Perspectives on Global Trends in Food Quality and Safety

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Abstract

In the wake of a number of major food safety incidences, there have been a range of responses at the consumer, the firm and the regulatory level. Food safety assurances are now universally required in value-added supply chains. Parallel with these developments is an increasing scrutiny of food production processes. Triple bottom line reporting, once considered a source of competitive advantage, is now becoming mandatory. The demand for food safety assurances is resulting in a proliferation of food safety and quality assurance programs. Worldwide, this has resulted in increasing calls for harmonisation, as proliferation often leads to greater costs for food producers which cannot be passed onto consumers. In this paper, we identify the food quality assurance requirements for northern hemisphere importers and southern hemisphere suppliers. The ability of agri-food firms to manage is considered and the implications for public and private institutions discussed.

Introduction

Prompted by a series of food quality and safety concerns (den Hartog 2003; Kaferstein 2003; Roberts 2008) and a growing awareness of sustainability issues (Huhn et al. 2007; Ridley 2007; Seymour et al. 2007), consumers are taking a greater interest in the holistic characteristics of the food that they buy. Environmental and welfare values, often described as credence or intrinsic quality values, are becoming increasingly aligned with a greater suspicion of industrial food processes and the desire to support sustainable farming practices. Consumers are becoming more interested in the non-price attributes of food and increasingly aware of such issues as water pollution, salinity and soil degradation (Batt et al. 2006). Functional foods and the rising levels of organic food sales are thought to reflect the increasing awareness of the long-term impact of food on the consumers' wellbeing and health.

With the need to give much greater consideration to food safety, the environment and fair trade and equity, the concept of quality is rapidly expanding. Many quality assurance systems impose restrictions on production practices (Garcia and Poole 2004) or present technical barriers to trade (Henson and Reardon 2005), especially for the developing countries (Jaffee and Masakure 2005). If suppliers do not comply with customer requirements, they risk loosing market share and potential market exclusion.

In addition, there is evidence to suggest that in saturated markets, many actors in the value chain are seeking to differentiate their market offer by imposing private standards, which often exceed those set by the public sector (Gehlhar and Regmi 2005). Especially in more mature markets, producers must anticipate that the "bar will be raised" with respect to the need for triple bottom line reporting. Even in the context of the recent downturn in the global economy, expectations are that triple bottom line and corporate social reasonability activities will not diminish, for they are now firmly entrenched in most multinational corporations and may provide a mechanism to assist survival in adverse economic conditions.

In an effort to provide assurances to consumers that the many actors involved in the value chain can deliver safe, wholesome food, the world has seen a proliferation of codes of practice and quality assurance programs. Australia perhaps has the dubious honour of spawning the greatest number of quality assurance programs and many others are in evidence in southern hemisphere exporting countries (Batt et al. 2006).

Australia has an enviable record of food safety when compared, on the basis of comparable reports, to other countries in the developed world (Batt et al. 2006). It has been suggested that Australia and New Zealand have a competitive advantage over other Southern Hemisphere exporters (South American and Southern Africa) with respect to food safety and quality assurance. In 1995, Australia led the world with the release of the first retail HACCP compliant standard: the Woolworths Quality Vendor Management System (WVQMS) which is now known as Woolworths QA. This was followed by the first public HACCP compliant standard: SQF 2000^{CM} (Peters 2005).

In order to protect their reputation and image, most European and North American retailers and food manufacturers, who have an increasing presence in Asia, have instigated stringent quality assurance programs which emphasise the need for better management control and greater transparency in food quality and safety through the value chain, often in concert with their Corporate Social Responsibility (CSR) initiatives. For food producers, processors and manufacturers, these shifts in customer and consumer demand often require major investments in order to secure and retain their customer base. With change occurring in multiple facets of production and market acceptability simultaneously, it is important to identify those trends which are likely to be the most important.

With this in mind, we report on a study undertaken by Curtin University and 12 other research organisations worldwide, to investigate the trends that are considered to be the most influential in shaping food safety and quality systems in global food chains. The work was commissioned by the Australian Government and focused on the dairy, fresh produce, red meat and seafood industries. The objective of the study was to identify and analyse global trends and emerging issues likely to impact on the development of food safety and quality assurance systems in the medium term (next 3-5 years) and the longer term (next 6-10 years).

Procedures

Based on a comprehensive review of the food safety and quality literature, a structured questionnaire was developed. Prior to distribution by in-country partners, a draft was pilot tested with selected actors from the food manufacturing industry, importers and traders, retailers, government officials, producers and industry associations to verify that all the major drivers impacting upon food quality systems had been identified. Where necessary, the questionnaire was modified to facilitate its use and thereby improve the response rate.

Project partners despatched the questionnaire via email to selected key informants in the import markets in Asia, Europe and North America. These informants occupied key positions along the value chains as food producers, manufacturers, processors and packers, importers and distributors, retailers and food industry associations. After answering questions about themselves and the nature of their business activities, respondents were asked to rate how important they thought each of the selected factors would become in their home market in the next 1-2 years, the next 3-5 years and 6-10 years on a scale of 1 to 4, where 1 was “not at all important” and 4 was “very important”.

Southern hemisphere exporters were asked similar questions to the importers, however they were asked to rate how important they thought each of the factors would become in their major export markets.

The many factors were grouped under four categories: (i) food safety issues and product integrity trends; (ii) food production trends; (iii) the development and cost of food assurance system trends; and (iv) food constituents.

Results and discussion

A total of 208 usable surveys were returned by the project partners from interviews with agri-food importers in Europe (France, Germany, the Netherlands, Spain and the UK), North America (Canada and the USA) and Asia (China, India, Indonesia, Japan, Malaysia, Singapore, Thailand and Vietnam).

In Europe and North America, the provision of safe food is currently the major food safety issue (Table 1).

Table 1: Major issues across the four categories by market region.

Category	Europe and North America	Asia
Food safety issues and product integrity	• provision of safe food • biological and chemical contamination • protection of customers integrity • taste factors	• taste factors • provision of safe food • protection of customers integrity and duty of care • biological and chemical contamination
Food production	• waste management • water use and pollution • worker welfare • sustainable production systems	• water use and pollution • waste management • ethical trade • sustainable production systems
Development and cost of food assurance system	• product traceability • segregation of non-conforming product • supplier based QA • market access	• product traceability • ability to segregate non-conforming product • market access
Food constituents.	• allergens • carcinogens	• country of origin • food preservatives

Food businesses in Europe and North America are expected to operate and maintain HACCP compliant quality assurance systems that will protect the customers' integrity, consumers and their own commercial interests through demonstrating that appropriate steps have been taken to identify and eliminate those production practices that are likely to result in unsafe food. Reducing the risk of microbial contamination and chemical contamination are the two major variables to be controlled, although the need to reduce contamination from heavy metals, pesticides, hormones and growth promotants is of considerable importance.

With regard to food production, more responsible waste management, water use, minimising water pollution and fostering the development of more sustainable and economically efficient production systems are all important. The downstream environmental impacts consider the greater use of recyclable packaging, enhanced conservation and biodiversity. With regard to the ethical issues, equal importance is currently attached to worker welfare, animal welfare, ethical trade and the more equitable sharing of value in the supply chain.

The need for product traceability and the ability to segregate non conforming product are identified as the two major issues currently impacting upon the development and acceptance of food assurance systems by the market. Market access is assured through the adoption of both supplier-based and customer-based quality assurance systems.

Food producers and manufacturers in Europe and North America need to identify the presence of any potential allergens and carcinogenic compounds on the label of all food products. Of equal importance is the need to identify the food energy content and the content of saturated fats and cholesterol, sugar and artificial sweeteners, food preservatives, vitamins and minerals.

In Asia, the provision of safe food that meets consumer's desired taste is currently the most important variable. So as to protect the integrity of both the customer and the company, safe food must be delivered which is free from microbial contamination. This is currently met by industry-based quality assurance programs that give due consideration to reducing contamination from chemicals, pesticides and heavy metals. In comparison to Europe and North America, HACCP-based food safety and quality assurance systems are less well accepted. While ethical claims are important, the desire to reduce additives in food is significantly less important. Of even less importance is the need to reduce the use of hormones and growth promotants, antibiotics and vaccines and transgenic material (GMOs).

In Asia, concern for the environment and sustainable production practices receive a similar amount of attention to the markets in Europe in North America. The more responsible use of water, minimising water pollution and waste management are the major environmental concerns, with ethical trading, worker welfare and the more equitable sharing of value in the supply chain being afforded considerable importance. Animal welfare however, is currently considered to be one of the least important variables in Asia.

In contrast to the European and North American market, significantly less importance is currently attached to product traceability in Asia and the need to segregate non conforming product. With market access currently perceived to be the most important driver for the development and adoption of food quality assurance systems, considerably more emphasis is being given in Asia towards the harmonisation of quality assurance systems within regional trading blocs and between public and private quality assurance systems.

In Asia, the country-of-origin is currently perceived to be the most important piece of information to appear on the food label. Of equal importance however, is the presence of those colouring agents and preservatives that have been added to the food and the presence of any transgenic material and potential carcinogenic substances. It is of equal importance in Asia that food producers and manufacturers provide information on the energy content of the food, the amount of saturated fats and cholesterol, sugar and artificial sweeteners, salt, and those flavour enhancing compounds, vitamins and minerals and probiotic substances that may have been added to the food.

In the next 3-5 years, the provision of safe food is expected to remain the major priority in Europe and North America (Table 2). With consumers purchasing greater quantities of semi-prepared, convenience and processed food, the need to reduce the risk of microbial contamination increases in importance. This is accompanied by an increase in the importance of HACCP-based food safety and quality assurance programs and industry-based quality assurance systems to protect the customer's reputation and the firm itself. Somewhat

surprisingly, there is a marked reduction in the relative importance of delivering food that will satisfy consumer's desired taste. Conversely, greater consideration is given towards ethical production processes.

In Asia, in the next 3-5 years, there is a marked increase in the need to demonstrate duty of care and due diligence. This is met by a parallel increase in the importance of providing safe food. Product must be delivered that will both protect the customers' integrity and meet consumers' desired tastes. There is within the market, a marked increase in the acceptance of HACCP-based food safety and quality assurance programs. Although considerable importance is attached to reducing the use of food additives, hormones and growth promotants, antibiotics and vaccines, to bring the markets in Asia more into line with Europe and North America, these issues remain significantly less important.

With regard to food production in Europe and North America, in the next 3-5 years, there is a marked increase in the importance attached to recyclable packaging, ethical trade and transgenic material, while the relative importance of animal welfare and worker welfare decreases. Conservation and biodiversity continues to grow in importance, with a marked increase in the relative importance of carbon credits.

In Asia, in the next 3-5 years, there is a marked increase in the importance attached to waste management practices and recyclable packaging. While conservation and increasing biodiversity increase in relative importance, many of the more ethical considerations including ethical trade, the more equitable sharing of value in the supply chain and the protection of indigenous property rights are compromised. Animal welfare remains one of the least important considerations in Asia.

With regard to the development and cost of food quality assurance systems in Europe and North America, over the next 3-5 years, there is a marked increase in the relative importance of the costs of insurance and legal liability, and the increasing use of prescriptive codes of practice. Conversely, there is a marked decrease in the importance of customer-based quality assurance systems and the increasing cost of multiple audits. Customer-based quality assurance systems are expected to decline in relative importance.

In Asia over the next 3-5 years, there is a marked increase in the importance of product traceability and most notably, in the importance of customer-based quality assurance systems. While efforts continue to harmonise quality assurance systems within regional trading blocs, there is a sharp decline in the relative importance of harmonising public and private quality assurance systems. Both supplier-based and customer-based quality assurance systems continue to increase in importance, with a parallel increase in the desire to harmonise quality assurance systems within supply chains.

Giving consideration to the food constituents, in Europe and North America, over the next 3-5 years, there is a marked increase in the relative importance attached to the need to identify the food energy content and the amount of sugar and artificial sweeteners added to food. Greater recognition is given to the presence of those hormones and growth promotants, vaccines and antibiotics that have been used in the food production process. Ethical considerations including Fairtrade labels and the identification of vulnerable consumer groups increase in importance. Conversely, there is a marked decline in the relative importance attached to the need to identify transgenic material or whether the food contains probiotics.

Table 2: Rank order increases and decreases over time across the four categories by market region.

Category	Europe and North America		Asia	
	Increasing importance	**Decreasing importance**	**Increasing importance**	**Decreasing importance**
Food safety issues and product integrity	• microbial contamination • HACCP based QA systems • industry based QA systems • high ethical claims	• taste factors • hormone and growth promotants	• duty of care • HACCP based QA systems	• malicious contamination
Food production	• sustainable production systems • recyclable packaging • conservation and biodiversity • transgenic material (GMO) • ethical trading • carbon credits	• animal welfare • worker welfare	• sustainable production systems • conservation and biodiversity recyclable packaging • salinity and land degradation	• ethical trading • equitable sharing of value • animal welfare • protecting indigenous property rights
Development and cost of food assurance system	• cost of insurance and legal liability • use of prescriptive Codes of Practice	• customer based QA programs • cost of multiple audits	• product traceability • supplier based QA systems • customer based QA systems • cost of insurance and legal liability	• market access • use of outcomes based QA systems • harmonisation of public and private QA systems • harmonisation of regional QA systems • use of prescriptive QA systems • cost of multiple audits
Food constituents.	• energy / sugar content • vaccines and antibiotics • hormones and growth promoters • food colourings • ethical / fair trade • vulnerable consumer groups	• fats and cholesterol • in home food storage and preparation • transgenic material • flavour enhancers • salt • probiotics	• energy / sugar content • fats and cholesterol • ethics and fair trade • hormones and growth promoters • eco-labelling	• carcinogens • provenance • in home food storage and preparation • flavour enhancers • transgenic material • vitamins and minerals

Of note is the relative decline in the need to identify the salt content of the food and the addition of any flavour enhancing compounds.

In Asia, over the next 3-5 years, there is a marked decline in the relative importance of identifying the presence of transgenic material, vitamins and minerals. Similarly, there is marked decline in the importance attached to identifying carcinogens, presumably because

changes in legislation make it mandatory for food producers and manufacturers to abandon the use of these substances in Asia. Conversely, there is a dramatic increase in the importance attached to identifying the food energy content and quantity of saturated fats and cholesterol present in the product. There is also an increase in the importance of identifying those artificial food colourings that have been applied and those hormones and growth promoters, vaccines and antibiotics that have been used in the production process. A considerable increase in the perceived importance of eco-labelling is noted.

In findings reported elsewhere (Batt et al. 2006. and Batt and Noonan 2009) but beyond the scope of this discussion, there were many between industry differences; inter regional differences were also found between China, Japan and other Asian nations and the US, Canada and Europe. Also, organics and food miles were generally not highly ranked in the market regions (Batt et al. 1996).

Perception of market trends from Argentina, Brazil, Chile and New Zealand (ABCNZ) and Australia

A total of 151 usable surveys were returned by the project partners from agri-food enterprises in the exporter countries and Australia.

There are few differences between the Northern hemisphere importers and the Southern hemisphere exporters. However, the most notable differences include: a lack of attention to waste management for ABCNZ exporters; a lower ranking of the importance of high ethical claims in Australia; and for all Southern hemisphere exporters, a greater number of factors are listed as being of importance in the food constituents category (Table 3).

Table 3: Major issues across the four categories by exporter region.

Category	ABCNZ	Australia
Food safety issues and product integrity	• provision of safe food • restricting microbial contamination HACCP based quality assurance system • meeting consumers desired taste • protecting customers integrity	• provision of safe food • meeting consumers desired taste minimising malicious contamination • protecting customers integrity • high ethical claims
Food production	• ethical trading • sustainable production systems • conservation and biodiversity	• worker welfare • water use and pollution • waste management • sustainable production systems
Development and cost of food assurance system	• ability to segregate non conforming product • product traceability	• product traceability • ability to segregate non conforming product
Food constituents	• ethical/fair trade • country of origin • provenance • food energy content • vulnerable consumer groups • food preservatives • food colourings	• country of origin • saturated fats and cholesterol • allergens • hormones and growth retardants • food preservatives

In the next 3-5 years, for the Southern hemisphere exporters, albeit at low rankings, the relevance of transgenic material declines in production but rises as a food constituent, There are however rises for the credence or ethical claims and eco-labels across the categories;

greater concerns about the constituents of food products; more importance on sustainable production systems; and a greater concern for the equitable distribution of value in supply chains. The exporters also pay more attention to delivering functional foods, a factor not highly considered by the importers (Table 4).

Table 4: Rank order increases and decreases across the four categories by exporter region.

Category	ABCNZ		Australia	
	Increasing importance	**Decreasing importance**	**Increasing importance**	**Decreasing importance**
Food safety issues and product integrity	• meeting consumers desired taste • HACCP based quality assurance system • delivering functional foods	• duty of care/due diligence	• restricting microbial contamination • reducing the use of hormones/growth promotants • delivering functional foods	• duty of care/due diligence • reducing pesticide limits
Food production	• more equitable sharing of value in the supply chain	• salinity and land degradation • transgenic material	• sustainable production systems • recyclable packaging organics	• worker welfare • ethical trading • increasing cost of multiple audits
Development and cost of food assurance system	• harmonisation of QA systems within a supply chain • global harmonisation of QA systems • harmonisation of public and private QA systems	• market access • supplier based quality assurance systems • customer based quality assurance systems • harmonising QA systems within regional trading blocs • rising costs of insurance and legal liability • increasing cost of multiple audits	• reverse chain litigation	• harmonisation of public and private QA systems • customer based quality assurance systems
Food constituents.	• vitamins and minerals vulnerable consumer groups • in-home food storage and preparation • flavour enhancing compounds • eco-labelling • transgenic material	• country of origin • provenance • food colourings • food energy content • saturated fats and cholesterol • carcinogens • hormones and growth promotants	• vaccines and antibiotics • in-home food storage and preparation • transgenic material • vulnerable consumer groups • carcinogens • ethical/fair trade • vitamins and minerals • eco-labelling • provenance	• saturated fats and cholesterol • allergens • food preservatives • flavour enhancing compounds • salt • food colourings • sugar and artificial sweeteners

Notable differences between the exporters and the importers include: ABCNZ suppliers have a rapidly increasing expectation of harmonisation occurring across QA processes during the

next 5-10 years, while Australian suppliers expect there to be less harmonisation; ABCNZ suppliers have an increasing expectation of the more equitable distribution of the value within chains and eco-labelling; country-of-origin issues are expected to decrease for ABCNZ suppliers, while maintaining a primary position for Australian suppliers, where reverse chain litigation is anticipated to increase.

Implications for agribusiness firms, public and private institutions and governments

While there is much difference in the relative importance attached to food integrity, sustainable production and ethical trade between the food markets in Asia and those in Europe and North America, over the next ten years, as the markets in Asia mature, market forces will inevitably result in the widespread adoption of a limited number of internationally recognised food quality assurance systems.

Food quality standards implemented and enforced either by government or voluntarily by industry bodies, need to be imposed for markets to operate efficiently. In the international market, food producers must not only meet the private standards set by customers, but negotiate the plethora of regulations established by importing countries. In the current trade environment, there is a clear role for Government in facilitating discussions at a government-to-government level to assure potential trade partners of the integrity and independence of the food safety and quality assurance systems. For governments, industry bodies and NGO's, there is a need to facilitate the more widespread adoption of GAP and GMP, leading towards more sophisticated systems of assurance. Arguably, this is a public good, for it can greatly assist in the prevention of major food borne illness.

Conclusions

While there is much difference in the relative importance attached to food integrity, sustainable production and ethical trade between the food markets in Asia and those in Europe and North America, over the next ten years, as the markets in Asia mature, market forces will inevitably result in the widespread adoption of a limited number of internationally recognised quality assurance systems.

For governments, industry bodies and NGO's, there is a need to facilitate the uptake of GAP's and GMP's leading towards more sophisticated systems of assurance, reduced food-borne illness and improvements in product quality.

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