INTRODUCTION

The European Union feels it has a great deal to offer other states and regions that are in the process of solidifying their food safety regulations.

With over half a century of hard-learnt experience, Europe has formulated and managed a sizeable proportion of the regulations and standards of its member states.

Since 1962, and the first step in Europe's food harmonisation process, Brussels has written, rewritten and replaced regulations with regularity as times change. As science has delivered new solutions, or forced issues to confront unexpected issues, so too regulations have had to keep up the pace. This makes Europe's food safety framework an ever-changing sea of directives, guidelines and standards.

Six time zones away from Brussels, at the headquarters of the Association of Southeast Asian Nations in Jakarta, the process towards harmonisation is moving at frantic speed, at least relative to the regular pace of government across much of the region.

ASEAN's members—Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam—are at widely differing stages of their development. There is little commonality between their individual food regulations, and their motivations for harmonisation are not uniform.

Having only begun their journey relatively recently, their challenge now is to lay down their traditions and established laws out of a desire to form an economic community as European nations have done before them.

Europe has supported ASEAN's development considerably with its input rising to match the fast-paced growth of Southeast Asia's wealth. This interest is not only altruistic; being part of ASEAN's development puts Europe in a position of influence as Southeast Asia continues to charge.

"The EU and ASEAN are the two largest regional integration projects in the world. We want to further our relationship with ASEAN," the EU's Ambassador to Malaysia, Luc Vandebon, has admitted.

"This is about changing policy and learning from each other's experiences. Because consumers are becoming more picky about what they eat, this has led to a variety of standards. In the EU, we have one common benchmark."

For its part, Southeast Asia will want to look closely at what Europe has to offer it by way of advice, support and regulatory experience. Blending the disparate protocols of 10 countries is no easy task, and there is little point in reinventing the wheel when others have been through the experience before them.

When they are regulated effectively, traceability, labelling, shelf life and cold chain are the four elements that govern continued food safety across nations. However, each of these vital elements presents its own

challenges and complexities, where mistakes could cost lives and livelihoods, and so industry and regulators take them very seriously indeed, albeit to varying degrees of effectiveness.

This white paper looks in detail at these four elements of food safety regulations to gain a picture of the practices in Europe and Southeast Asia today, and also of what these should be in a perfect world.

While the EU is often accused of being slow, lumbering and intransigent in many areas, the fact that it has largely kept hundreds of millions of its citizens safe and protected for decades suggests that its food regulations largely achieve what they set out to.

ASEAN nations want this same security for their own people, and so are on the whole willing to listen to Europe's voice of experience.

EUROPE AND ASEAN

ASEAN and the EU are each home to a similar size of population. The EU began with six member states while ASEAN started with five, and now they have both grown in numbers. Both share the common objective of creating a single market. But aside from this, are there many other similarities?

"If one looks at this in greater detail, it is evident that ASEAN and the EU are very different organisations. For example the European Commission has a technical role and is able to propose new EU legislation," says Teoh Keng Ngee, scientific programme manager for the International Life Sciences Institute's Southeast Asia region in Singapore.

"In comparison, the ASEAN secretariat only has an administrative role with no power or authority to [operate like Europe]. In terms of harmonising standards in the EU, there are mandatory regulations and directives; while in ASEAN this is mostly still a voluntary process that needs to be adopted by member countries individually."

ASEAN began its harmonisation process a lot later than the EU, not least within the sphere of regulating the food industry. The EU harmonisation of food safety standards started way back in 1962, whereas in ASEAN it only began in the late 'Nineties.

Regardless, many believe that ASEAN can learn from the EU because of Europe's experience in relation to food safety. At the same time, it should be careful only to take knowledge and support that is relevant and applicable to its own region; in some regards, local practices might provide better, more tailored solutions. Just because the EU has had experience in a particular area does not necessarily mean that its findings are suitable for other parts of the world.

World's Newest Economic Community

Regional integration began in Southeast Asia in 1992 with the signing of the ASEAN free-trade agreement after the region's leaders had recognised the benefit of creating a free-trade area, with tariff reductions as the main instrument for its development.

The 1997-98 financial crisis provided the catalyst for further serious integration. During this time government leaders set out the ASEAN Vision 2020 statement, signalling their intention to create a regional community, and not just a free-trade area. In 2003, there followed the Declaration of ASEAN Concord II, which laid out the framework to establish an ASEAN economic community by 2020.

In a bid to expedite this process, the bloc in 2007 brought forward the timetable for the creation of the community to 2015. At the same time, the ASEAN Charter was signed by all the member countries to provide a foundation for the existence of the bloc as an entity under international law.

The overarching objectives of the ASEAN community are to ensure durable peace, stability and shared prosperity in the region. It is based on the three key pillars: the political-security community that is already in existence; a socio-cultural community; and an economic community to be at its heart. These goals are similar to those of the EU.

The ASEAN Economic Community (AEC) is seeking to develop a single market and production base to create a highly competitive economic region, one that has equitable economic development, and one that is fully integrated in the global economy.

In terms of harmonisation in food safety standards, ASEAN has focused on its production base primarily because a number of its members are major suppliers of semi-finished goods, with the nations possessing different comparative advantages in the types of products they export to markets outside their home bloc.

The ASEAN Trade in Goods Agreement (Atiga), a comprehensive, preferential trading agreement signed by national leaders in 2009, is the primary instrument for the implementation of a single market. Atiga's focus, apart from the elimination of tariffs, is to remove non-tariff hurdles by taking away technical barriers to trade, and harmonising standards and establishing mutual recognition agreements when harmonisation is not possible.

"ASEAN leaders identified the harmonisation of food safety standards in 2004 when they first discussed the community. Food falls under the agro-base sector and this was identified in the ASEAN framework agreement for the integration of priority sectors," says Teoh.

"Harmonisation of food safety standards was also specifically mentioned in the ASEAN economic community blueprint, as well as the ASEAN socio-cultural community blueprint in 2007. All the work to im-

plement this harmonisation of standards has been done by numerous ASEAN working groups that are under the privy of ASEAN ministers of trade, health and agriculture."

Working towards Harmonisation

Several working groups are currently in the process of developing the harmonisation of ASEAN's food safety standards.

The prepared foodstuff working group is responsible for harmonising standards and developing a mutual recognition agreement. Its purpose is to exchange information on food safety standards and food regulations across the bloc, and to identify areas that can lead to more effective harmonisation between the countries.

This group also supports the building of capacity and technical infrastructure for food safety, and it developed in 2005-06 the common control requirements that govern food control systems, labelling and food hygiene. These were later to become the reference points for the food harmonisation process in ASEAN.

A second working group is in the process of looking at the maximum residue limits of pesticides to create harmonised limits that ASEAN member states can then incorporate into their own legislations.

The third group has the objective of improving food safety across ASEAN under the guidance of individual health ministries. Besides implementing capacity-building projects to improve food safety across member states, this group is also tasked with promoting harmonisation of food safety standards.

"It's very encouraging that most of these groups have adopted Codex Alimentarius standards as their starting point of the harmonisation processes—something that is not always possible because Codex standards sometimes are not available, or they may not be directly applicable to the ASEAN region," says Teoh, referring to the 1963 initiative by the World Health Organisation and the Food and Agriculture Organisation to devise a collection of internationally recognised standards, codes of practice and guidelines relating to food production and food safety.

"In any case, many of the working groups have agreed to use a scientific risk assessment system to harmonise food safety standards. These harmonised standards have also to be adopted by ASEAN member states themselves into their own national legislation."

One of the biggest challenges to harmonisation occurs when working groups do not have sufficient scientific data on which to support risk assessment activities, continues Teoh.

"When conducting an assessment of dietary exposure, there's a lack of nationally representative food consumption data in many ASEAN countries. Apart from science, other political and non-scientific factors

relate to what is accepted as the appropriate level of risk within different countries. Of course, the ASEAN countries will take time to agree on these."

Such issues are reflected in the current ASEAN discussion on aflatoxin standards. In this debate, some ASEAN countries have very different aflatoxin standards: some have zero tolerance, such as Brunei; while others like Indonesia and Thailand, which are producers of products that can be contaminated by aflatoxin and stand to benefit most from less rigid levels, have much higher maximum limits.

Some of these national issues are being addressed. The ASEAN risk assessment centre is supporting this effort by developing a common ASEAN food consumption database to support risk assessment activities.

In July 2014, ASEAN food regulators released three documents that were developed in conjunction with the EU's programme for the support of ASEAN regional integration. Based on the Codex, these governed the principles for food import and export inspection certification, operational guidelines for the design, assessment and accreditation of export certification systems, and food import controls,

The prepared foodstuffs working group has also been developing an ASEAN food safety database—a process that began in 2003 by launching a pilot database that was revised and updated in 2011. The database mainly covers food additive standards, again using the Codex as the basis of comparison for harmonisation. This was transferred to the working group in 2012 to be used as technical infrastructure for food safety and harmonisation.

TRACEABILITY

European Union law defines traceability as: "The ability to trace and follow any food, feed, food-producing animal or substance that will be used for consumption, through all stages of production, processing and distribution."

A cornerstone of the EU's food safety policy, traceability is a risk-management tool which allows food business operators or national authorities to withdraw or recall products which have been identified as unsafe or potentially unsafe.

Traceability is widely considered to be the most important tool available to the industry and authorities to respond to health risks in a fast and economic manner. When a risk has been identified, it must be traced back to its original source to prevent more contaminated products or produce from reaching customers.

Methods of traceability also enable targeted withdrawals and the provision of accurate information to the public. This is designed to minimise trade disruption while ensuring effective inventory management

by storing and communicating information on specific product characteristics, and also allowing for cost savings during product recalls.

However, in spite of this primacy, traceability in practice has evolving issues and developing requirements. Technology, communications and manufacturing protocols have progressed at a faster speed than EU legislation, meaning there is still much work to be done to keep up with the pace.

With increased global trade having made a wider variety of foods more accessible to more people, consumers now expect international products to be available on their supermarket shelves throughout the year. They also expect their food to be safe and fully traceable from farm to fork.

In Asia, stakeholders are finding that the subject of traceability is becoming increasingly complex. Whereas Europe's organised food industry is largely developed and organised, in Southeast Asia there is a widely varying mix of unorganised, maturing and established businesses and segments, while individual countries operate across a range of different laws and processes. As a result, most ASEAN countries are still feeling their way as they find and legislate for the processes that work best for them.

EU's Evolving Framework

Throughout the 'Nineties, the EU had experienced some well-documented food safety issues, including the BSE and dioxin crises. It was believed that the EU's food law, a container law that simply stated the bloc's general principles, was not serving to protect European citizens. By the turn of the millennium, Europe was in dire need of new legislation.

Subsequently, updated regulations were published in 2004 and made applicable from January 2006. From the time Europe began to look at how to organise itself on issues of food safety to the new laws coming into practice, it had taken six years to implement the process.

Under the current framework, food business operators are required by law to have a self-checking system—an important piece of legislation as it forms the basis of everything else under the food law. An operator must now have its own checks and is charged with implementing its own rules on traceability.

Operators are also responsible for working hygienically and delivering compliant food with correct labelling information. They are obliged to inform authorities when action needs to be taken, such as if an incident or crisis takes place. The burden of traceability here is quite clearly on the side of the operators.

CASE STUDY: Belgium's Dioxin Crisis

The means by which Belgium took lessons from its dioxin crisis in spring 1999 illustrates how member states can benefit from the EU's food safety legislation by overhauling outdated domestic practices.

"The dioxin crisis formed the basis of our new approach. From it, we found that what we first believed to be a crisis was in fact an opportunity," recalls Herman Diricks, chief executive of the Belgian Federal Agency for the Safety of the Food Chain.

The contamination of feedstock with polychlorinated biphenyls, mainly from eggs and chicken, quickly turned into a political crisis. Though health inspectors discovered the problem in January 1999, the government only took measures the following May after the press had uncovered the case.

Hundreds of farms were affected, leading to the widespread destruction of pork, poultry, beef, eggs and other foodstuffs. The affair's financial impact was estimated at more than €437m; though incalculable related damages, like the loss of export markets, would raise this total considerably. It led to the resignation of two government ministers, and Belgium's reputation as a food producer was hard hit.

"Why was there a crisis? First of all, as an authority we lacked transparency. We were working very hard to find the source of contamination but we forgot to explain to the public what we were doing. It also coincided with the elections," says Diricks.

He believes, in hindsight, that the affair wasn't really a "crisis". "It was a food scare because afterwards, when we looked back at it, it was shown that there was no real threat [to public health]."

Belgium at the time also lacked an efficient traceability system, which prevented officials from acting swiftly enough. However, when they did act, In a bid to stem public concern, the authorities were forced to withdraw massive amounts of meat from the shelves.

"The crisis provided Belgium with the motivation to develop more effective traceability," says Diricks. This process began with regulators devising a new food safety policy that, although clearly sourced from EU regulations, included several local features.

First, Belgium worked on the modernisation of its inspection capabilities. It also placed emphasis on traceability for the safety of the entire food chain—not only for food but also for feed, plants and animal health. The consumer was then put right at the centre of the process with a single political body enlisted to govern food safety. This was a departure from previous years when a legion of different government departments would share responsibilities in a muddled way.

Traceability would now begin with the identification and registration of food and feed business operators, who in turn were required to identify their suppliers and customers to regulators, and compelled to hold records of the nature of the products they had dealt with, as well as articles and batch numbers, amounts and dates.

Fast access to this data was essential, and in the event of an incident it was mandated that authorities should know within two hours the names of a company's suppliers and to whom the product had been delivered. Detailed data on batches was then to be supplied within a day.

Belgian operators were also compelled to have written procedures to establish all links between supply and delivery of each product. The level of internal traceability is sector dependant, and the strongest areas of internal traceability will have an influence on monitoring food across the entire food chain.

Based on this post-crisis overhaul, Belgium now claims to be in possession of some of the tightest regulations and time-effective traceability protocols in Europe.

Aims vs. Practice

It is one thing to have a comprehensive framework in place, but the best warehouse system in the world cannot guarantee traceability if the people who use it are not trained sufficiently, leading to procedural mistakes happening.

Put simply, if a wrong label is printed, or if a new technology is handled in the wrong way, the chain will lose its ability to be traced.

"During one audit, we found strawberries labelled as '60 organic free-range eggs'," says Dr. Matthias Grill of Agrovet, an independent agricultural certification body in Austria. "Now this raises a lot of questions. Did they use the wrong boxes, was it a label mistake? Who was in charge? This is a very visible example of mislabelling."

Smallholders can also be an issue, Grill says, especially if manufacturers do not provide sufficient information on their suppliers. This has led to debates over how the two sides can integrate better.

Grill recommends that manufacturers should teach smallholders to be more efficient, to bring these efficiencies in the the supply chain. "Farmers do not only supply their product, they are also consumers. So we have to raise their awareness, give them examples and tell them why are we doing that," he adds.

EXAMPLE: Malaysia's Global Readiness

Malaysia's traceability framework and implementation processes are largely more developed than some other ASEAN countries.

With around 60% of its population engaged in the Muslim faith, the country has had a long tradition of observing halal food production and imports, which has given it significant experience in monitoring the source and ingredients of food products.

However, Malaysia can still be heavily affected by food chain breakdowns overseas. Recognising this, the country's health department has devised an international approach to traceability.

Through globalisation and the increasing strength of developing Asian countries, the food supply chain is getting longer and providing more opportunities for contamination to occur. This risk is further height-

ened when supply chains extend into countries where food safety control is ineffective or is not a high priority.

"Through traceability, authorities should be able to identify any specified stage of the food chain. When we talk about traceability we mean a stepped approach to cover the whole entire food chain. And for food processing businesses, traceability should be able to identify the source of all inputs, such as raw materials, additives, other ingredients and packaging," says Noraini Dato' Mohd Othman, senior director for food safety and quality at the Malaysian Ministry of Health.

Malaysia's 2009 food regulations put the onus on the food industry to develop traceability systems so that all food companies will be able to identify one step back and one step forwards. When infant formula in China was contaminated with melamine in 2008, resulting in almost 13,000 infants being hospitalised and four deaths, Malaysia took action to prevent a similar crisis by approaching its traceability protocols.

"Malaysia was blessed in a way as it does not import infant formula from China. Though as a precautionary measure we imposed a ban on all infant formula milk imports through our food safety information system, a web-based database that manages Malaysia's food safety surveillance at points of entry," recalls Noraini.

The health ministry monitored a wide range of food products that it suspected of containing melamine, including 2,981 consignments from China. Of these, around RM5 million of imports were sealed and another RM3 million were rejected. Several food categories were impacted, with 95.7% of the rejected Chinese food products being mainly sweets and biscuits from the confectionery segment.

Based on the findings, the authorities conducted further surveillance on local biscuit manufacturers and found that some brands contained melamine.

The Malaysian authorities conducted further sampling of the suspected biscuits to confirm they had been contaminated, then investigated the factories where they were produced in an effort to trace the source of contamination. The process revealed that a leavening agent used in some biscuits, ammonium bicarbonate, which had been imported from China, was contaminated with melamine. This led to a huge product recall by the biscuit manufacturer.

"As a regulatory authority, the challenge for imported products is how we actually ensure traceability. After all, a chain is only as strong as it's weakest link," says Noraini.

CASE STUDY: Smart Traceability Systems

Traceability systems should go beyond simple identification and look at traceability by capturing and sharing information.

"Global standards play a role in critical areas when they are integrated to build smart traceability systems," says Carolyn Lee, food traceability manager for GS1, a not-for-profit international organisation that develops and maintains standards for supply and demand chains.

"We not only trace the product but also keep the data that follows across the supply chain intact, especially when the consumer requires a lot of information. We can make sure they have the right data that is needed for traceability, such as the name of the product, the address of the manufacturer and the ingredients contained in the product."

Each of the steps in the manufacturing and distribution chain are central to managing traceability, so the industry must identify critical tracking events, Lee says.

"If you are producing ice cream, having the right temperature is the critical event and we need to control it. Global standards define the three critical areas: the point in the chain, the type of event, and the input and output.

"Looking the very simplified supply chain of a beverage, when a packed product is sent to the distribution centre, that's a transportation event. After the distribution centres, you have to pass the product on, so that's a depletion event—the product's journey is over."

"Standards play a role by defining a minimum denominator, a unique identification code and a lot batch to pass on between the partners so they remain consistent in traceability information. This is one case where global standards play an important role."

A German self-service wholesaler, Metro Cash and Carry, which is present in more than 30 markets in Europe and Asia, built its own smart traceability solution that was strictly based on open global standards such GS1's Epcis with an emphasis on its customers' own supply chain.

It was important for Metro to provide its business-to-business-to-consumer customers with information from every event its products had passed through in the food chain. Customers can scan barcodes on, for example, the fish they buy at Metro to understand where the catch was sourced, how it was caught, the best-by-date and other important data. The information is provided directly by Metro's suppliers and trading partners by scanning the products at each step of the chain. Through this system, the retailer is able to call on the data itself for whatever reason, while its customers can also benefit from the same information.

Many SMEs can do similar by setting up their own, often inexpensive web interfaces, says Lee. Through these, they can also make sure that the data is centralised, standardised and without redundancies through replication, allowing stakeholders to receive correct information in real time through mobile phones and Cloud systems.

Internal traceability processes are already in place through many proprietary systems. "But to have true external end-to-end traceability, these need to be used in accordance with global standards as they help define common minimum requirements, while protocols can be integrated with existing systems to deliver smart traceability," says Lee.

LABELLING AND SHELF LIFE

The EU's definition of labelling, the second of the four key pillars of food safety, covers "any words, particulars, trademarks, brand names, pictorial matter or symbols relating to a foodstuff and placed on any packaging, including documents, notices, labels, rings or collars accompanying or referring to such foodstuffs."

Appropriate labelling should ensure that consumers have easy access to complete, accurate and consistent information on the composition of products. Any claim made on a food product's labelling, its presentation or its marketing should be clear, accurate and based on evidence accepted by the wider scientific community.

However, the regulation of labelling is a thorny area where finding a way to provide the information consumers need within the strictures of presentation is often illusive. Regulators continue to search for ways that labelling can be harmonised to enhance international trade while ensuring a high level of consumer protection.

In December 2016, nutrition labelling will finally become compulsory in the EU for all pre-packed products. However, member states will have to decide in the meantime how they make nutrition labelling possible and also compulsory for non pre-packed products.

In terms of mandatory labelling items, nutrition labelling and listing the country of origin will become compulsory for many more products, notably animal products. For the first time the EU has introduced a minimum size for the labelling and will also govern contrasts between the colour of the writing and the backgrounds used.

A compulsory nutrition declaration will now have to state a product's energy, fat, saturated fat, carbohydrate, sugar, protein and salt content. A nutrition declaration, which will be voluntary, should convey information on mono-unsaturates, poly-unsaturates, poly-oils, starch, fibre, vitamins and minerals—though trans-fat will not be covered.

EU Consumer Protection

Labelling protocols are among the most contentious areas of food safety, but what they can achieve is greater consumer safety, the prevention of adulteration and the misbranding of products.

There is a whole raft of European labelling regulations, with laws evolving and changing often, and new ones being introduced regularly.

The main purpose of food laws is to protect the consumer: to safeguard their health while insulating their economic interests by limiting the scope for the buyer of a product to be misled.

EU food safety laws use labelling to legislate over health risks; by contrast, trading standards and advertising laws consider labelling issues to look after the consumer's economic interests.

There are, however, some areas of law where these two aspects converge, such as the law of torts, where consumers can receive damages if a product is misrepresented or mislabelled from a nutrition point of view. There are also EU labelling laws that mainly govern the way a product is communicated to consumers, though these also cover best-before and use-by dates.

Handling, preparation and storage instructions advise when a product needs to be refrigerated or frozen at a certain temperature. Then there are instructions for use if certain preparations are required if a product is not intended for raw consumption.

There are also advisory and warning statements that relate to a particular group of the population for which the food may not be suitable. These apply, for example, to those with specific dietary requirements, such as children in the context of food supplements. Warning statements would relate to potential health risks that might occur if consumers don't stick to labelling advice.

It hasn't yet been determined if the labelling of genetically modified organisms or nanotechnology in products is related to food safety. In some countries, these are viewed in that context, though this might not be valid from a scientific viewpoint if some of the products in question have already been approved by regulatory bodies around the world as safe.

In some cases, genetically modified ingredients will form a component of "knowledge labelling", which can be more about politics than safety labelling. Nanotechnology is less clear as there may be some safety issues that haven't yet been fully researched.

Finally, there is allergen labelling. The increasing incidence of allergies in the population has led to the introduction of this kind of labelling as allergens can have a severe effect on some consumers.

An allergen that is not in a product by formulation but could be introduced by chance during processing or handling is currently a matter of product liability, meaning it is up to the processors to decide whether they add voluntary labelling to warn of this.

INFORMATION OVERLOAD

It is an established principle that the more information that goes onto a label, the less the consumer will read it, so the challenge for manufacturers is to identify the essential statements that should go on a pack, and how other information can be provided by other means. This depends on a number of factors that vary by EU country.

European consumers are reasonably well informed. In one ruling, the European Court of Justice decided that because the consumer is so observant and circumspect, he or she should be expected to read the information on a label. It added that although consumers may sometimes be misled, that risk remains minimal and cannot justify barriers to trade. This again suggests that it is a consumer's obligation to read the label.

However, the reality is different, says Dr Martin Holle, professor of applied food law and administrative law at the Hamburg University of Applied Sciences. "There's limited education on nutrition in schools and families, so knowledge gets lost. Marketing also tends to sometimes be unrealistic. As far as a product's properties are concerned, consumers find it increasingly difficult to find trustworthy information because there's just too much information out there. And food labelling by definition is very much made by experts for experts; it is not designed for consumers, but more for enforcement."

"Consumers don't research buying a bag of rice as they would when considering something more expensive, like a car. As a result, they cannot be expected to take in sizeable quantities of information before making a food purchase. Grocery shopping is largely done under time pressure, and very often on autopilot," explains Holle.

"Consumers buy what they always buy, so it's not something they spend a lot of time thinking about. The average time it takes a consumer to read on-pack information is between 1.2 and 1.6 seconds. You can imagine how much information you can convey in just 1.2 seconds - an entire label cannot be read at that time. So manufacturers make their choices by deciding on the key information that they need to provide."

"An especially difficult process is how to detail where ingredients have come from. For this, consumers must rely on what the producer has stated because shoppers will not have access to check this information for themselves. While sourcing statements do not affect safety, a lack of the relevant information that is required by consumers will have an impact."

"Because consumers are unable to check the facts, they have to believe what they are told by the manufacturer, and if they feel they cannot trust this, then they are unlikely to continue believing in the safety of the food they buy," says Holle.

"Whereas the EU offers a very high level of safety, many consumers still hold the opinion that the foods they eat are not really safe. It's a misconception really, and that's because consumers are unable to check for themselves."

"Original labelling containing the words 'Made in…' is designed as a marketing ploy to appeal to citizens of that country who believe their produce is better than that of their neighbours," says Holle. It requires the assumption that food from one country is safer than the same food from another country, which is largely impossible to substantiate.

Nutrition labelling, too, can be difficult, especially if one believes that over-nutrition and obesity are safety issues. Europe is currently embroiled in discussions on statements about foods that are high in fat, sugar or salt. The UK has tried to tackle this with its traffic light system on domestic packaging, though it will take years to ascertain if obesity has decreased as a result of such labelling. What's more, it is still not yet known if such warning statements can really change consumer behaviour.

Labelling Standards

There are effectively two different methods of expressing what is in fact the same concept. The first is the sell-by date, which is always geared towards the producer; the other, which is meant for the consumer, is the use-by date, though there is often confusion between the two.

International agreements in this area, such as the Codex, have seen some over-arching standards developed for food and food safety across the globe. There is a general standard for international food labelling, though some definitions within this can be confusing and liable to interpretation in a number of ways. In practice, the EU might interpret these definitions one way, while the North American trading bloc could look at it in a very different light.

"To achieve something worthwhile, we have seen through experience how important it is to bear the concepts of food safety and food quality in mind when developing new standards and new definitions," says Stephen Pugh, who is in charge of food information at the United Kingdom's Department for Environment, Food and Rural Affairs.

"The European Union's definitions on food information are important. It's a single market for food trading throughout Europe and has harmonised labelling requirements for those exporting to the EU. Companies in this position must look at just one set of requirements, which is helpful when you have 27 different languages in use across the EU."

The EU is currently looking at the way food information is conveyed to feature details about how a product is sold, whether it is organic or whether all products from the same country should be put onto the same shelf.

"Its focus is on the communication of information to consumers, while the scope of what it is considering differs from established practice in that it does not just cover food labelling but also business-to-business transactions," explains Pugh.

"This approach is expected to clarify the parties responsible for each feature of food labels so there is no confusion. In the event of some contravention of the regulations, it should be very obvious who to approach."

The EU is also mulling requirements about Internet sales, which presents a significant problem in the EU, where products can be sold across borders and where languages and labelling regulations can be different. A ruling on legibility has been introduced, and manufacturers can no longer make voluntary claims as all claims must be substantiated in some form of fact.

Better origin information is among the features of new EU labelling laws. For example, manufacturers will have to provide the country of origin for fresh and frozen meat, or the catch area for fish. All information that appears on a label must now be verified through some form of traceability system.

One significant change, which will be introduced in 2016, relates to mandatory nutritional information for all processed and packaged foods, though in some markets there's the expectation that nutrition information will be provided on a voluntarily basis.

Some Codex definitions for pre-packaged foods show why there's such confusion in the eyes of consumers surrounding the date information that must be printed on all packaging.

Shelf Life

While shelf life can be a difficult concept to nail down and varies depending on how a food is manufactured, the EU has become very careful about how they should be used.

Shelf life is defined in European legislation as the "date of minimum durability" or, in case of perishable foodstuffs, the "use-by date", as covered respectively in articles nine and 10 of directive 2000/13/EC.

Food business operators are obliged to ensure optimal food quality during production and throughout the shelf-life of a product, while at the same time they are under increasing pressure to extend shelf life.

On the whole the first thing a typical consumer will look for before buying a new product—aside from its ingredients or whether there are any allergens—is its best-before, sell-by or use-by date.

A product's shelf life depends on its raw materials and formulation, processes applied, materials used for packaging, hygiene conditions during production and storage, and also temperature during storage, distribution and sale. Manufacturers must be aware of these factors before giving a reliable indication of shelf life in the form of a time stamp.

Current consumer trends across Europe are towards natural, minimally processed and organically grown food. To consumers, this food is healthier, whereas to researchers, maintaining a product with as little processing as possible while providing the characteristics desired by the consumer presents a growing challenge.

"Five different time definitions can be put on food packaging, from the date of manufacture through to the use by date," says Pugh. "The EU has changed this slightly over time and now discourages terms like 'sell by' and 'date of packaging' due to the confusion this could present to customers if there is more than one date on the packaging."

Out of these five versions of dates, two are legally defined: the best-before date, which is a quality issue, and then the use-by date, which affects safety. It is now considered illegal to sell food after the expiry of the "use-by" date, whereas the "best-before" date only offers some level guidance to consumers.

In many countries outside the EU, a practice has become widespread of artificially attaching use-by dates to products with long shelf lives to connote to consumers that they are fresh, natural products. "It was a marketing ploy and we've worked against it now," says Pugh.

Stamping Out Confusion

Date stamps listed in the Codex feature slight differences from one country or trading block to another. For example, individual portions of ice cream are exempt from requiring a date in New Zealand and Australia; the EU has just removed this exemption and now a best-before date must feature on all such products.

There are often difficulties in deciding on whether a food should have a use-by or best-before date. In the UK, for example, the cheese question is among the biggest time-stamping conundrums. Regulators are unsure as to whether cheeses sold in Britain should have a use-by or best-before date as some are soft, fresh cheeses like mozzarella or brie from Europe, while those typically produced in the UK have extremely long shelf lives that shouldn't require a use-by date at all.

"In essence, by asking pertinent questions about the type of product, it's shelf life, the condition it's in and whether or not it's been cooked, these will give some idea of whether or not a best-before or use-by date should be required. And of course it varies, with information like 'suitable for home freezing' coming into the equation," says Pugh.

There are ongoing investigations into how consumers perceive date marking and what they use it for. According to British research, there has been a significant improvement in the understanding of date marks, but there is still a worrying lack of knowledge, and around half of consumers admit that they rarely worry about them.

The study found that 49% of the British population know that they shouldn't eat a product after its use-by date, but only half that number realise that it's acceptable to consume a product after its best-before date. However, the situation is compounded when "display till" and "sell by" dates are added to the equation. Regulators in Britain have been trying to persuade supermarkets not to put these on their food.

Also under investigation is how consumers use date marks, and the importance of a date mark to a consumer. For example, some consumer groups have been calling for an indication of how long a product can be stored in a cupboard. However, the fact that many manufacturers are becoming more conservative in this low-risk, best-before environment is of concern to regulators. This is because, as manufacturers shorten their best-before periods, they are also adding to problems with food wastage.

"Can officials improve how the industry highlights the different date marks to better differentiate between them? Should these marks be found on all packaging? How does the industry understand consumer perception about the sort of markings on the food? And what can regulators do to limit the amount of edible food that is discarded by consumers? These are all shelf life issues that must be worked out in Europe and elsewhere," says Pugh.

A Vietnamese Perspective

In Vietnam, food labelling did not exist as specific or separate regulation until 2010; until then, it formed just a small part in the General Labelling of Goods regulation.

There were special provisions for functional foods and drinks, additives, irradiated foods and food produced by modern biotechnology. When the new law was drafted, the issue of GM food imports also became apparent; functional food was emerging and additives posed a range of problems. So specific provisions were included in the law to allow the government to promulgate a sub-law document to regulate these specific issues.

"With the Food Law 2010, the responsibility for food management and food safety were changed completely between ministries to bring about a vertical division of responsibilities so that just one ministry or government agency is responsible for a particular commodity or product, from production to consumption," says Dr Vu Ngoc Quynh, of the Vietnam Food Administration.

As Vietnam has experienced problems with date marking, the country now uses the Codex definition on this. Though while time stamping is still being debated within the government, regulators will accept

best-before marking because of Vietnam's position as a net foodstuff importer, and if it rejects the best-before mark, there are fears that the market might react adversely.

The requirement to list the address of the manufacturer and the origin of the product are consistent with the standards of labelling for packaged food from the Codex. Specific provisions have been made, such as the labelling of food additives and irradiated food, and these are also consistent with the Codex.

COLD CHAIN

The cold chain is a temperature-controlled supply chain, while an unbroken cold chain is an uninterrupted series of storage and distribution activities that maintains a given temperature range. Used effectively, the cold chain is a means to help ensure and extend the shelf life of products such as fresh agricultural produce, fresh dairy products, and frozen and chilled foods.

However, because food it is at its most vulnerable during transit, through temperature variations, appropriate refrigeration and storage, and conflicting processes during different steps of the process, food companies must note that transfer points serve as potential risk areas for maintaining the temperature for their products.

The number of transfer points for a given product should be identified and current practices evaluated. Staff at transfer points should be identified and trained to ensure a fast and secure product handover from cold area to cold area, while particular attention should be given to newly introduced members.

Efficient operators will introduce logging and reporting systems to ensure that all temperature abuses are reported to both ends of the commercial food chain, such as the processor and retailer, to ensure that appropriate action can be taken where necessary.

Chilling and Freezing

Chilling and freezing slow down the microbial, physical and chemical reactions that are associated with food spoilage and quality limitations in terms of shelf life. Even in a frozen state, some of those physical and chemical reactions may still occur if the food is not properly packaged or maintained, thus causing deterioration in quality. Many of the reactions that occur in frozen meat can be accelerated and made worse by temperature abuses through mishandling and during production, storage and distribution times.

Frozen food has a relatively better safety record than chilled food though its handling, processing and storing requires the same degree of care and attention.

The distribution of perishable food is a complex process with a number of interface or transfer points, and any breaks in the cold chain can destroy the product. If a product is not handled properly, it will deteriorate in quality.

The impact of cold chain breaks on produce is dependent on several factors, such as how often the breaks occur, the duration of each break, the temperature the product was exposed to at the time of the break, and how temperature sensitive the foodstuff is. These impacts are seen as cumulative. Indeed, the impact of deterioration on a product can be quite staggering, especially when it is mistreated more than once.

Temperature monitoring for traceability is also critical, says Paul Chiew, of Singapore's Agri-food and Veterinary Authority.

"It is important to take temperatures regularly to monitor the performance of the supply chain and identify problem areas so remedial steps can be taken to mitigate or prevent temperature breaks. A system of regular temperature monitoring compliant with time-bound temperature criteria is an essential component in a good quality-assurance system to demonstrate due diligence," Chiew explains.

"In this globalised food chain, it is important to understand and analyse the characteristics of a product's flow through the entire supply chain from production and distribution to retail. Expertise and logistics are critical to ensure the cold chain is maintained across the different players. This is to ensure that the handlers and players at different stages in the supply chain know the correct temperature."

EXAMPLE: Singapore's Cold Chain

Codes of practice and knowledge of the cold chain is constantly evolving, and Singapore has three codes to govern refrigeration.

First, regulations for the management of chilled pork covers the best practices for the cold chain from the abattoir, through de-boning and distribution, right up to retail.

The country has also developed a code for the management of milk and dairy products, chilled meat, frozen food and fermented food. This has the same objective as the pork code, namely to guide the industry through best practices at each step from production to sale.

A final code covers the cold chain management of vegetables. For vegetables there are additional relative humidity profiles to ensure the quality is maintained throughout the food chain. There are also guides on pre-harvest and harvesting practices at the farm.

Singaporean authorities see the success of an unbroken cold chain as a joint responsibility, not just the sole responsibility of the regulatory authority or industry. The consumer also needs to play a part.

"Cold chain operators need to be diligent in selecting and managing their distribution partners or logistic providers, and pay attention to whether they have a system of SOPs and KPIs, tracking and traceability, system or inventory management, product knowledge and effective communication with a common understanding of the temperature parameters, as well as storage and transport requirements," says Chiew.

"Knowledge of product-process-package and time-temperature-tolerance is critical at each stage of the interface or transfer, and stakeholders should communicate specific handling and temperature requirements such as pre-cooling or special storage.

"Professional handlers are educated on the importance of compliance and awareness of the potential presence of micro-organisms that can grow at cold temperatures, and develop the appropriate management of handling procedures and check for compliance regularly. They maintain awareness for high-level hygiene throughout all these stages in the cold chain for low bacteria count."

CASE STUDY: Tesco in Malaysia

British retailer Tesco arrived in Malaysia in 2002 as a joint venture with local conglomerate Sime Darby. Today it has 50 stores in peninsular Malaysia, with two distribution centres and 12,000 staff working across the country. It carries 60,000 products in stores and launched a grocery home shopping shopping channel in 2013.

"If you look at the end-to-end cold chain, it's common for wholesale farmers in Asia to harvest in the heat, wash the vegetables in a possibly contaminated pond—if they wash them at all—and transport the produce without a cold chain to a very open packing house," says Ch'ng Oon Teong, Tesco's regional head of law.

"What Tesco did was invest in a modern cold chain, source temperature-controlled fresh distribution centres and bought 38 trucks with cold boxes."

However, a multi-million dollar system such as Tesco's still does not guarantee product quality unless sources are controlled—systems only maintain quality if the product they protect are good. Therefore the most important thing link in the distribution chain is the source.

Now vegetables are chilled and packed for Tesco's distribution centres and kept at the same temperature all the way there. Suppliers are trained in operating in the environment of Tesco's system.

Animal carcasses are popular among Malaysian consumers, who often buy them from supermarkets. It is common consumer thinking in the country that a carcass that can be seen on the bone will be fresh; on the other hand, many believe that pre-packed meat and food in the chiller is not as fresh. To adapt to

consumer needs, Tesco displays carcasses so the customers can see for themselves where the meat comes from.

"We only do this in Malaysia because no other Tesco in the world sells animal carcasses. The customer can see the carcass but can't touch it because of the glass barrier. The butcher will go inside to the back to cut the part the customer wants and sells it to him. So the customer sees the carcass and is happy that is it fresh, and that's how we still capture the business."

With high ambient Malaysian temperatures being ideal for bacteria growth, Tesco has also paid for a fleet of 65 three-chamber trucks for home deliveries.

"We need to invest in this because maintaining the cold chain is ensuring we deliver safe, legal and good quality products to our customers. We have a responsibility to the stakeholders, authorities, NGOs, the media, the community, and our customers," says Ch'ng.

THE CONSUMER'S POINT OF VIEW

A 2013 study found that over half of countries were very supportive of consumer protection policies. With plans to spend €188 million on its consumer programme from 2014 to 2020, the EU is among the biggest supporters of the shopping public.

ASEAN, however, is not at this stage, says Dr Anni Mitin, executive director of the Southeast Asian Council for Food Security and Fair Trade.

"While there are expectations that the ASEAN Economic Community will be achieved in 2015, we haven't even addressed consumption aspects of harmonisation because our focus has been on production. We have to start looking at how to improve on the consumption or the market in the region."

All the "4As" of availability, affordability, acceptability and accessibility must be in place to have food security, though this becomes a concern when many of those involved talk about food security but address it from the supply chain, not from the point of view of the consumer, says Mitin.

The UN guidelines on consumer protection list eight basic rights for consumers. These include the right to basic needs, to safe products and services, and to accurate information. Moreover, consumers should have the right to choose, be heard and be given redress or remedy. They also have a right to consumer education and to a safe and healthy environment.

Metin believes that of all ASEAN nations, only Indonesia has a strong act on access to nutritional information, while some other countries don't even have laws governing data. In Laos, labelling does not even have to be in the national language, especially in the case of imported products, which come mainly from Thailand.

Only six ASEAN countries have implemented a consumer protection act, though in some cases this has not been done thoroughly enough. The Consumer Protection Act in Malaysia, for example, brings confusion over which ministry is responsible for compensation after an event, meaning there is no clear-cut way for the consumer to access, remedy or secure compensation if food safety is in involved.

So is it possible to achieve a more coordinated approach to fulfil the full definition of food security?

"Consumers believe that the government and industry do not provide enough information to enable them to make an informed choice," says Mitin. "Consumers also feel that some processes using new technology are unsafe because they have not been adequately evaluated. This is the case with GMO and irradiation.

"In Laos we visited the border to look at how officials check the food that comes in. We found their equipment had been sitting there for three months and no one knew how to operate it. And when we asked whether they checked for expiry dates; if a consignment contained canned or processed food; or if there was a minimum date for when the food could come in; they were unaware of any regulations. So competence is a major concern when dealing with food safety."

The most commonly cited food safety-related concerns in developing ASEAN countries include inter-agency coordination, the certification process and corruption issues.

"In light of this, how can we trust the certification? Likewise the role of media in education and marketing? No TV programmes or radio shows highlight the issues of food safety, and this is one of the areas we need to address."

But there are still positives. In Cambodia, for example, the constitution highlights that the state will severely punish anyone who sells drugs, counterfeit products and expired goods that affect the health and life of the consumer. Legislation like this is important to ensure a coordinated approach in addressing food safety, Mitin says.

Laos recently amended its food safety law to include consumer protection, though this has not yet been fully implemented. In Myanmar, the National Consumer Law is currently tabled, though it does not feature any labelling laws at the moment.

LIFE AFTER HARMONISATION

ASEAN is coming towards the conclusion of the long process of harmonising its standards in preparation for becoming an economic community. Its leaders, ministers and members of working groups would do well to continue to work closely with the EU as its framework evolves.

By adopting some areas of Brussels' regulatory system for its own use, Jakarta can capitalise on such similarities by adhering to export rules from the very start. While many other countries and international groups have their own excellent systems, Europe offers reach and scope for two-way business with ASEAN.

For its part, the EU will remain in competition for ASEAN's favour alongside rivals like the US. As South-east Asia's wealth grows, and Europe's market continues to stagnate through maturity in contrast to ASEAN's vibrant business environment, the importance of such relationships will grow.

One thing is for sure: and that is the 10 member countries of the Association of Southeast Asian Nations will benefit from greater clarity, safety, quality and efficiency in the food industry once a harmonised commercial and regulatory framework unites them.

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FORUM ON FOOD SAFETY
Shelf life • Traceability • Cold Chain • Labelling

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