

Food related regulations (farm-to-fork)

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Introduction

What do *mad cow disease* in United Kingdom in 1996, dioxin in feed in Belgium in 1999, milk formula in 2008 in China, spinach and peanut butter in 2008 in the United States have in common?

They are all related to food in different stages of processing and they are all examples of well publicized food scares although with different numbers of fatalities. Even a casual consumer of news once in a while (hopefully not too often) notices a report on food scarcity on the front pages. Outbreaks of food-borne diseases, especially those with fatalities tend to make better stories than food quality issues. Food related regulations (or lack of them or their enforcement) tend to receive the most attention in times of crisis. On a positive note, they usually lead to reforms or at least adjustments of policies. Food related regulations can be mandatory or voluntary, formal or informal in nature. This course focuses on formal food regulations, whether they are mandatory or voluntary.

1. Scene setter

We all have direct experience with food related regulations. We expect eggs to be of uniform size, buy groceries and eat out in restaurants believing they will not make us sick with a foodborne illness. Often, we note a small print on a restaurant menu saying that consuming raw meat can be dangerous. There are many types of food related regulations, which can affect:

- Sizes and grading of products (such as eggs and apples of a certain size).
- Their organoleptic properties (that is any sensory properties of a product, including taste, colour and odour).
- The processes under which products were produced (for example, products of organic agriculture or milk pasteurization).

In this chapter we explore food related regulations in the food chain and make an argument for a systemic farm-to-fork (sometimes called farm-to-table) regulatory approach. Subsequent chapters examine different types of food related regulations in detail. While this is not a food law course but a course on the interaction between food safety and trade, we will still have to establish some terms as additives, adulteration, standardization, harmonization, etc.

2. *What is food?*

The definition of *food* shapes the regulations imposed and its consequences for industry, consumers, and trade. Consumers expect their food to be wholesome, nutritious, and not to fall sick after consuming it. Modern food processing and increasing tendency to consume meals away from home changed the notion of *food*. It no longer covers only primary or simply processed commodities or goods that would be turned into a final product –a meal consumed at home. *Food* comes in different forms and shapes: commodities such as wheat or maize that remain an important input in processed foods although their shares in the final product are low, meals eaten away from home, intermediate products used to further processing, etc. Advances in technology, research, and breeding allowed further advancements: flour is enriched by vitamins, cream contains less fat and animals are bred to increase size of their bodies that are most demanded by consumers. These alterations may respond to:

- health concerns raised by consumers (demanding less fat in dairy)
- producers' cost controlling measures (such as adoption of roundup ready varieties of soybeans or growing chicken with enhanced breast)
- the interest of public health (iodine added to salt)

The Merriam-Webster dictionary defines food as

"Material consisting essentially of protein, carbohydrate, and fat used in the body of an organism to sustain growth, repair, and vital processes and to furnish energy; also: such food together with supplementary substances (as minerals, vitamins, and condiments)".

The Merriam-Webster dictionary

Codex Alimentarius defines food as

"any substance, whether processed, partly processed or raw, which is intended for human consumption and includes drink, chewing gum and any substance which has been used in the manufacture, preparation or treatment of food but does not include cosmetics, tobacco or substances used solely as drugs".

Codex Alimentarius

Food includes raw materials, food components, and food additives. Food additives (substances intentionally added to foods), in particular, present a regulatory challenge. A question arises whether added substances are considered to be a component of the food, or added. Codex Alimentarius defines additives as

"any substance not normally consumed as a food on its own and normally constituting a typical food ingredient, whether or not it has any nutritional value, the intentional addition of which to food for a technological purpose in the manufacturing.....or may reasonably be expected to result...in it or its byproducts becoming a component of or otherwise affecting the characteristics of such foods".

Codex Alimentarius

Additives can be beneficial, although some additives can result in adulteration. Additives also include irradiation of food, a process that is accepted in the EU, but less so in the US.

A well-known example is the court case of *United States vs Coca Cola* addressing a question whether caffeine is an additive or a part of a product. Coca Cola's argument was built on a fact that caffeine is a part of its product and should not be considered an additive even if added separately. The Court ruled that caffeine was an added substance on the basis of consumer protection.

Some changes in the concept of food call for additional regulation. For example, with widespread sourcing of foodstuffs, rules for recall had to be established. Different countries adopt different approaches to *novel* food that is food that is enriched by vitamins, biotechnology, and the like.

For example, are dietary supplements foods or drugs? In general, marketing of foods is easier than marketing of drugs, and foods are not subject to testing and approval procedures.

Some countries, such as the United States, consider *novel* food as being equivalent or not much different from existing food, and thus not subject to new regulations. Other countries, such as the EU, consider some *novel* food to be substantially different from the original source and subject to approval process. Different standards for different markets put additional costs on producers and can lead to trade tensions.

3. Origins of food related regulations

Although food related regulations are gaining increasing importance, in their broadest sense are centuries old. Examples of such regulations are religious practices, such as halal and kosher prescribing types of food that can be eaten and *production processes methods* to treat the foods, for example detailing methods how animals should be slaughtered. Egyptians had similar laws. Greeks and Romans had laws prohibiting watering down of wine. In medieval times trade guilds were in charge of quality issues ensuring products of producers belonging to their association fulfilled certain quality requirements and were not adulterated. The incentives behind them were not directly related to consumer protection but to producers' efforts to protect the good name of their products.

Modern food administration treats food related regulations under the auspices of consumer protection. The industrial revolution, increasing distance between producers and consumers accompanying increased urbanization and related growth in storage, preservation, processing, packaging, transport, etc. brought along the need for more regulation. Many states in the United States passed food laws in the 19th century.

The first one was passed in Iowa in 1838 "to punish vendors of unwholesome liquors and provisions".

The one passed in Massachusetts in 1874 stated that "any food sold not wholesome without buyer knowledge punishable by fine, imprisonment, standing in pillory - depending on severity".

Bibliographical reference

Hutt, P. B.; Hutt, P. B. II (1984). "A History of Government Regulation of Adulteration and Misbranding of Food". *Food Drug Cosmetic Law Journal* (No. 39, pp. 2–73).

While state food laws in the US flourished in 1800s with more than 200 passed, some states had no laws; others lacked enforcement, while some laws were in conflict. Federal law was needed as the inter-state commerce in the United States began to prosper in the late 19th–beginning of the 20th century. For a long time, the US Congress was of opinion that food supply is a matter of local importance and best left to the States.

The history of modern food regulation is still evolving. Let us look at the United States. US food regulation includes setting up a Bureau of Chemistry in the USDA in 1883 by Harvey Washington Wiley. The Bureau later became the Food and Drug Administration. An important contribution to demonstrating

a need for more profound food regulation was a book by Upton Sinclair *Jungle* that described unsanitary conditions and practices of workers in the meat processing industry causing an outrage among readers.

Jonas had told them how the meat that was taken out of pickle would often be found sour, and how they would rub it up with soda to take away the smell, and sell it to be eaten on free-lunch counters; also of all the miracles of chemistry which they performed, giving to any sort of meat, fresh or salted, whole or chopped, any colour and any flavour and any odour they chose. In the pickling of hams they had an ingenious apparatus, by which they saved time and increased the capacity of the plant; a machine consisting of a hollow needle attached to a pump; by plunging this needle into the meat and working with his foot, a man could fill a ham with pickle in a few seconds. And yet, in spite of this, there would be hams found spoiled, some of them with an odour so bad that a man could hardly bear to be in the room with them. To pump into these the packers had a second and much stronger pickle which destroyed the odour; a process known to the workers as "giving them thirty per cent." Also, after the hams had been smoked, there would be found some that had gone to the bad. Formerly these had been sold as "Number Three Grade," but later on some ingenious person had hit upon a new device, and now they would extract the bone, about which the bad part generally lay, and insert in the hole a white-hot iron. After this invention there was no longer Number One, Two, and Three Grade; there was only Number One Grade. The packers were always originating such schemes; they had what they called "boneless hams," which were all the odds and ends of pork stuffed into casings; and "California hams," which were the shoulders, with big knuckle joints, and nearly all the meat cut out; and fancy "skinned hams," which were made of the oldest hogs, whose skins were so heavy and coarse that no one would buy them, that is until they had been cooked and chopped fine and labelled "head cheese!"

Sinclair, Upton (1920). *The Jungle*. Harvard University.

In 1906–07, the **Federal Meat Inspection Act** was passed, mandating inspections of livestock before and after slaughter, established sanitary standards for slaughterhouses and meat processing plants, and authorized federal inspections. Also, in 1906 the **Pure Food and Drugs Act** prohibited interstate commerce in adulterated and misbranded food and drugs even if analytical techniques were rather weak at times. Following more than 100 deaths from *Elixir of Sulfanilamide* in 1937, the 1906 Act was revamped and the 1938 **Food, Drug and Cosmetic Act** was passed mandating pre-market testing, prohibiting toxic substances, establishing safe tolerance levels for pesticide residues, and establishing standards for many foods. Other additions and amendments followed responding to new challenges. Even today the discussion on food safety is not complete.

4. Product and process attributes

Before moving on, we need to establish the term *attribute* with which food related regulations often work. Economists and lawyers often talk about *attributes* of products.

Attributes are in fact characteristics of the products.

Attributes can come in many guises and differentiate seemingly similar products. For some the most important attribute is the price, for others the price-quantity relationship or the amount of calories or nutrients contained in a serving. Some attributes are easily recognizable. Among those we find:

- **colour** (red apples, green apples, and yellow apples)
- **shapes** (cuts of meat for example)
- **size** (small, medium, and large eggs)
- **prize**

Less recognizable are attributes which result from production methods.

- What is the pesticide level in a big red apple?
- Was the meat in the TV dinner sufficiently cooked?

Attributes can be cut in several different ways.

- One cut differentiates based on whether the attribute is product or process related. Furthermore, process attributes can be distinguished between those that are embodied in the product (such as produce treated with pesticides that leave a residue), and those that cannot be embodied in the product (such as determining whether child labour was used to produce a product).
- Another cut is based on the timing during which the consumer *discovers* –if ever– the relevant attribute. In this classification we talk about:
 - Search attributes, such as price, size, freshness, brand, and appearance can be evaluated at the time of purchase.
 - Experience attributes, such as taste can only be evaluated upon or after purchase or product consumption. Some food safety aspects, such as the presence of bacteria causing a foodborne illness, are in this category.

- Credence attributes cannot be verified by consumers themselves, even after consumption. Presence of carcinogens that might or might not cause an illness after a certain period of time, are in this category.

Yet, there are attributes that are not directly verifiable:

- processes involved in the production such as rainforest safe produce
- shade-grown coffee
- organic produce

Studies ask consumers how much they are willing to pay for a certain attribute. Although in study settings consumers often indicate a higher willingness to pay, for example, for meat produced in an animal-friendly manner, faced with a budget constraint, many consumers prefer lower prices.

Labelling, if properly designed, enables the consumer to recognize attributes that cannot be verified directly. In case of credence goods, in particular, consumers rely on government intervention to ensure the quality of the products provided on the market, since consumers do not have the ability to verify product attributes. Food safety is one of those attributes. In the case of experience goods, whose attributes are only known after the good was consumed, fearing a backlash against the firm, most producers do not have an incentive to market unsafe products.

Attributes have always been important to consumers. However, *Eurobarometer* surveys indicate that health, food safety and other non-price attributes are becoming increasingly important for consumers. Among those are:

- pesticide residues in produce
- hormone or antibiotics residues in meat
- conditions in food handling outside the home

5. Markets for food regulation or government intervention?

- Can markets take care of food related regulation?
- Can consumers differentiate between safe and unsafe products and, if so, under what conditions?
- Or is it the role of a government to impose standards and regulations?

Governments start by identifying society's objectives or targets (such as to minimize risks associated with a foodborne illness), and then choose methods or instruments to achieve them. Governments' policy objectives are determined, at least in democratic societies, in a political interaction between government, parliament and legislature, public and other stakeholders, such as producers and NGOs, constrained by the institutional framework.

The objectives governments pursue are driven by political interests in combination with balancing contributions of the market and public sector.

The institutional framework is in charge of the rules. Some objectives are best achieved in public-private partnerships.

One way to answer the question of government involvement is through types of goods. Goods can be divided into:

- **Excludable** and **non-excludable**.
- **Rival** and **non-rival**.

Excludability means other consumers can be costlessly excluded from consuming a good. Goods are called rival if consumption by one person decreases the amount available for others.

- Goods that are excludable and rival are called **private goods** (e.g., food consumption).
- Goods that are excludable and non-rival are **club goods** (those can be used freely by members of a club that contribute to their provision).

Examples are paid highways or memberships in golf clubs.

- Goods that are non-excludable and rival are **common goods**, where the property rights are often not well defined: everybody is free to use them but they get exhausted.

Examples are pastures, fishing, etc. where the users individually are not interested in preserving the common good, although it would be in their collective interest.

- Goods that are non-excludable and non-rival are **public goods**.

For instance, provision of landscapes

Governments intervene in the non-excludable category of common goods (non-excludable and rival) and public goods (non-excludable and non-rival). Public economics studies the provision of public goods. In general, governments assist in the provision of public goods, and markets are sufficient to provide an adequate supply of private goods. In some cases, markets can provide a sufficient amount of public goods.

Food safety –as a non-excludable and non-rival good– deserves intervention. An example of markets providing a public good is **GlobalGAP** (formerly EuprepGAP) established by leading European retailers of Good Agricultural Practices with independent certification to achieve harmonization of standards for food safety assurance and exchangeability of products.

A second way to answer the question of government involvement is whether consumers can differentiate between different attributes. In this case, market failures are due to asymmetric information, adverse selection and moral hazard. If markets were perfect with perfect information, no government intervention would be necessary.

Let us look at a problem of quality and asymmetric information. Akerlof's *lemon* problem provides a framework to the analyses. Assume there are two types of goods: one in high quality, one in low quality. Let us also assume that both qualities are safe to consume but high quality is more expensive. However, in an absence of signalling– using certifications or labels– on the market place, a consumer cannot distinguish between those two qualities. Thus, both qualities will sell for the price of lower quality, resulting in high quality –but also high cost– producers failing to break even. High-quality producers will then drop from the market or produce low quality products if the technology allows it. Consequently, only low quality products will remain available in the market. The scenario changes when high-quality producers can signal to the consumers that their products are high quality. Labelling and certification are introduced as signalling devices to keep consumers informed and let them help to make their choice. While labels are generally preferred to straight bans, as we will discuss later in the module, a proliferating number of labels and certification schemes can lead to information overload. Labels and certification schemes can be further strengthened by liability laws enacted by the government. Liability laws enable litigation processes. However, liability

Bibliographical reference

Coase, 1960

laws are usually of little help when consequences of consuming a product are grave, for example in case of a damaging foodborne illness when the person affected is too ill or disabled to claim. In that case, the best solution is a ban or other form of strict regulation on the product or the substance. Information on food safety is typically available within the food supply chain, but firms may not have an incentive to share it with their customers. For this reason, the government may have a role in providing food safety information to the general public.

The nature of goods and externalities can change over time. Of course, societies evolve with new technologies and general progress and so do policies which respond to consumer demands for safety and quality (later in the text we will differentiate between those two concepts).

Examples of policies in the food sector include tracing and tracking of ingredients and products down to a field level or an animal killed. Such information is used in case of a product recall.

Governments intervene to address efficiency and market failures (such as environmental and food safety issues), distribution (such as safety nets, taxes) and sustainability issues and distribution of depletable natural resources. The trend in the 1980s was to leave decision making to the private sector. Governments may not necessarily stay involved with the implementation, which can be left to the market. Following the BSE crisis in Europe, governments strengthened requirements for food safety but, at the same time, shifted the direct responsibility to the food supply chain. Under the **General Food Law** of the European Union, firms within the food and feed chains are responsible for the quality and safety of their products and, by implication, liable for the cost caused by any negligence in this respect.

Thus, in economic terms, government interventions are justified when they address market failures. These include provisions of public goods that would be underprovided in case they were decided on an individual level, existence of externalities, or imperfect information. Externalities, such as environmental provision, and food safety standards occur when actions of one person or group affect others but economic actors do not take consequences of their actions into account when making their decisions. Governments also define property rights. The economic theory tells us that unless the substance is detrimental, in general standards supported by labels, certifications, educational and informational campaigns are the most efficient tools giving consumers choice.

At the core, the policy challenge is to shape and maintain arrangements that allow governments to pursue multiple objectives in a consistent and effective manner.

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Bunte F; J. C. Dagevos (2009). *The Food Economy: Global Issues and Challenges*. Wageningen Academic Publishers.

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WTO (2005). "Trade, Standards, and the WTO". Geneva.

6. Why increased interest now?

We now proceed to analysis the factors responsible for increasing interest in food regulations. Four prominent factors can be identified:

- **Declining income shares spent on food in developed countries.**
- **Globalized sourcing and increased trade flows.**
- **Coverage of food scares in the media.**
- **Progress in science and research.**

6.1. Declining income shares spent on food

In line with Engel's law that says that as income increases, the proportion consumers spend on food is decreasing, on average consumers in developed countries spend only a small share of their income; and this share has been falling. With decreasing shares of income being spent on necessities, consumers become less concerned about the price and calorie intake as main attributes. Instead, they care about convenience, easiness to use, wholesomeness, conditions under which the food was grown, and its origins. Taking meals away from home –in developed countries up to 50 percent of the food budget is spent on food away from home– contributes to fast spreading of a single contamination.

Consumer demands in many developed –as well as developing– countries change as consumers become wealthier and demand further attributes from their food.

Instead of the price component only, consumers demand non-price attributes. At the same time, however, we observe weakening brand loyalty and strong interest in private brands. In return, private brands are responding by focusing on delivering not only the price element but also non-price attributes.

It would be a mistake to assume that consumers in less developed countries are ambivalent to the concept of safety and quality. In general, however, price and calorie considerations are likely to prevail above considerations over the conditions under which food was produced.

6.2. Globalized sourcing and increased trade flows

A longer distance travelled between producer and final consumers, coupled with increasing degrees of processing, challenge the trust present between consumers and producers when food is purchased on a farmers' market direct-

ly from the producer. Globalized sourcing and increased trade flows associated with globalization have contributed to loss of this trust. They have also revealed potential differences in standards and regulations across countries. While differences in standards are not necessarily bad and, in some cases, trade in heterogeneous products can offer consumers more choices, different standards could lead to trade frictions. In addition, increasing trade also revealed potential impacts on producers in exporting countries. On the other hand, consumers benefit from globalization in the form of broader variety, all-around accessibility, and possibly lower prices.

Globalized sourcing also implies sourcing of inputs. The WHO in its Global Strategy for food safety from 2000 shows an example of the dioxin crisis in the EU in the late 1990s when more than 1,500 farms in Europe received dioxin-contaminated feed from a single source over a two-week period. Food produced from animals given this contaminated fodder found its way onto every continent within weeks, while the effects of exposure to dioxin from this source on public health may become known only after years of investigation.

A rebirth of local food is mitigating the problem of globalized sourcing, but it is unlikely to be adopted across the board for large segments of the population. Many countries do not possess climatic and geographic conditions necessary to produce sufficient amounts of food to feed its populations. In addition, they might not be the most cost efficient producers.

6.3. Coverage of food scares in the media

Following the BSE crisis in the EU in 1996, the food safety system in the EU got a major overhaul. Although too much information can easily lead to information overload, the argument can be made that the spread of internet communication, blogs, messaging and the like helps spreading the news of a food scare. The cost of information about various attributes is declining as the role of *non-traditional* media is increasing. Historically, consumers given their size and diverse interests are difficult to organize. With new media, a target audience is easily reachable, and bloggers and other internet savvy users have proven their aptness in mobilization. In addition, companies possibly affected by food scares are increasingly aware that their reputation can be put in jeopardy by their own food scare, regardless of what or who is at fault.

A background document to the communication on food quality lists multiple food scares:

Year	Event	Country
1987/88	Beef hormone scare	Italy/European Union

Food scare examples from 1987 to 2008
Source: http://ec.europa.eu/agriculture/quality/policy/com2009_234/ia_annex_d_en.pdf
(World Bank, 2005 and own additions)

Year	Event	Country
1988	Poultry salmonella outbreak/scandal	United Kingdom
1989	Growth regulator (<i>alar</i>) scare for apples	United States
1993	E.Coli outbreak in fast-food hamburgers	United States
1996	Brain-wasting disease linked to BSE	United Kingdom
1996/97	Microbiological contamination–berries	United States, Canada
1995-97	Avian flu spreads to humans	Hong Kong, Taiwan
1999	Dioxin in animal feed	Belgium
2000	Large-scale food poisoning–dairy	Japan
2001	Contaminated olive oil	Spain
2006	Rotten meat scandal	Germany
2008	Melamine in dairy products	China
2008	Dioxin in pork	Ireland

Food scare examples from 1987 to 2008
Source: http://ec.europa.eu/agriculture/quality/policy/com2009_234/ia_annex_d_en.pdf
(World Bank, 2005 and own additions)

Media coverage resulted in lowering consumer confidence in the system. The public sector responded by tightening standards and made significant changes to the institutional oversight of food safety. Governments, particularly in Europe, started implementing traceability schemes and farm-to-fork regulatory environments (discussed later). Food retailers responded by setting up private standards.

6.4. Progress in science and research

Research progress and science allow detection of smaller particles and smaller amounts of substances, such as residues. It also allows determinations of risk factors that were previously unknown, resulting in a need for new policies. Increased antimicrobial resistance in bacteria also presents new challenges.

But progress in science and technology delivers new innovation responding to new demand.

For example, increases in demand for fresh fruits and vegetables required the industry to develop new methods of maintaining food quality and extending shelf life. Industry responded by modified atmosphere and controlled atmosphere packaging which extends shelf life of fresh foods by changing proportions of oxygen, carbon dioxide and nitrogen in a sealed container.

While modified atmosphere packaging, food irradiation and other innovations look promising from the food safety point of view, consumer acceptance can still present a challenge. At the moment, biotechnology and genetic engi-

Bibliographical reference

<http://www.fda.gov/Food/ScienceResearch/ResearchAreas/SafePracticesforFoodProcesses/ucm091368.htm>

neering innovations are mostly directed at cost reduction for producers rather than at delivering benefits for consumers, although resistance can be expected.

7. Developments of and approaches to food policies

While simplified, in this course pack we loosely refer to food policy as a set of food safety, food quality and other food related regulations mandated by governments.

Food related regulations include food policy as well as private initiatives.

Regulations embodied in a legislative framework serve as instruments to realize policy objectives. Policy objectives could be to:

- ensure adequate supply of safe food,
- minimize risks in the food system, or
- protect public health.

The legislative framework also sets instruments and resources. Some regulations, on the other hand, are not embodied in a legislative framework. Industries and retailers can also be self-governing and self-impose standards and requirements due to the demand power of its major customers.

For example, fast food chain restaurants could ask their egg suppliers to comply with additional space requirements to protect animal welfare.

Food policies come in different shapes and evolve with society's needs. Food policies in many countries started under the auspices of agricultural policies discussed in the first part of this chapter. In many countries, food policy remains to be treated under the auspices of agricultural policy, uniting policy objectives of wholesome food, food security of its population, income maintenance of farmers, and possibly other objectives such as protection of the environment. Elsewhere, the element of consumer protection is more present.

After the Second World War, the emphases of agricultural production were income maintenance of agricultural producers and relatively low prices for consumers. Ballooning agricultural policy budgets and complaints from the taxpayers combined with international factors described in the previous part also resulted in a call for alternation of agricultural policies and creating of specific food policies and related agencies. Among other factors affecting evolution of agricultural policies are changing demographic patterns and more population living in cities with smaller direct connection to the farming community.

Public choice teaches us that smaller groups are easier to get organized and consequently to lobby. There are fewer farmers with relatively similar interests forming powerful lobbies and a lot of consumers with divergent interests.

Policy

Any plan or course of actions adopted by a government, political party, business organization, or the like, designed to influence and determine decisions action and other matters.

Although the rise of internet communication has helped pool consumers together to lobby for a common cause in a grass roots manner, farmer and producer lobbies seem to retain an upper hand.

Governments have always acted in the spirit of protecting public health, so governments take an active role in setting up and implementing food related regulations. These efforts tend to get reinforced following a food scarce.

An example from the EU

Common Agricultural Policy (CAP) objectives are:

- To increase agricultural productivity.
- To secure availability of supplies.
- To provide consumers with food at reasonable prices.

Thus, the focus lies on food security and cost without referring to food safety or food quality although quality issues were not completely absent from considerations. Commodities purchased via intervention mechanism to ensure higher domestic than international prices had to be of certain grade and fulfil certain quality requirements. Nevertheless, the CAP was and remains an agricultural policy although these days more attention is given to quality issues.

Food safety issues got into a spotlight following the BSE crisis in 1997. At that time, for example, the Directorate General for Consumer and Health Protection Policy was created. From the point of European integration in the field of health and consumer interests the Treaty of Amsterdam is important. The Treaty of Amsterdam moved human health in front of agriculture. Sanitary and phytosanitary measures are considered public health and not agricultural policy.

Consumer protection is also mentioned in the Maastricht treaty: the task of the Community is to "contribute to the attainment of a high level of consumer protection", with the Treaty of Amsterdam rephrasing it to "in order to promote the interests of consumers and to ensure a high level of consumer protection, the Community shall contribute to protecting the health, safety and economic interests of consumers."

Although current agricultural policies in many countries remain mostly producer oriented, they contain a lot of causes consumers care about in the form of cross compliance. Payment of subsidies is conditional on the complying with conditions such as requirements on protection of environment, food safety, animal welfare, etc. Many food safety elements are related to environmental protection, such as pesticide residues.

Current food regulations reflect increasing trends in food consumption, including increasing shares of food taken away from home. Food related regulations include:

- activities on farms
- food processing companies
- retail outlets
- restaurants
- similar eating establishments regarding products, production processes, storage, etc.

Food policy in essence balances the demands of consumers and producers in all stages of production with public health.

In addition to agricultural agencies, health and consumer matters agencies are also involved. In countries where agricultural policies still include food related policies, focus has been shifting from production to quality.

8. Case for and against supply chain approach

The supply chain can be divided into four parts:

- **Production of raw commodities.**
- **Processing.**
- **Retailing.**
- **Consumption.**

Different stages of the food chain call for different regulatory approaches. The last link –consumption– is usually addressed by educational campaigns. These can be staged by governments or private firms to contribute to consumer education. We will not explore consumer education programmes in detail but some websites might be worth a visit.

Bibliographical reference

<http://www.foodsafety.gov>
<http://www.food.gov.uk/safereating>

That the increasing distance between a commodity producer and a final consumer results in a need for more regulation was already mentioned. This increasing distance is part of the industrialization of agriculture. At the same time, retailers –the link closest to the consumers– are the most aware of changing consumer demands for attributes. Increased interdependence among the entities that deliver the final consumer product– food with desired attributes– has major implications for the efficiency of the food sector. Industrialization of agriculture refers to the changing nature of linkages between the production stages and the consolidation of firms in the food production and distribution system.

Bibliographical reference

Boehlje, Michael; Lee F. Schrader (1998). *The Industrialization of Agriculture: Questions of Coordination. In Industrialization of Agriculture: Vertical coordination in the US food system.* (Eds. J. S. Royer and R. T. Rogers). Ashgate.

Coordination between stages of the food chain is characterized less by open markets and more by negotiated contracts or integration. Coordination can enable a better response to consumer preferences. Conformance to specific quality standards may be more easily accomplished with a contract or ownership coordinated system. Some technologies might not be economical on a smaller scale. The coordination needed to ensure both quality and quantity for efficient operations can be achieved through contracts, ownership of more than one stage, joint venture, or similar arrangements in the food production and distribution chain. System coordination can also help to reduce or control risks of food safety and environmental contamination in the view of product and environmental liability laws.

For a functioning approach to food safety, the entire supply chain including retail sector needs to be included. Hazards can occur at any step of the supply chain and can be made worse downstream. For example, policies on geographical indicators start with the producer of commodity location, which is often determined by the production of the primary commodity and continues all the way through the food chain. While production of primary commodities is crucial for ensuring a safe and quality product, processing offers ample opportunities for potential contamination in various stages. As such, food policy is best treated as part of a supply chain. The supply chain approach was greatly facilitated by advances in technology allowing tracking, traceability, and the like.

The concepts of industrialization and of vertical integration share similarities, although the latter is often discussed in the context of global supply chains. These result from increasing complexity and stringency of standards and other food related regulations, resulting in a need for closer monitoring. A frequent complaint is that of multinationals dominating supply chains and pushing the food distribution system to contractual arrangements or even ownership to ensure consistent volume and quality of products. One of the drawbacks is sourcing away from small farmers to vertically integrated producers that have the resources and ability to comply with stricter requirements and related higher cost of compliance.

Industrialization is not new and not specific to agriculture only. Coordination between different links of processing is also discussed in the industry where the questions of interoperability and technical compliance arise.

9. Types of food regulations

Food related regulations deal with food itself

For instance, composition standards, residue levels or storage requirements.

or processes associated with the product. They are tools used to achieve objectives set up in food policies. Food regulations can be:

- **Public**, in a form of a food law.
- **Private**, in a form of business-to-business requirements.

In the EU Regulation 178/2002 *food law* is defined as:

"the laws, regulations and administrative provisions governing food in general, and food safety in particular, whether at Community or national level; it covers any stage of production, processing and distribution of food, and also of feed produced for, or fed to, food-producing animals".

EU Article 3(1) of Regulation 178/2002.

In the EU, food legislation comes from provisions related to:

- **agriculture**
- **the internal market**
- **health protection**

Among the different food related regulations we find:

- **Product standards.** Standards are essentials for addressing market failures such as imperfect information and negative externalities such as environmental degradation. They are also crucial in facilitating well-functioning markets where technical compatibility (network externalities) is important.

Network externalities and technical compatibility are somehow less important in the agri-food sector, although a comprehensive discussion of standards should include those effects as well. Standards identify product attributes such as grading, sizes, properties, some of which can and some of which cannot be verified at the time of purchase. We will study standards in Modules 3 and 4.

- **Production processes.** They are necessary to convert inputs into intermediate and then into final products and are one of the most challenging issues the trading system has to deal with.

Unlike products, processes are not traded. As already mentioned, processes can be incorporated into the product (such as organic agriculture) or not

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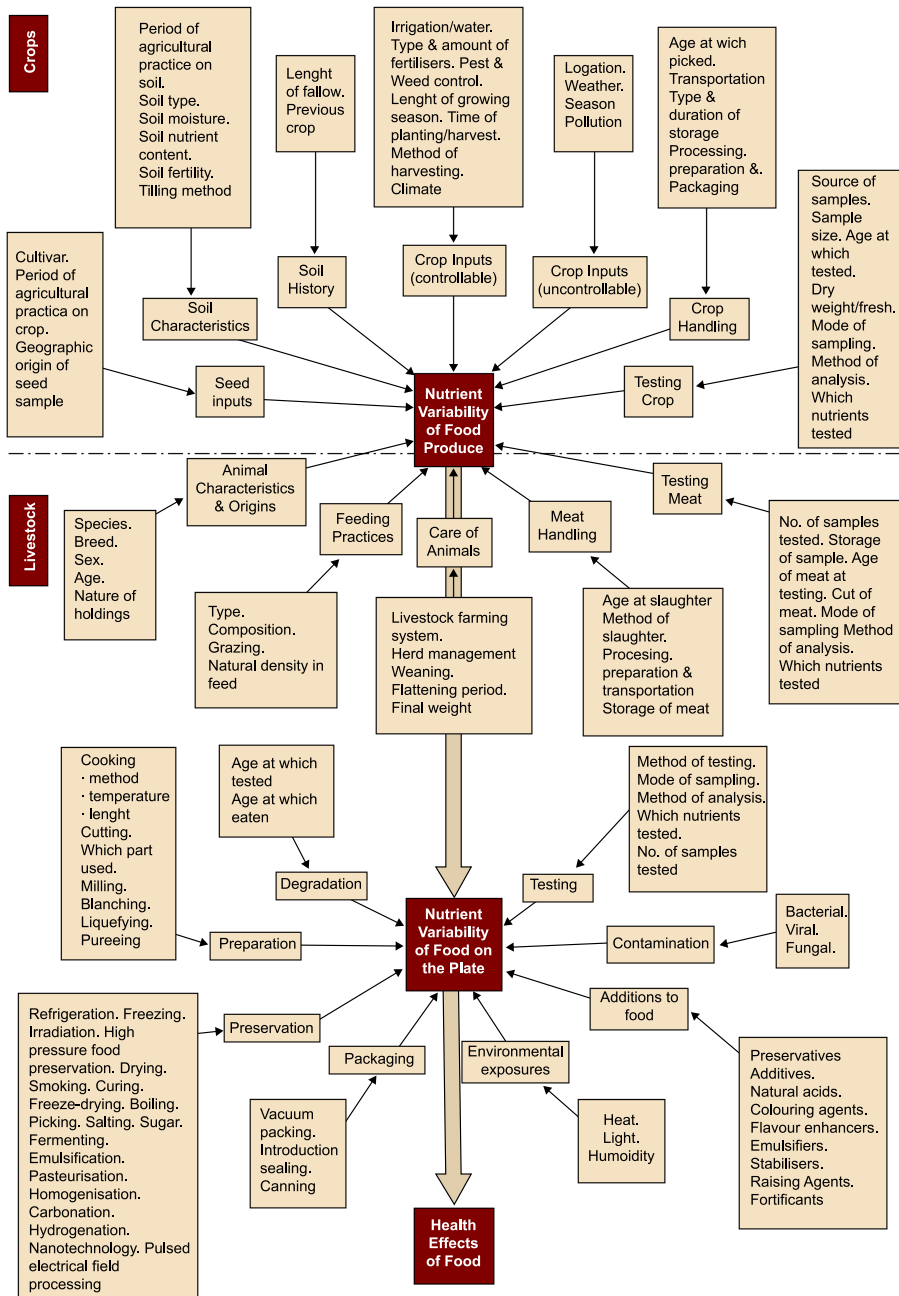
directly incorporated into the product (such as labour conditions under which the product was produced). The jury is out on whether some aspects, such as animal welfare standards are incorporated or non-incorporated into the product. We will cover production processes were relevant under standards and food safety regulations.

- **Food safety regulations** come in a form of product and process standards but given its importance, we will cover food safety separately in Module 5. Even based on science, some aspects of food safety can be rather subjective in nature: consider examples of oysters, raw milk, or consumption of raw meat. The *subjectivity* depends on the level of risk averseness across and within societies. Food safety regulations are aimed at matters causing rapid illness as well as those possibly causing illness in the longer run. A foodborne illness can have fast and severe consequences, while presence of harmful substances can lead to slower and possibly uncertain effects of exposure. Different populations exhibit different levels of sensitivity towards certain factors, with children, pregnant women, and the older population being the most vulnerable.
- **Labelling** informs consumers about the attributes of the product in case those attributes cannot be visually determined at the time of purchase. Labelling can be **mandatory** or **voluntary**. Government can require mandatory labels when it considers matters to be of utmost importance. Labels can also be **positive** or **negative**. Research indicates different consequences on purchasing decisions depending on the type of label. We will cover labelling under standards in Modules 3 and 4.
- **Packaging** requirements are in place to ensure the content is properly protected, shelf life is appropriate, and the good is safely delivered to the consumer. Some goods require refrigeration, others do not. Packaging is an area where standards compatibility is crucial to achieve economies of scale. Packaging standards also facilitate handling of products, such as palletization.
- **Inspections** are usually directed at processes, since those cannot be verified by consumers at the time of purchase. Among the most widespread are veterinary inspections to ensure animal health, inspections in slaughter houses, etc. Inspections can be done by the government but also by private entities.
- **Certification** is often combined with labelling and inspections. A label without a certificate or backing would be meaningless. Certification informs consumers about attributes he or she cannot verify at the time of purchase or even ever. Certificates can certify that the product is organic or that it was not produced using child labour. Other forms of certifications involve certifying that a product is kosher or hallal. Government controls,

reassurance through certification or industry claims are important for credence attributes.

- **Product testing** as part of oversight is often found on the domestic markets to ensure products comply with domestic regulations. Product testing and conformity assessment procedures are often in place to ensure imported products comply with domestic requirements. Exporters often consider this testing burdensome, and surveys (for example, those by the OECD) indicate that not product standards per se, but rather administrative and conformity assessment procedures combined with double testing burden exporters.
- **Traceability.** With increasing distance between producers and consumers combined with increased processing, traceability has become an important concept.

This part provides a review of food related regulations, many of which we will cover in detail in later parts.



Source: Caswell, Noelke, and Mojdzuska

