis and awards GAP certificates (Sriwichailamphanet al. 2008).

In summary, VietGAP and GlobalGAP are costly systems for farmers with little development so far. It was not possible to evaluate consumers' trust in these systems as vegetables certified as VietGAP are little available in the market.

ICS combined with PPD certification

In the Superchain project, we worked with four groups of vegetable farmers in the district of Hoai Duc, located in Hanoi Province, which represented a total of 140 households. We identified as critical points determining excesses in pesticide residues the type of pesticides used and the delay between spraying and harvest. These were monitored by farmers themselves in a notebook and by a monitoring committee made of a group of farmers in the cooperative, who checked monthly the validity of the records and filled out a five-page questionnaire. Noncompliance

results first in a warning then a sanction in the form of excluding the farmer from using the group label. This, combined with external inspections by a research institute accredited by the PPD, enabled an 18-member group to obtain VietGAP certification in 2005, which was not renewed subsequently due to its cost. The Internal Control System (ICS) is now used as a communication strategy for the group in its marketing and it helps them to obtain "safe vegetable" certification from the PPD. It was interesting to note that the effectiveness of recording was unequal among producers: from 30% to 80% for each of the four groups. Adoption was higher the younger and the more educated the members, and the smaller the group (Nguyen 2009). At any rate, the internal control system is fragile, because it requires a lot of time, but farmers do not yet feel the pressure or receive incentives from the government or the market to sustain this internal control system.

Organic vegetables control

Since 1999, organic vegetable production is developing around Hanoi, following training programs by a Belgium, then a Danish NGO (ADDA). In 2009, 69 farmers of Soc Son district were following organic production specifications (which have been the subject of a public standard in 2008). Twenty-four conditions for organic production are included in the specifications. An internal control system is established and operated by the group leaders. The conditions are verified in order for Participatory Guarantee System (PGS) certification to be issued. Until 2010, the certification process was

carried out by inter-groups on a monthly basis. Inter-groups are comprised of the farmer association, a panel of farmers, a panel of consumers, and a technician from ADDA. The monthly meeting is an opportunity to take stock of quantities available, PGS certificates issued, disease outbreaks, and means of dealing with them. It is difficult to determine the frequency of inspections upstream from getting the PGS certification and the makeup of the group of inspectors. In practice, consumers do not inspect the fields. They declare themselves as lacking the competence required to evaluate the degree of rigor present in the development of safety standards and their control. But when the fields are visited at different times during the year, they can get an idea of the production conditions. In 2010, the NGO was performing a number of incidental sample analyses. The group leaders were paying 6 USD a year for PGS certification. Once a year, random samples were taken from four families for two types of vegetables. These were analyzed using a quick test. However, it was difficult to tell whether consumers were trusting the PGS system or the NGO, since both were mentioned on the label, and no survey has been conducted to investigate the matter.

The development of direct sales

A final observation relates to the recent development of direct sales (or at least short, with only one intermediary) between producers and consumers, especially to promote specific attributes of quality, be it in terms of safety or a specific geographical location. Nine of the 27 cooperatives certified as “safe”

have developed an efficient marketing strategy (Moustier and Nguyen 2010b). Of these nine cooperatives, six are regular suppliers of supermarkets, and six (including three selling to supermarkets) have market stalls or shops where they sell directly to consumers. An approximate total of 500 farmers are involved in these cooperatives. All of the nine cooperatives are regular suppliers of canteens. Compared with the supply of traditional markets—which is characterized by a chain of collectors, wholesalers and retailers—the distribution of vegetables labeled as “safe” generally involves zero or one intermediary. While direct sales represent 60% of the sales of cooperatives of SVs, it is less than 10% for conventional ones (Moustier and Nguyen 2010a).

Direct sales are increasing quickly: in 2002, there were 22 points of sale for “safe vegetables,” including 20% managed by cooperatives. In 2008, there were 54 points of sale, 70% of which were managed by cooperatives. This development is also observed for organic vegetables, for which direct sales look more sustainable arrangements than contract farming as shown by the history of the development of the sector. In 2002, Hanoi Organics private company was distributing organic vegetables via its own shop, as well as delivering directly to the consumers and to schools. The company signed two-year contracts with six families of producers in the TuLiem district (Hanoi province) and 32 farmers in Chuong My district (Ha Tay province), specifying the production regulations and frequency of controls, while quantities and prices were renegotiated every three months (they amounted to two to three times the prices of ordinary vegetables

at producer and consumer levels). In 2005, the company stopped operating because it faced various management and logistics problems.

Since 2008, the NGO “Action for the City” has supported a group of 70 organic vegetable growers (organized into eight sub-groups) in Soc Son district to provide home deliveries in Hanoi. To date, 400 consumers have subscribed, and the number is regularly increasing. They pay for packs of vegetables delivered weekly at stable prices (1 USD per kilo for all types of vegetables all year round). This NGO is also trying to develop participatory certification of organic production, based on inspections by consumer groups and extension workers, and the experience of ADDA.

Buying “safe vegetables” from producer groups in shops give consumers more reassurance because of face-to-face interactions. Buying vegetables from supermarkets also partially reassures consumers because they link supermarkets with expert systems (which is debatable, as supermarkets source “safe vegetables” from the same sources as shops and the declared system of additional sample analysis that they perform is quite opaque). A survey of 707 consumers in 2006 showed that the perceived “safeness” of vegetables increased depending on the location at which consumers purchased their vegetables. The least “safe” was a spontaneous purchase at an unknown market. Trust in “safeness” increased, moving from official markets, SV stalls and shops, and finally, to supermarkets (Mayer 2007). Another survey conducted on 801 consumers in Hanoi and Haiphong showed that for 60% of the consumers,

buying from familiar retailers is the best way to ensure vegetable safety, while only 16% rely on certified products (Luu et al. 2005).

At the moment, the greatest impediment to direct sales in Vietnam is farmers’ lack of credit to get access to market shops and stalls, all the more so because available land is very limited in the city. This is less the case in Laos, where the authorities have set aside some land for a weekly organic farmers’ market in Vientiane.

Results in terms of vegetable safety

It is difficult to appraise the results of different systems of guarantee in terms of vegetable safety. First, it is difficult to disentangle the effect of the system of quality control from the effect of production practices. Second, high costs are involved in collecting vegetable samples and carrying out analyses of pesticides, nitrate, and heavy metal residues, among others. We conducted a study to compare the excess pesticide residues in different points of sale in 2005. Even though the sample is relatively small (250 samples, between 25 and 70 for each type of points of sales), we don’t know of other similar studies, which makes the results valuable. The sale points chosen include three supermarkets, two SV market stalls; one organic vegetable shop, two wholesale markets, and two retail market spots. The sampling was conducted three times during the summer of 2005. To detect if maximum residue limits were exceeded we used quick tests based on Rapid Bioassay of Pesticide Residue (RBPR), as developed by Taiwan Agricultural

Table 2. Summary of pesticide residues found in various points of sale in 2005

	Supermarkets	Wholesale markets	Retail markets	Organic shop	SV stalls
Total number of samples	75	75	25	25	50
Number of positive samples	1	6	3	0	1
% of positive samples	1	8	12	0	2

Source: FAVRI analyses, see Nguyen and Moustier (2006)

Research Institute. The quick test is used to screen samples with excess residues of carbamate and organophosphorus (Ops) pesticides which are the most dangerous neurotoxin pesticides. Then chromatography (which is more reliable, but 20 times more expensive) was used to confirm and deepen the evaluation.

The results of the study are shown in Table 2. No pesticide residue was detected in the organic shop. Very limited contamination was identified in vegetables sold as SVs in supermarkets (1%) and in shops (2%). The highest residues were found in conventional markets, be they formal or informal (8% in wholesale markets, 12% in retail markets). Hence the results suggest a growing vegetable safety when one moves from conventional to “safe” and organic vegetables.

Conclusions

The paper highlights strategies by Asian farmers to have their quality efforts rewarded and better recognized by consumers for the benefit of both. The hypotheses drawn from the literature are partly confirmed by the fieldwork. The strategy of farmers' getting nearer from the consumer stage by integrating marketing stages is efficient to reduce uncertainties related to food safety and get higher prices. The farmer-consumer or farmer-retailer relationship is an opportunity to exchange knowledge on production methods, and this fulfills the purchaser's need for reassurance, as producers are perceived as the most competent persons to give this information. In turn, direct farmer-consumer exchanges enable farmers to better ascertain consumer demands.

Hence the farmer-consumer relationship and exchanges enables a partial change of credence attributes into search attributes (which is also the function of labels according to Caswell and Mojdzuska 1996).

On the other hand, trust cannot circumvent all risks of moral hazards. On the whole, consumers show a little trust in the safety of vegetables supplied to them. The vegetable safety analyses show that there are indeed excess pesticide residues in all types of marketing chains, except for organic vegetables. Some form of control and certification, based on verifiable documentation processes, appears desirable to limit opportunistic behavior and increase the outreach of quality chains beyond local communities. The problem with verifiable documentation processes is that they add costs and constraints to local farmers, and the latter are not immediately rewarded by consumer premium prices. Table 3 summarizes the basic characteristics of personal interactions and expert systems in relation to their ability to assure food safety. The illustrations in the paper show some success of initiatives based on personal interactions in Southeast Asia, whereas expert systems are more difficult to set up. Some intermediary systems combining internal control systems with verifiable procedures and external inspections—made by consumer groups, trading companies, or public bodies—have been documented as promising options. These systems are based on relational proximity, expert systems, and labeling on the origin of vegetables as ways to enhance consumers' trust and farmers' commitments. One interesting outcome relates to the combination of

systems based on relational proximity, expert systems, and labeling on the origin of vegetables as enhancing consumers' trust and farmers' commitments. Hence relational proximity, standards, and labels are complementary rather than substitutes.

Some recommendations in terms of research are now given.

First, a more rigorous impact assessment of alternative marketing and quality control strategies is necessary to determine how trust and food safety can be strengthened in the chain and at what costs and risks for farmers. It implies being able to compare, for the same type of crops and farmers, different methods of controlling food safety: for instance, direct sales without ICSs, direct sales with ICSs, contracts between farmer groups and a consolidator supporting certification costs, etc. It also involves panel data, treatment, and control samples, which is not easy in situations where direct sales or certification may represent a small share of farms.

Second, more action-research as well as research in economics, management, and agricultural sciences are also needed to determine how the role of farmer organizations involved in ICSs, that of public authorities and that of private buyers involved in external certification can be combined in a such a way that the characteristics of food safety as a public good are efficiently tackled at a reasonable cost.

Third, identifying conditions for up-scaling of success stories in terms of quality development involving small-scale farmers is also crucial. This implies a more thorough investigation of the links between mass and niche markets

Table 3. Characteristics of personal interactions versus expert systems as regards food safety assurance

	Personal interactions	Expert systems
Basis	Kinship, neighborhood, encounters	Verifiable procedures Systems of penalties and rewards
	Mutuality	Enforceable commitments
Scope	–	+
Cost for farmers	–	+
Vulnerability	Limited sanctions against opportunism	Lack of skills and rigor Rigidity Complexity
Strength	Limited sources of opportunism Simplicity Adaptability	Replicability
Supplier substitutability	–	+
Role of public sector	Favoring farmer access to training (on production protocols) and market place Inspecting farmers and retailers practices and product safety	Favoring farmer access to training (on production protocols, ICS, contracts) Favoring retailer access to marketing space Inspecting traders' ICS
Examples in SE Asia	Vietnam: Direct sales in shops of SVs; direct home deliveries of organic vegetables Laos: Direct farmers' markets	SE Asia: VietGAP, GlobalGAP, retailer certification schemes
SE Asia: contractual arrangements between farmer groups and consolidators with quality and inspection specifications		
Vietnam: SV certification; ICS for SVs in Tien Le and organic vegetables in ThanhXuan		

Note: Based on framework set by Giddens (1990) and Daviron and Vagneron (2012)

for horticultural products. Assessing how temporal interactions between stakeholders located at key entry points of the chains can compensate for low geographical proximity, as suggested by Torre and Rallet (2005) is a promising avenue of research.

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Abbreviations and Acronyms

ACPOW	Advisory Committee for the Purity of Water
ACT	Australian Capital Territory
ADWG	Australian Drinking Water Guidelines
AS	Australian Standard
CoAG	Commonwealth of Australian Governments
DoH	Department of Health (WA)
DoW	Department of Water (WA)
ERA	Economic Regulatory Authority
GL	Giga Litres
HACCP	Hazard Analysis Critical Control Point
ISO	International Standards Organisation
MDB	Murray Darling Basin
ML	Mega Litres
MoU	Memorandum of Understanding
NCC	National Competition Commission
NCP	National Competition Policy
NHMRC	National Health and Medical Research Council
NRMMC	Natural Resource Management Ministerial Council
NSW	New South Wales
NWI	National Water Initiative
NWC	National Water Commission
NWQMS	National Water Quality Management Strategy
NZS	New Zealand Standard
SA	South Australia
WRC	Water and Rivers Commission
WRIC	Water Reform Implementation Committee
WA	Western Australia