

**Labelling to corn fed cattle which influences right to health:
Freedom of choice for consumers**

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2012-2013

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Abstract

Modern food production performed intensive way to extract maximum outcome. Especially, meat production is combined with cultivation of feed crops thus its destructive influence is not just limited to animal welfare. Although there are many sectors, which ruin health and environment, this paper focused on the corn-feeding system in the meat production.

Fattening herbivore livestock with intensive grain deteriorates environment, animal welfare and human health. Indeed, modern meat production is fragile to defense epidemic disease. Mad cow disease and hormone fed cattle are the case outbreak recently in the modern meat production. Meat production is not safe from the GMOs controversial since it can be used for animal feed.

European Union and WTO have considered food safety problem which increasingly controversial. Newly introduced technology make future unpredictable thus decision making process became maze. Above all, introducing restriction measurement became carrying thin ice since it could be a breach of free-trade rule. Therefore, balanced perception between food safety and free trade can be found by case study concerning meat product in EU and WTO.

Although the government can make regulation in the meat production, without consumer's action, new regulation is hard to achieve. Therefore, corn-fed labelling can empower the consumer as a citizen who has a stake of health and ethical concern. Thus, this paper would search feasible labelling scheme to protect consumer's right.

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Acronyms

AB	Appellate Body
AGA	American Grass-fed Association
BLS	Beef Labelling Scheme
BSE	Bovine spongiform encephalopathy
CBD	Convention on Biological Diversity
EFSA	European Food Safety Authority
FAO	Food and Agriculture organization
GFL	General Food Law
GHG	Greenhouse Gas
nvCJD	new variant Creutzfeld-Jakob disease
SPS	Sanitary and Phytosanitary Measures
TBT	Technical barrier to trade
UNEP	United Nations Environment Program
USDA	U.S. Department of Agriculture

Labelling to corn fed cattle which influences right to health:

Freedom of choice for consumers

1. REASON

Since when, people could eat meat almost every day? Since when, people started feeding corn to livestock? Since when, animal suffered holocaust of the epidemic disease? Since when, meat product considered as a major factor of obesity? History of livestock farming almost traced to the Neolithic ear, but those questions raised recently. In other words, modern farming system innately have drawback. Some people changed their diet as vegetarian, and organic farming method developed to supplement concerns. However, not all peoples can stop eating meat. Also, organic farming leaned to the industrial market, thus it could not transfer to traditional farming. Above all, organic label is not satisfying consumer's desire of information because the definition of 'organic' is vague to the consumer.

The claim of this paper is 'labelling to corn-fed cattle' which demands precise information by labelling system. Current labels inform either side of production, positive or negative. For example, organic label informs positive meaning compare to other product, on the contrary GM(genetically modified) label offers warning information. Then, how other remained common product produced? Consumers have right to get proper information of all product. Therefore, the argument of this paper differentiate meat product by feeding system to fill the gap of the current labelling loophole. Corn is representative grain used for animal feed, and grain feeding system deteriorates environment, animal welfare and human health. This paper would researches on grain-feeding dispute, and as a further step labelling would introduce according to developed argument. Cattle represent beef production, but it does not deny other meat production such as pig and poultry.

1.1 Environment

Compare to traditional farming, modern ways generate environmental deterioration.

Traditional way of breeding animals was environmentally efficient compare to intensive monoculture in modern industry. Good quality land used for sowing crops, and the by-product of agriculture, such as dried grass and left crops used for animal feed. During the winter season, animals could remove some clovers in the land and pasturing gives land break time to recover richness. On the contrary, intensified farming method is less efficient than the traditional method when it includes total input and output. Energy input, especially oil is not reusable, and it generates substantial amounts of environmental waste.

Main problem of modern livestock system derived from ignorance of biological character of animals. Livestock categorized as two groups according to their natural digestive system. Cattle, sheep, horse and rabbits are born to feed grass. Among these herbivore group, cattle and sheep are specially grouped as ruminant animal. It means that their digesting process bring food back from the stomach to mouth, and chew it again. Second category is omnivore, such as pig and poultry. Omnivore can eat the same kind things like human. Although they evolved as herbivore or omnivore, modern intensive farming ignores their natural habit and feed animal concentrated cereals, such as soybean and corn. Intensive livestock pen supplies their feed from intensive monocultivation of animal feed crops. Those two modern systems lead serious environmental problem in water and soil. Statistics of greenhouse gas emitted by livestock farm is controversial. This paper will describe environmental problems by meat production.

1.1.1. Greenhouse Gas (GHG)

When the greenhouse gas (GHG) discussed concerning to the environment problems, the one of a controversial topic is livestock farming system. Cow and sheep, which categorized as ruminant animals emit more methane than mono-gastric animals, such as pigs and poultry.¹ Methane (CH₄) erosion during the process of digesting feed is a natural phenomenon to ruminant animals. According the report of the Food and Agriculture organization (FAO), GHG emission by the livestock system estimated

¹ (Garnett Tara pp.38-39)

around 18 per cent in the global level.

To diminish GHG emission physically, cutting off the meat consumption is crucial. Especially, pork and chicken is preferred than beef and lamb since ruminant animals emit methane gas for the digesting process. Indeed, curtail of meat diet and increase vegetable diet recommended it cannot be forced. Gastronomy constitutes cultural habit and history thus it is not negligible. Some culture composed table with meat diet rather than vegetable recipe. Above all, modern industrial society brought people higher income than traditional society; thus meat consumption increased following the speed of industrialization. Introducing westernized diet to newly developing society, such as Asian countries is the most significant phenomenon. It is expected that meat consumption would increase continuously in the future. In reality, curtail meat consumption has limitation; thus modern farming requires urgent change to sustainable method in order to reduce GHG emission.

Most problematic greenhouse gas concerned with animal farming is the methane gas that ruminant animal emit most. Compare to carbon dioxide, the methane in the air by ruminant animal is not significant amount, but because of its destructive effect, methane cannot be neglected the influential as one of GHG.² However discussion of the GHG by agriculture sector has focused too much on CH₄ emission and this focalized view makes cow as guilty animal. Indeed, wrong targeted calculation brought ironic argument, for example, when vegetarian criticize beef advocators, they adversely claim that methane gas emitted by vegetarian should be calculated together. To make accurate calculation, balance sheet of GHG effect by livestock should include not only emission by ruminant animal but also the farming method, since the CH₄ is not a unique GHG emitted by the animal farming.

Cultivating crops for animal feed is another main contributor of GHG problem.

² ". Methane is the second most important GHG, 21 times more potent than Carbon dioxide over 100 years. Its concentration in the atmosphere has increased from under 7000 parts per billion (ppb) before the industrial revolution to over 1700ppb today, but its relatively short life (12 to 15 years) make it an ideal target for climate change amelioration." (Young Richard pp.82)

Intensive livestock system feeds grains, such as soybean and corn. Cultivating feedstuff is essentially connected carbon dioxide (CO₂) and nitrous oxide (N₂O). Additional fuel, electricity, fertilizers and pesticides used for intensive agriculture, which is less used to the grass-fed cattle. To make same amounts of meat, cow need more feed compare to poultry and pig farming.³ On the perspective of energy consumption and GHG emission, it is undeniable that poultry and pig farming are more efficient than farming ruminant animal. However, the organic farming implemented essentially grazing cow and sheep. Therefore comparison between different species is infeasible, and debating efficiency cannot give excuses of destructive farming system. For the accurate measurement of the GHG impact by livestock, it needs to include total input and output of each manufacture, thus it enables comparing between different method and different species of farming. In other words, intensive beef production is suitable to compare with organic beef production, not with pig production. Although poultry and pig, mono-gastric animals do not emit methane like ruminant animals, their agriculture method converted intensive way to supply franchising supermarkets near the city. Therefore, comparing intensive method and organic method of poultry can explain precise result of GHG effect.

Depending on the animal feed, rearing system classified into pasturage (mainly grass-fed) and feedlot (or factory farm; mainly grain-fed). Since many factors intervene measurement of GHG effects, there are ceaseless controversial between two methods of rearing animal. American Meat Institute, who advocate grain fed beef in their fact sheet wrote that grain diet is easily digestible compare to grass diet to the cattle. Moreover, the paper declares that grain-fed cattle need less time to reach slaughter weights than grass-fed cattle. Additionally, grass-fed cattle require five acres of land, which require only 1.7 acre to grain fed cattle. The methane emission of individual animal, indeed grain-fed cattle emits less methane since grain has less cellulose than grass. On the contrary to this report, there is adverse measurement of the CH₄ emission that resulting

³ (Garnett Tara pp.38-39)

intensive farm emit more CH₄ than grazing ruminant animal in the grassland.⁴

Focusing on GHG emission of the system easily omitted to account environmental cost caused by modern. Overloaded agriculture for the animal feed results ground and water pollution, including GHG emission problem. When natural grassland converted to plough corps, land lost substantial amounts of CO₂ and nitrogen. Nitrogen flows to the water, thus water change it as N₂O and disperse in the atmosphere. The Centre for Ecology and Hydrology (CEH) has informed their annual report of Defra (Department for Environment, Food and Rural Affairs of United Kingdom) that UK converts grassland for continuing plough. As results, soil losses carbon average from 23 to 90 tons per hectare (84 to 330 tons CO₂) depending on the soil state. Scientists predict that annual losses of CO₂ will decline over 100-150 years, and the emission would become a low level. The other problem is N₂O which can affect global warming for a long period since it can persists in the atmosphere for over 100 years.⁵ Cultivating farm release N₂O faster than CO₂

Brazilian Amazon, which called lung of the world converted as a broad soybean production. The World Bank concluded in '*The International Assessment of Agricultural Knowledge, Science and Technology for Development Report*' that current industrial food production, especially mono-cultural production in Amazon is not sustainable.⁶ Industrial cattle rearing cause both explicit and implicit GHG emission by soybean farming. Additionally, GHG emission by transporting animal feed from China and Brazil cannot be ignored. Moreover, transnational corporations are supporting behind the mono-cultivation business, and they take away the land from local smallholder.⁷ Grain-feeding system is harmful for the environment, also injurious to the local economy.

GHG emission is not only an issue of the environmental problem caused by ruminant

⁴ (Johnson, D.E. and Johnson, K.A.pp.2483-2492)

⁵ (Melillo, 2009)

⁶ (World Bank and UN World Food Program, 2008)

⁷ (Nepstad et al, 2006; Fearnside and Hall-beyer, 2007)

animal farm. Intensive husbandry methods for livestock require a significant amount of cereal crop even in poultry and pig farming. The process of cultivating the crop damages environment since intensive farming uses vast land for animal feed, not for human. Also, intensive method ruins local environment where it operated. Every required resource exploited in this method. Indeed, large amounts of water used. Soil exploitation destroys surface, and a lot of wastes generate by intensive farming. Rotating farming, which is possible in organic method, is impossible in intensive method. Therefore, intensive method has no benefit of carbon storage and no excuse of environmental destruction.

On the contrary to modern methods, traditional livestock farming contributes positive role in surroundings since animal and ploughing crops use lands based on symbiosis system thus it generates less waste than modern method. First of all, gain meat and dairy product which contains rich nutrition, including energy, protein, iron, zinc, calcium, vitamin B12 and fat, is still main purpose. Secondly, animals provide not only food, but also leather and manure. Getting substitute of wool and leather inevitably needs much environmental cost. By-product of the animal, such as manure can improve soil quality, and it can substitute synthetic fertilizers.⁸

Certain area is not suitable to cultivate crops. For example, Welsh uplands and Mongolian steppes preferred to pasture animal rather than plough up plant. Moreover, rotating ploughing land with livestock pasture could give soil natural fertilizer. Rotating can avoid overload of the land, and it can give halt time to recover richness of the soil. Traditional method of animal rearing can avoid additional farming for feed crop, which generate substantial amounts of GHG emission.

Human activity of food production inevitably devastates environment. However, there are benefits breeding animals to get nutrition and by-product for human well-being. Also, livestock farming has performed over the centuries in human history. Although,

⁸ (Garnett Tara pp.40)

ruminant animal such as cattle and sheep naturally generate methane gas, it was not serious issue. The problem became grave in modern society, since farming method the pasturing changed as intensive way. Concerning the global warming, both animal and animal feed cultivation cannot avoid criticism. Thus, introducing sustainable method to modern farm is urgent assignment for the ecology.

1.1.2. Biodiversity

GHG is not only one problem of the environmental issues which caused by factory farm. Factory farm system leads air, water and soil pollution which ruins natural ecosystem. Biological diversity or biodiversity is the diversity of life such as plants, animal and even micro-organisms in the earth. Every species needs certain ecosystem to live and develop, but the modern meat production ruins ecosystem and threat biodiversity.

Modern industrial farming requires large quantities of cereals as animal feed. Mono-agriculture is a main reason of converting land from natural use, directly and indirectly. Direct way forwarded by colonization of new land. Indirect way happens by side-effect of colonization, and it pushes existing activities into new lands.⁹ For examples, soybean farming and cattle rearing cause deforestation in Brazilian Amazon. Deforestation happens directly by transnational corporation, which start their business in this cheap land. The inflow of new industry pushes local industries from where it existed.

Large portion of soybeans used for animal feed to produce meat product with cattle, pig, poultry and fish. One fifth of former rainforest changed as soybean farmland. Around three quarters of the feed requirement in Europe covered with cereal crops from South America.¹⁰ In the crisis of global warming, protecting Amazon rainforest became crucial issue. Moreover, Amazon is the vast natural habitat for numerous species, include unknown species in academy. Habitat modification is the prime factor of the

⁹ (Garnet Tara pp.42-44)

¹⁰ (Gura Susanne pp.58)

spices extermination.¹¹

Amazon is not only one threatened place of its natural environment. The industrial livestock farming destroyed ecosystem of the Northern Gulf of Mexico and Mississippi River basin. According to the FAO, coastal water in the United States polluted by nitrogen which cause low oxygen levels in the water. As a result, in 2001, fish and shrimps could not survive more than 20,000km² of coastal area. Industrial livestock system was the leading contributor of this pollution.¹² Major cities sited along the coastal area of South China Sea, which shared with China, Vietnam and Thailand. In this place, pig and poultry operation clustered together and it results nutrient pollution of the sea.

Intensive farming threatens biodiversity of wildlife by ruining their natural habitat, but also artificial technology used in animal farming unifies genetic diversity. Most of the countries converted farming method into industrial way, which supported by transnational corporations. According to the Gura's statistics, three quarters of the chickens in the world, two thirds of all milk, half of the eggs and one third of the pigs bred in industrial method. Traditional farmland, which breeds national spices of livestock, rarely performed. Above all, these animals are genetically similar since biotechnology selects only productive animals.

Intensive method performed mainly to the animal, such as cattle, pig and poultry. Their genetic pool became exceptionally narrow compare to other animals. Fast growing cattle species are selected to get beef easily. Cattle which can produce large amounts of milk preferred. Selective breeding also existed in the traditional method but not artificial way. However modern intensive farming systemically selects animal species by new technology; thus it results exceptional uniformity of the species. Artificial fertilization became convenient to produce only efficient animal offspring. Nowadays, significantly

¹¹ "The most significant threat by far to the world's 5,500 mammal species is habitat loss, with 2,000 (40%) species being negatively impacted. Globally over 4,000 of the assessed plant and animal species are threatened by agricultural intensification." (IUCN 2008)

¹² (Stenfeld et al, 2006)

progressed biotechnology allowed until the genetic modification of animals.

Behind the industrialized livestock chain, enormous multinational corporations dominate biotechnology, and limit farmer's choice, which accelerate unification of animal species. For example, hybrid poultry lines are operated by the four global activities (Erich Wesjohann Goup, Hendrix Genetics, Groupe Grimaud and Tyson). These groups monopolize the gene of the poultry.¹³ Their market influence extended to Asia, Latin America and up to African countries. The World Development Report 2008 censured that the agricultural transnational corporations which operate in developing countries, distorted local market by their excessive power.

Genetically uniformed animals risk environment, human health and animal welfare. New gene (Genetically modified; GM) introduced to livestock can transfer to wildlife. Above all, genetically uniformed animals are fragile to combat with a new form of disease, and they can spread the disease to wildlife. Human is not free from infectious animal disease. HIV, chicken and pig viruses and mad cow disease are examples, and the risk still exists. Center for Food Safety researched that many GM animals act abnormally, and *in vitro* culture cause high stress to the animal. Consequently, in the animal welfare context, genetic engineering is hazardous.

Compare to the modern system, which is weak at animal disease, local breeding method has many benefits. Local farmers also select strong species, which can cope with harsh nature, and this is not an artificial method. Local animals survive from the local environment, such as heat, disease and water shortage. They can transmit their own character to offspring. The International Union for Conservation of Nature (IUCN) emphasize importance of pasturing livestock to protect biodiversity at grassland.¹⁴

1.1.3. Food Crisis

¹³ "EW Group provides 68 per cent of world demand for white egg layer; Hendrix genetics caters for around 60 per cent of brown egg layer genetics." (Gura Susanne pp.68)

¹⁴ "More eco-agricultural cropping systems and sustainable meat production could have immediate positive effects on both biodiversity and water resource management."(CBD,2008)

FAO researched statistical change of the human diet since 1964 until 2030 which includes future estimation. In this research, meat consumption increased along the population growth and income rise. This research also indicates that almost 50% of calories human intake is cereals (including wheat, rice and maize). FAO report estimates that over a third of world crops consumed for animal feed. According to the Environmental Food Crisis report, conducted by the United Nations Environment Program (UNEP), the meat production demand world's cereals nearly half amount for animal feed. In conclusion, meat and dietary production influences cereal demand hence it affects global food consumption.

Getting protein and calories by feeding cereal to cattle is inefficient compare to consume cereal directly as food. Around 3kg of grain and 16,000litres of virtual water requires to produce 1kg of meat. With calories perspective, cereals used for animal feed can cover about 4.34 billion people.¹⁵ Above all, when GHG emissions and other environmental pollutions occur by intensive agriculture, deficit of modern meat production is unsuccessful.

Intensive agriculture exploits land by growing crops over and over without pause. Therefore, fertilizer and pesticide are indispensable to harvest similar amount like before. These temporary expedients result desertification, soil erosion, degradation, coastal flooding and reduce of actual productivity. Mono-cultivation unifies plants species since selected crop seed, or GM seed used in farmland. Likewise, unified livestock, these crops are fragile to crops disease. Productivity decrease significantly because of irregular climate change, flood and droughts.

Using cereal as animal feed should be reduced in order to achieve food energy efficiency. Inefficiently consumed food cannot prevent future food crisis; thus it could lead famine in the world. Environmental damage is unavoidable in agricultural activity, but food policy need to change less damaging way for biodiversity and environment.

¹⁵ (FAO,2006 and Chapagain and Hoekstra 2008)

1.1.4. Conclusion

Modern industrial society enables general income increase, and alongside this phenomenon accessibility of meat product became easier. Intensive livestock system developed to fit with increasing demand of the city. Therefore producing “cheap meat:” became possible to contribute supermarket and franchising food industries. On the report of future perspective, meat and dairy food consumption would increase consistently.

Lowered market price of meat product became accessible to public, but the price hide substantial environmental cost. Environmental damage leaded by animal pen and intensive agriculture for animal feed. Greenhouse gases are unavoidable problems of the breeding ruminant animals. Comparing amount of GHG emission between intensive cattle pen and pasturing cattle pen is controversial issues. However the GHG released by cultivating feed crops and appended water and soil pollution is incomparable. It is certain that grazing animal is sustainable farming method for the environment.

Intensive farming risks biodiversity of the wild species because land modification deprives wild habitats. Biodiversity within livestock is in danger because productive species only selected artificial way. Uniformity of species spread to crops broadly and quickly. While modern food system seems to supply much food than traditional methods, but it is fragile because of uniformity of the gene pool and consistent environmental damage. Consequently, modern agricultural system menace human with the food crisis in the future.

1.2. Animal welfare

Urbanization and industrialization increased total meat consumption. To supply more meat and milk in the cities, animal pen became more crowded than traditional pasture land. Animal has not enough time to enjoy sunlights, above all they are fed unnatural

feed indigestible. In the perspective of the animals' rights defenders, animal factory cage has no welfare. Not only activists but also consumers are interested in animal welfare level because it can affect human health. Therefore, modern farming should re-examine the perspective of animal welfare.

1.2.1. Beef cattle

Beef cattle produced in intensive farm, but the level of intensity could be different. One extreme case of intensity records that around 8,000 cows bred or confined in tiny areas; movement is almost impossible, and this place purposed to build fat and muscle in a short period. Prime beef, which produced relatively large space, considered holding beef market around 15%~20%. Organic beef market is only 0.4~0.5% scale.¹⁶

Cow is herbivore; thus grass-based diet is natural for their digestive system. Cereals concentrated with rolled barley, soybean and corn are unusual diet for the cattle, but it widely fed in feedlot system. Cereal feed make cattle grow fast thus it needs 14 months to reach slaughter age. Organic and prime beef reared by grass-based diet slaughtered between 21 and 24 months. The problem of the high-cereal based feed is that the cattle suffers indigestion problem since cereal cause overflow of acid in their gut. Antibiotics also keep fed intensively, since infectious disease is uncontrollable.¹⁷ Additional medicines are prerequisite to feedlot animal for helping digestion and for save feed price by less feeding.

According the research of the Bristol University, natural cow is social animals, thus they make a bond around 2 to 4 animals. There are researches demonstrate strong bond between heifer and calf. They also can interact with human. Animal experts found that cows prefer open and wide space where allow them to express their natural behaviour.

¹⁶ (Cross Sue pp.56)

¹⁷ "After gradual phasing out their use ended throughout the EU on 31 December 2005 not because they had a detrimental effect on the animals but as a safeguard against antibiotics resistance in humans."(Cross Sue pp.58)

However, modern intensive method ignores welfare of cow. Densely stocked cage makes them hardly move. Calves bred separately from their mother at early ages. Milk cow need to produce milk ceaselessly, thus artificial insemination used to make them pregnant. Furthermore, the new born calves separated from their mother cows within 48 hours. Inappropriate feed and stressful environment are the factors which make animal disease uncontrollable. Thus, inoculation and antibiotics are essential to prevent epidemic disease.

Organic beef cattle reared at pasture and fed organic feed. However they also went to feedlot system before slaughtered. During the winter season, cows reared at the inner pen but still have more space than factory farming. Silage made with grass and legumes substitutes grass during the winter. Organic farming let the calves stay with mother at least until 6 months old.

1.2.2. Pork

Factory farming applied to pigs neglects their natural character. Among the farm animal, the most intelligent and sociable animal are pigs. In wild, they make family bond and spend most of time in the soil for rooting. As an omnivore, pigs eat various things such as vegetable, egg, insect and even small hunt animals. However, factory farming fed pig concentrated feed with soybean and cereal. Fishmeal and fish oil mixed into feed, to fill nutrition which lack in the cereal feed, but fish oil is banned since the BSE-Mad Cow Disease-broke out. Feather meal, which made with the left-over of slaughtered poultry, is still allowed for pig feed. Antibiotics and inoculation are indispensable for pigs in factory pen. Researchers realized that the pigs bred out-door are less aggressive than pigs in the pen.¹⁸ Nutrition is enough for both natural feed and industrial feed. The industrial feed is just lack of fibre which can cause constant hunger to pig. Lack of fibre makes pig eat constantly, and the cage has no room to exercise.¹⁹ As a result, factory pig pen can produce fatty pork in short times.

¹⁸ (Idem.pp.157)

¹⁹ (Idem.pp.155)

1.2.3. Poultry

Chickens are active, and they naturally spend most of their time for foraging and exploring. However mechanized rearing system not allows chickens to enjoy their natural behaviour. Conveyor belt automatically bring feed, and water topped up in the cage. Cage is too small to stretch their wing, and artificial lights turned off only 4 hours a day. Keeping light for a long time confuses broiler chicken's bio-rhythm, thus makes them consistently eat feed. Industrial chickens fed cheap ingredients such as soybean and cereal. It can make chicken grow fast, and unnatural sleeping cycle gives stress. As a result, immune system became weak, and antibiotics require to prevent disease. Also, stressed broilers peck each other and pecking is abnormal behaviour to chicks. To prevent injury, farmers trim the beak of young chicks between 1 and 7 days.

UK Assured Chicken production certifies "free-range" chicken which reared according to the regulation conditions. However "free-range" divided into three categories, basic free-range, traditional free-range and free-range total freedom. Although free-range offered more space to broilers, it does not change basic foundation of intensive farming method. Chicks can have more access to outdoor, but their cereal-based diet and flock numbers in shed are almost similar with intensive farming. Thus, this naming can confuse consumer "free-range" as naturally reared broiler. "Traditional free-range" gives more space to chicks than basic standard, and "free-range total freedom" gives unlimited space but rarely performed.²⁰

1.2.4. Conclusion

To integrate, the character of factory livestock cannot express their natural behaviour and live in poor condition. Tiny cages offer not enough space²¹ and their feed are

²⁰ (Idem.pp.122~123)

²¹ "Broilers reared in groups of many thousands in tightly packed cages can have as little space as 450-500cm² per bird. That is a square with a side as small as 21 cm, providing just enough room to stand." (Vaclav Smil, pp599-639)

almost same which based on concentrated cereal. This form adjusts every livestock without concern of different species and different character. Among livestock, poultry industry is the most excessive intensity. As a result, heightened stress is common, and animals are fragile in front of infectious disease. Epizootics mean epidemic disease often broke out to livestock. Recently, epizootics, such as bird flu became chronic event in Western Europe and East Asia. Most fatal disease is BSE-mad cow disease-caused by feeding waste of animal slaughter to herbivorous species.

Economic benefit ignored discussion of animal welfare, but recently, awareness of animal welfare increased. Veterinary and agricultural institute found that animal welfare interlinked with human health. Thus, sustainable animal farming is getting attention. As one of sustainable farming activity, organic farming considered most as existing sustainable method both for environmental and animal welfare. Organic farmed animals are not free from animal disease, but they have better resistance. Therefore, animal welfare adds one more reason of necessity why intensive modern farming should reform.

1.3. Human health

The World Cancer Research Fund (WCRF) analyzed that high rate of red meat consumption have more risk of bowel cancer rather than eating white meat. Also, scientists accepted that saturated fat of red meat increasing risk of heart disease. Obesity caused mainly by high level of fatty diet, and one contributing reason considered increasing rate of meat consumption. Therefore cutting off the total meat consumption is crucial for health benefit. However, high meat consumption is not exactly explains health problem, since nomadic tribe such as Mongolian kept eating meat-based diets for a long time. Therefore, the reason of meat diet became unhealthy food exists in modern food system. Feedlots over fed livestock concentrated-cereal which is unnatural for herbivore animal and it make them grow fast. Animal feed construct their fat and muscle tissues, thus people who eat those meat also influenced with this system.

Quality of animal feed reflects decisively to animal's health, and it implicated to human

health. Intensive feedlot nourishes livestock with concentrated cereal and maize diet which contains fibre only 13%.²² According to the scientific reviews, grass-fed cattle have shown lower level of total fat than grain-fed (corn and soybean) cattle. Also, fat of grass-fed beef is positive for human health. Grass-fed beef contains higher rate of positive fat, or stearic acid, which is saturated-fat and not influence to rise of blood cholesterol levels. Grass-fed meat contains lower rate of negative fat, which increase cholesterol rate (e.g. palmitic acid, lauric acid and myristic acid), than grain-fed cattle.²³ Also, grass-fed cattle had shown 11 times high level of omega-3 compare to grain-fed cattle.²⁴ According to the science research, omega-3 polyunsaturated-fats operate to protect against disease and cancer in human's body.²⁵

Animal feed implication to human health is not limited phenomenon to beef. Institute of Brain Chemistry and Human Nutrition in London found that modern chicken tissue composed with more than half of fat, while 60 years ago majority nutrition were protein. As like beef, farmed broilers have quite unbalanced rate of omega-6 and omega-3 fatty acid, which means those chicken meats are highly unhealthy for human diet. The WCRF approved that wild animals have different fat composition compare to farmed animal. Farmed animal contains little amount of omega-3 fatty acid and docosahexaenoic acid (DHA) which can find in wild animal. Organic farming recognized that they could produce meat which consist similar fat profile with wild animal.

Since human are in the top of the food chain, meat diet represent what they fed with accumulated fat structure, and this influences human health directly and indirectly.

²² "Ruminants have a requirement for fibre to maintain rumen function and health. Low dietary fibre can have negative effects on rumination, rumen pH, milk fat concentration and hoof health." (Kleen, J.L., Hooijer, G.A., Rehage, J. and Noordhuizen, J.P. pp406-414)

²³ (Young Richard, pp.90-91)

²⁴ "Ruminants are generally supplied with unsaturated fatty acids (UFA) from the forage portion of their diet and it has been well documented that animals consuming fresh pasture will have a higher content of UFA in their milk or meat than those receiving a cereal-based concentrate diet. Grass is a good source of omega-3 polyunsaturated fatty acid although there can be variation due to maturity and variety." (Woods b. Vanessa, Fearon M. Anna.2009)

²⁵ "Dietary intake of unsaturated fatty acids (UFA) has been shown to reduce risk of cardiovascular disease (CVD) and possibly the incidence of some cancers, asthma and diabetes among other conditions." (Woods b. Vanessa, Fearon M. Anna.2009)

Medical scientists and veterinary highlighted unhealthy fat of meat diet causes obesity related disease. In the context of high obesity rate and increasing medical expenses, tracing problem of modern animal breeding system became crucial.

1.4. Consumer

Modern livestock system is damaging environment and is degrading animal welfare. This aspect also interlinked with human health and food safety. In other words, modern meat production is not sustainable both social and environmental aspect. Continuing present mode of production is questionable because it is not sustainable. As a result of present activity, future generation would be limited to enjoy benefits of development and natural resources. However, modern system enlarged choice in the market. Consumer's action is a 'vote' to society, thus consumer, or citizen has responsibility of sustainable consumption. Labelling to corn-fed cattle has value since the choice left to consumer.

1.4.1. Food governance

There is no doubt that the consumer has positive and unconditional rights to get safe food from the producer. Since the consumer is the unconditional rights holder, producer has unconditional duty to provide safe food, or zero-risk product. Furthermore, duty of producer implied to providing proper information for the food safety. The relation between consumers and producers operate based by liberal-democratic society. Regulators (or government) manage the unbalanced power between these two groups and respect the consumer's right whose power is comparatively weak than corporation.²⁶ Thus, government secures food safety by regulating food producing process by company. Also, government asks producer to offer proper information in the public.

However, globalization of the food market increased uncertainty. This phenomenon

²⁶ (Beekman Volkert pp.64-66)

reduced authority of nation-state as food governance because the producer's action over the border cannot be controlled efficiently. Finance capital and trade increased the physical size of the food market. Long distance of supply chain blurs traceability of food contamination. Moreover, technology used in food production requires specialized experts who can decode information. Another reason for weakening national government as food governance is that supranational organizations, such as the European Food Safety Authority and the WTO restrict the sovereignty of nation-state to governing the food market.²⁷ Also, non-governmental organizations and local actors are challenging present food policy.

Therefore, national government is not sufficient to regulate the contemporary food chain. Once a modern food crisis outbreak, such as the BSE crisis and animal epidemic disease, it has lethal damage to animals and humans. Also, it became difficult to put preventative policy because of increasing unpredictability of the system. In the context of conventional food crisis, non-state based activities increased to respond to public concern of social and environmental effects, caused by food. Non-state practice is efficient and innovative. Their activities are expected to supplement the loopholes of official regulation in the food industry. The examples of non-state actors are the social groups of NGOs, consumers, farmers and retailers etc. They engage in political issues and attend decision-making processes of government. The examples of their successful outcomes are private certification and labels to encourage growth of the organic and fair-trade markets.²⁸ Since certification and label schemes are not synthesized, these can mislead consumers. However, it is sure that their actions distribute responsibility to producers, retailers, consumers and civil society.

1.4.2. Consumers' rights as citizens

Consumer is a key stakeholder since their interests affect the company's decision and activity. Social demand for ethical production and sustainable goods is reflected

²⁷ (Oosterveer Peter, pp.23-35)

²⁸ (Idem. pp.25-32)

consumer's choice both directly and indirectly.²⁹ Thus, consumers can express their social concern by choosing ethical and environmental friendly product. As a result, consumer activism affects public debate thus their action transforms as ethical enforcement to the market.³⁰ Consumer's choice performs as a 'vote' with their money and it is participating sustainable development. Consumer's choice based on individual willingness, thus individual consumer considered as individual participation in society. In conclusion, consumer's behaviour contains citizen's responsibility in the liberal democracies.

Offering correct information to the consumer is crucial to ensure that consumer's choice can act as democratic decision, especially in the food market. Food consumption deeply related with morality issue, such as biodiversity, animal welfare and health. Choosing properly produced food has a health benefit, additionally with social and environmental benefit. However, the principle of consumer's rights,³¹ particularly right to information is limited, thus consumers cannot exercise their power lose citizen's power in the market. Globalization increased complexity of business. Transnational corporations armed with substantial amounts of financial capital thus individual cannot easily access to the information. Above all, proliferation of labels weighted complexity but lowered confidence of its policy. Consumer's action became meaningless in front of misleading information. Also, individual loses motivation in front of elephantine environmental issues, such as greenhouse gas problem which seems that individual act cannot change situation.³²

To encourage consumption of sustainable product, it needs to increase the awareness of citizenship. Consumer's identity as a citizen could help turning into sustainable consumption, not only activist consumer but until the non-active consumers. Thus, their

²⁹ (Wilhelmasson, Thomas pp.46)

³⁰ (Idem. pp46-52)

³¹“(i)The right to information, (ii)The right to choose, (iii)The right to protect of health and safety, (iv)The right to good bargains, (v)the right to count on business liability, and (vi)the right to be heard (Consumer participation)”(Idem pp.50)

³²(Frasell, Nadine and Scherer-Haynes, Isabelle pp.187-192)

choice not limited as an action but became a habit. Also, citizenship based consumerism can alter the one-sided action to collective public action.

Citizenship can improve sustainable consumption. However, without explaining exact benefit from sustainable consumption in the food industry, it is difficult to expect citizenship consumerism. In other words, convincing consumer is a priority issue to expect consumer practice as a citizen. Non-superficial food values³³ such as animal welfare and environmental friendly are closely related with food producing process. Therefore, producers need to verify transparent of their process. Thus, product can increase trustworthiness and responsibility of their product. As one of consumer's rights, traceability of food enables the consumer to access proper information. These information can explain consumers that their choice is reasonable.

1.4.3. Consumer's motivation of choose organic food

Number of surveys conducted to research consumer's choice of both organic product and non-organic product. The reports stated that the consumer's decision based on concerns related to health and animal welfare.³⁴ For examples, people who choose free-range eggs, do not always consider the standard of animal welfare, but they worry intensive farming method which affect health. They recognized intensively farmed animal not healthy thus they willing to pay much money for animal friendly food.

Consumers perceive organic food as non-chemical used, not intensively bred and fed more natural feed.³⁵ Other reasons to choose organic food is for better taste and to be free from the food crisis such as GM food and animal disease. Protecting natural environments and other ethical issue are additional reason for the consumers. The priority concern for the consumer's decision is health rather than 'ethical consumption'

³³ "Non-superficial value is concerns about impacts on public and personal health; genetic modification; animal welfare; the natural environment; international justice; and preservation of regional foods."(Beekman Volkert,pp67)

³⁴ (Harper, Gemma C and Makatouni, Aikaterini pp.287-289)

³⁵ (Idem. pp.289)

which is additional reasons for choosing organic food.

According to the survey, not only those people who buy organic egg and free-range egg, but also non-organic buyers perceive link between health and animal welfare.³⁶ Participants thought that animal welfare, such as feed quality and pen condition decide food quality.³⁷ It demonstrates that consumers want healthy food. However, the biggest barrier of sustainable consumption, even to organic buyers, is untrustworthy information, which provided by the government and current food industry. For example, standard of 'free range egg' decided by several criteria but satisfying those criteria does not give any guarantee that free-range egg does not rear intensive method. Criteria make loophole of the regulation, and cases escape through loophole drop consumer's belief on food.

Consumer's priority concern is health, and producing healthy product benefits human health, animal welfare, environment, and nutrition.³⁸ In addition, necessity of ethical consumption gives enough reason of shifting consumption to sustainable product or organic food. Although lots of information offered to public, food safety issue accelerated distrust even in the organic market. Therefore, building trust in the food market is priority assignment to change the consumer's choice.

In modern business market, consumer is responsible actor in the liberal-democratic society. Therefore, empowered consumerism could have equal authority with other actors in the market. First of all, consumers need to understand their identification of citizen, as a decision-making power. Understanding the benefit of ethical consumption related with food production is essential to encourage consumer's responsibility. Thus,

³⁶ (Idem. pp.294-298)

³⁷ Interview of organic buyer, Tracy "You are what you eat.. happy animals produce healthy products.", Interview of non-organic buyer, Anne "So even if we buy free range eggs I am not sure what the hens has been eaten, I just know that they had a nice life, being chickens. And being able to do what they want, whenever they want." (Idem. pp.295)

³⁸ "From consumer's point of view, three major potential benefit areas are associated with grass-fed beef: health and nutrition, animal welfare, and ecosystem friendly farming practices"(Duckett 1993, Morrow-Tesch 2000, Horrigan 1999)

consumers can express their interests both collective way and individual way. As a result, their voice can have monitor power in the market as food governance.

1.4.4. Regulator of food production

Although producers launch the corporate social responsibility (CSR) as self-regulatory, inner regulation has limitation to monitor corporations since they are groups pursuing financial interests. Corporations' priority choice is economic benefits rather than moral values. Therefore, government takes position to intermediate power between consumers and corporation. National and global institutions are the duty holder to safeguard consumer's choice. The key barrier shifting sustainable consumerism is distrust of the common food system. Building trust and guarantee food security are the immediate assignment for the institutions. National government has regulated food safety by legal institutions. However, globalization of the food market decreased responsibility of both government and corporation since environment deterioration is difficult to trace its origin. Both economic and environmental issue enlarged geographical boundary which cannot solve by a nation state. Thus, international institutions govern global policy, but it can conflict with national policy. For example, nation-state can prohibit certain product for health reason, but the WTO can consider this regulation as protectionism. Therefore, nation state requires innovative action to harmonize food governance between private actor and international regulator.³⁹

Since European Union achieved to integrate European market, food market became the most competitive trading part. Thus, ensuring food safety among member-state became crucial to the European Union. Although international governance developed regulations, the system has lack transparency and weak at risk management. The EU could not prevent the BSE crisis, as well as other food crisis, such as dioxin in poultry and Foot and Mouth Disease (FMD), which consistently happens. In 2002, European Union established to restore consumer's confidence on food. However the highest

³⁹ (Oosterveer Peter,pp63-69)

authority and decision-making power still concentrated in European Commission. EU tried to respond food safety issue, but proliferated, inefficient sub-bodies were not enough to restore consumer's belief. The current challenges of the EU food safety policy are achieving efficiency of the system and involving consumer in the decision making process.⁴⁰

1.4.5. Conclusion

Consumer has responsibility in their individual choice as a citizen. Fortunately they are willing to pay healthier product whether they can connect healthy product with ethical consumerism. However, current food safety policies both nation level and international level failed to construct consumer confidence. Policy makers overlooked consumer's role in the food market and they excluded consumers from policy making process. Both international and national government require interaction mechanism with consumer in their food governance to achieve food safety in the context of globalized food flows.

1.5. Integrated close

To conclude the first section, main problem of modern stock farming led grain feeding system. This system organized to maximize output of the system. Grain-centralized feed introduced to livestock farm because direct input price is cheap, and it is efficient to fattening animal. Mono-cultivation for animal feed induced environmental destruction by emitting greenhouse gas, ruining biodiversity. This system indeed threatens the animal welfare standard. Industrial farming system optimized spend minimum price thus it offers not only unnatural feed but also space impossible to move. It is undeniable that the meat come from intensive system is not healthy for human health.

In the context of industrial market, consumer plays essential roles as a citizen. Citizenship explains why consumers require alter ethical consumption. Also, social demand to convert sustainable farming paralleled its direction with organic food

⁴⁰ (Idem. pp65-69)

demand for health purpose. Especially animal feed chain explains current farming problems interconnect with environment, animal welfare, human health and ethical consumerism. However, to realize consumers' right in practice, product information should be fully disclosed. Whether the consumer knows ethical problems of current meat production or not, their priority concern of health paralleled direction with ethical consumption. Therefore, accurate labelling to meat product could empower the consumer, and their action expected to change modern stock farming.

2. APPLICATION

2.1. Precautionary principle

'Corn-fed' label devised to give consumers information of the product, at the same time, it contains messages of potential effect on health, such as fat or sugar label. Environmental and animal welfare are accompanied messages in the label. The main role of the public health is preventing disease and promoting health in public.⁴¹ Public health practice embraces the precautionary principle⁴² as a heart concept. Although health problem derived individual habit and genetic character, industrialized and globalized society increasingly influences individual health condition. Above all, cause-and-effect relationships are not fully identified in modern society. According to the general comment of the International Covenant on Economic, Social and Cultural Rights, "The right to health, like all human rights, imposes three types or levels of obligations on State parties; the obligations to respect, to protect and to fulfil".⁴³ All these conditions make ground of applying the precautionary measurement in the public health policy. Therefore, preventative measure without clear scientific evidence should be taken in the public health practice.

⁴¹ (Neil Pearce pp.49)

⁴² "The right to health protection is, amongst economic, social and cultural rights, connected with environmental protection and application of the precautionary principle most closely" (Veinla, Hannes. pp.95)

⁴³ E/C.12/2000/4, CESCR Comment 33.(11 August 2000)

European Union formulated a legal definition of the precautionary principle in the Regulation No 178/2002 which established the European Food Safety Authority, and it states risk procedures in matters of food safety.⁴⁴(In other words, General Food Law; GFL or the Regulation) This is the first time that the precautionary principle defined as a legal principle at the EU law. This principle, firstly developed in the environmental law, started to apply on health safety issue which became increasingly crucial combined with the food safety. For example, the bovine spongiform encephalopathy (BSE) outbreak in the UK failed to prevent the risk. Although, hormone treated beef was food safety issue, preventative policy increased tension between the US and the European Union. Therefore, the precautionary principle became increasingly prominent for the food safety policy as one of risk management. Precautionary principle, in other words 'looking before you leap'⁴⁵, is preventive measurement when the input price is cheaper than the remedy price when actual risk happened. Nowadays scientific measure cannot expect future cost exactly. When the mad cow disease outbreaks in the UK for the first time, scientist could not figure out lethal effect of this disease to the human. As a result, policy makers depend on scientific analysis, and they could not prepared preventative policy. Since there was not enough measurement, spreading new variant Creutzfeldt-Jakob disease (nvCJD) which infected from the BSE disease could not expected thus government lost control. Another current example requires risk management with the precautionary principle in the global warming sector which has scientific controversial. Thus, corn-fed cattle had ground of adjusting precautionary principle both public health perspective and environment perspective.

Since the precautionary principle considers the future perspective, interpretation of the concept is not yet coherent. Lack of clear definition enables various ways of interpretation possible, and this is the main critical point of this principle. This principle established specific legal definition in the food safety area with cases, and the case connected with meat product. To analyze the possibility of applying this principle in the 'corn-fed' label, interpretation of the principle can be found within the context of

⁴⁴ Official Journal of European Communities.2002,L31/1

⁴⁵ (Gollier Christian pp.301-303)

General Food Law(GFL).⁴⁶ Tracing the legal framework by case study helps understand this principle for the future application at the food policy.

2.2. Case study of risk policy at BSE crisis

BSE, or 'mad cow disease' was health crisis happened to cattle and infected to human which started at UK and dispersed in European country between 1985 and 2000. This case study would explain the problem of modern industrial food system and deficiency of risk policy by nation-state and European Union.

2.2.1. History of the BSE

The first case of the BSE, dead cow which suffered neurological disorder, recorded in 1985 by the Central Veterinary Laboratory.⁴⁷ Cattle, evolved as herbivore, were feeding processed meat and born meal to provide protein in their feed. Feeding leftovers of the slaughtered animal rationalized to producers because it is technically cheap method and it has benefits of reducing waste. The UK government conducted scientific research through the Ministry of Agriculture, Fisheries and Food (MAFF)⁴⁸ and took initial measurement. First of all, the UK government ban to use leftover of slaughtered meat as cattle feed because it considered as main reason of BSE infection.⁴⁹

Although, public feared the possibility of spread the disease to human, the official government maintained the position and addressed that the UK beef is safe. In May 1990, the case, disease transmitted to cat, eroded the public confidence in the government. First case of vCJD occurred in 1992, but the government officials reiterated that there is no evidence to relate between BSE and vCJD. Since the scientist and official government keep ignored the risk of spread disease to human, first admit of

⁴⁶ (Szajkowska Anna pp.173-174)

⁴⁷ (Wells et al.1987)

⁴⁸ (Beck, Matthias et al. pp.400)

⁴⁹ (Oosterveer Peter, pp.83)

the 'probable link'⁵⁰ in 1995 was shocking to the consumers. As a result, the beef consumption rapidly decreased all over the European countries.

The UK policy of the BSE case took different steps according to dividend period. During the first crisis period between 1985 and 1996, the government policy focused on keeping public confidence of the food safety and protecting agricultural industry. The government measure was highly symbolic method to offer messages to the consumer, 'UK beef is safe'. For example, Agricultural Minister's 4-years daughter was eating beef in front of the camera in May 1990. One considerable report from the Southwood recommended that bovine offal should be excluded from the baby food. This report is ironic because they confirmed that offal is harmful but only to baby and ignored harmful effect to all grownups. Each minister offices divided their responsibility precisely. Thus, synthesized problem like the BSE crisis could not be controlled by any office because it was not their duty. The BES crisis was synthesized problem interrelated with economic, agriculture and scientific offices thus it could not be solved without communication and sharing the responsibility. When the BSE spread around the UK, agricultural ministry could not handle the uncertainty, and UK government was unable to respond risk management.

In 1996, government admits the fact that the disease can transmit to human, and the situation changed dramatically. Until the government announced admission, during almost 8 years, they kept opinion that British beef is safe. Thus, consumer's confidence of food and government dropped rapidly. Government changed their opinion and started to trace failure factor of the former policy of the BSE case. Also, urgent assignment was restoring trust of consumers. The final report of the Commission analyses failure factor from divided government department which blocking circulation of the communication. Clearly divided responsibility between scientist and government office result no department command problem. The BSE case that scientific uncertainty prevails explains problem why traditional bureaucracy system failed. Scientists avoided giving clear opinion and left decision making power to the Commission. On the other hand,

⁵⁰ (Idem. pp.83)

Commission ignored seriousness of mad cow disease according to the positive scientific opinion, and breaking economic stability was expensive for the future 'nothing would happen'. Each department offices avoided their task and transferred their responsibility to other office. In 2001, the UK government explicitly announced the necessity of operating precautionary principle when the scientific uncertainty remains. Purpose of the precautionary principle is not only to prevent future damage but also to stop risk managing department evade from their responsibility.

After the 2004, the UK government could put the BSE crisis under control. Although, there were recording cases of vCJD even after 2004, the occurrence of the disease decreased sharply. At the beginning, the UK government considered cattle which have the BSE diagnosis, as similar weight problem of other animal disease, such as poultry flues. Therefore, the official measurement limited to conventional measurement and public excluded from the information. The government did not provide public the enough scientific evidence and information. Blocking public debate, thus resulting lack of communication was a key failure of the government policy because they lost public trust. Scientific uncertainty significantly increased in modern society; thus either scientist or government officer could not control conventional risk analysis alone. The BSE case is milestone case notified the importance of public attendance in the decision making process.

When the case occurred in the UK, other European countries overlooked the BSE case as a specific local problem defined only to the UK. However, the BSE case happened first in France, 1991, also in the Netherlands on 21 March 1997 and in Germany 2000. Spreading of the BSE around the European countries raised public debate. Controversial was not limited beef production, but until the overall modern agriculture industry. The BSE crisis considered as a beginning of the food safety problems. Modern intensive process inevitably causes natural destruction and weakening the animal welfare. This view triggered debate of alternative model to reform modern food production.

From the BSE crisis, the EU recognized the importance of the EU level control on food

policy since the agricultural policy is supported by the largest portion of the EU budget. Food is the most actively trading list, thus protecting single market is the priority issue. Some countries wanted to stop importing beef from other member state thus involvement of the EU required urgently to protect market.⁵¹ The EU undertook risk management by operating scientific research as a first step, and converts the scientific information into the EU's recommendation. The EU decided to prohibit exporting UK beef in 1996, the prohibition provokes anti-EU voice in the UK, and this case went to European Court of Justice. The verdict concluded that if there is probable risk for human health, even though the risk contains scientific uncertainty risk presenting country should accept the EU policy. This verdict enlarged interpretation of the precautionary principle until the food safety policy combining with human health risk. This case encouraged the EU to set up the European Food Safety Agency (EFSA), and the EU applied precautionary principle in the risk analysis.⁵² The EC proposed dissemination of core information to the consumer in the White Paper on Food Safety. The major achievement of this paper is that it allows precautionary principle to protect food safety although it has vague evidence.⁵³

Main difficulty to operate risk policy was long incubation period of BSE until the disease apparition. Although, uncertainty prevailed in the BSE crisis, the main defect of this case was that information not offered to public. There was increasing information searched over the years, but the public was not informed enough. There was another problem in the policy to prevent disease effectively. Just stop eating beef could not be a solution because beef is not only entering food-chain, but also enter in various ways, such as medical and cosmetic production. Therefore, incomplete government policy aggravated disbelief ambiance in the public. This case gives several lessons that interaction of communication is crucial for the policy making process, and the efficient system is the prerequisite to control epidemic disease. Lastly, if there is uncertainty factor, precautionary action is always better than not preparing. In short, this case gives

⁵¹ (Idem. pp.99)

⁵² (EC 2000a)

⁵³(Dratwa pp.197-214)

a lesson that opening information is crucial for the food policy, and EU level of policy requires to manage health and economy policy connected with food.

2.2.2. EU Food Law and Policy

The Commission published White Paper on Food Safety in 2000 which clarified the future direction of the food policy.⁵⁴ According to the White Paper, EFSA is established. This document is managing overall food security include beef production. The regulation controls all the process which can cause food safety problems; animal feed, animal welfare, food hygiene and food packaging. Protecting consumers' health is the priority purpose of the White Paper. The paper also considers economic and environment issue that affected by food production.

White paper stressed protecting the internal market; thus food regulations operated by all member state. The paper stated that food production requires monitoring system and assessment measure, especially which related with human health concern. The document demand member state to apply food safety regulation as unified European Union Level. Thus, food producers should respect national standard, also the EU standard as a minimum condition. However, responsibility of enforcing and applying this standard left to national and local authorities. National government takes responsibility until surveillance of importing product from third countries.

Even though, the White Paper tried to regulate overall food chain, it has a lack of coherence, and not sufficient to apply practical case. Therefore, the legal framework approached to build coherence of interpretation, and set clear definition include limited obligation. The White Paper established new legal framework to control all the step of producing food chain. For examples, animal feed controlled as divided regulation. Separated measurement allows detect potential problems easily and enables to take

⁵⁴ Commission Decision 1994/474/EC of 27 July 1994 concerning certain protection measures relating to bovine spongiform encephalopathy and repealing Decisions 1989/469/EEC and 1990/200/EEC [1994] OJ L 194/96

preventative actions in early stage. The Commission make the list of positively allowed material for feed production, and ordered to reduce antibiotics gradually. The EU food law standardized feed manufacture industry with minimum requirements.

After the BSE crisis, animal welfare standard is promoted in the White Paper. However, legal framework concerns animal welfare only associated human health concern. To reflect the consumer's concern, animal welfare and environmental reasons requires integration in the legal framework. Another insufficient measure of the White paper is that current emergency measure is not efficient to control the actual risk. Simplifying the decision-making process can increase efficiency of the system.

There were numerous efforts to codify the EU level regulation, but the operating and monitoring constantly remained the responsibility to the nation state. It is certain that the White Paper outlined unifying guideline for the food safety rules. However, communication between EU and member state was asymmetry to enforce regulation. Also, the EU food safety rules requires to check whether the rule is clear, coherence and flexible to the consumers. As a further food regulation, consulting and developing food label is premised on consumer's understanding.⁵⁵

The EFSA, which organized to implement the Regulation 178/2002,⁵⁶ is a scientific analyzing department concerning the food safety and nutrition issue. They initially identified current the food risk. Since their advice is the key element to decide policy, independence and transparency of the body are crucial to re-build consumer's trust of food. The preamble of the Regulation 178/2002 states that the scientific regulation of the food and feed production based on the health protection of the community. Therefore, the preamble allows reinforcing the EFAS system to achieve high quality of scientific support. Additionally, the responsibility increased to the authority to provide independent scientific point of view. Thus, the member state and Communities, which

⁵⁵ (DG SANCO 2006)

⁵⁶ "EFSA was established, following the proposals put forward in the White Paper on Food Safety, by Regulation 178/2002."(Macmaolain, Caoimhin. pp.178)

are policy makers, enables to prepare the risk management. On the other hands, EFSA takes the role as only opinion provider, just offering ambiguous prospect and reside from assessment is not allowed. Thus, clear division of the obligation expected to strengthen the communication between risk assessors and risk managers.

2.2.3. Precautionary principle in EU law context

In the legal point of view, the most progressive part in food safety regulation after the BSE crisis is the extension of the precautionary principle which applied only in environmental law. The first legal framework of the precautionary principle is found in the Article 174 EC as an environment law.

[The EC Treaty Article 174(1)][Community policy on the environment shall contribute to pursuit of the following objective inter alia of protecting human health][Article 174(2)][Community policy on the environment shall aim at high level of protection taking into account the diversity of situations in the various regions of the Community. It shall be based on the precautionary principle and on the principles that preventive action should be taken]

According to this state, environmental activities dangers human health could be protected by the principle of the precautionary measure. At first, the BSE-infected cattle cannot be included in preventive actions since it is not direct environmental problem. Therefore, broad interpretation of Article 174 and integrated definition of Article 11 6 EC⁵⁷ could supplement the Union policy.

The first confirmation of this extended interpretation could find the Court in *Artogodan*. In this case, the precautionary principle has the status of an independent principle in EC law because of the demand of protection to human health, safety and environment which interrelated into all spheres of Community activity.⁵⁸

⁵⁷ “Environmental protection requirements must be integrated into the definition and implementation of the Community policies referred to in Article 3, in particular with a view to supporting sustainable development,” [Article 6 EC]

⁵⁸ *Antegodan and Others v. Commission*, (7 December 2005) ECR

Before the General Food law instituted, the European Court of Justice and General Court tried to identify the unclear concept of the precautionary principle which stated in EC treaty. The first example of using this concept, before the precautionary principle is not introduced can be found in the *Sandoz* case.⁵⁹ The measurement confirms balanced view which need to policy-maker in a situation of scientific uncertainty, and set a standard how to decide margin of appreciation when precautionary principle applied.

When the Court of Justice ordered the embargo on British beef export, the Court widely interpreted the precautionary principle, although the possible link between BSE and CJD is not verified.⁶⁰ The Court banned all the export of British beef for the moment. This verdict became the most prominent reference of the precautionary principle.

Shortly after the BSE crisis outbreak in the UK, the EC treaty includes precautionary principle in the environment provision. During the EU suffers the BSE crisis, the World Trade Organization (WTO) addressed Agreement on Sanitary and Phytosanitary Measures (SPS). SPS Agreement is the exceptional allowance to the member state to implement health protection measures when the scientific uncertainty is prevailed. The BSE crisis and the SPS Agreement encouraged the EC to revise regulatory of food safety.

The European Commission confirmed the importance of the precautionary principle for Community food safety policy by publishing the Communication in 2000. Although, the Communication is not legally binding document, this document allows the EU court using numerous references to reflect this principle in practice. Accumulated court indictments became the first legal definition of the precautionary principle in EU law which codified in the General Food Law in 2002.

⁵⁹ “In so far as there are uncertainties at the present state of scientific research, it is for the Member States, in the absence of harmonization, to decide what degree of protection of the health and life of humans they intend to assure, having regard however for the requirements of the free movement of goods within the Community” Case 178/82, *Sandoz*, [1983] ECR 2445, at 16.

⁶⁰ “Where there is uncertainty as to the existence or extent of risks to human health, the institutions may take protective measures without having to wait until the reality and seriousness of those risks became fully apparent.” *National Farmers’ Union*, cited *supra* note 9, at 63 ; and *United Kingdom v. Commission*, cited *supra* note 9, at 99

The concept of the precautionary principle in the food law developed with the effort that the EU tried to cope with the BSE crisis by a legal framework. However, the recognition of the precautionary principle limited to the EU level. International institutions, such as the WTO, hesitate to apply the precautionary principle explicitly at the food safety policy concerning public health. At the *Biotech Products* case of the WTO decision.⁶¹ The Panel expressed question of the precautionary principle which is not yet recognized concept as a customary international law. At the *Hormones* verdict, the principle confirmed as not settled notion in the international law. Further cases, in the context of WTO rule would be searched below. Main lesson from the EU law is that the idea of precautionary principle has been developed as main principle of EU food law policy.

2.2.4. Precautionary principle in the EU GFL(General Food Law)

The General Food Law established to regulate overall food production and the principle introduced explicitly. The BSE crisis raised doubt of food safety regulator, and the European Union felt necessary of the EU regulation. According to the Article 6 GFL, the risk analysis requires scientific research and following Article 7 of GFL state the precautionary principle. Risk analysis defined as a process of “connecting the gap between science and policy”⁶². First of all, experts require to give their opinion of certain health effect to the public, after that the policy makers select the best action to reduce the risk. Former part devised to evaluate the risk, and later part is managing risk in practice. The scientific information does not have decisive power. It just gives a clue to ‘take into account’ whether enacting the precautionary principle in the risk assessment process or not. In other words, the precautionary principle gives reason of the policy but not determine the policy itself.

The precautionary principle in the GFL is a measurement which adopted by both the

⁶¹ WTO Report of the Panels, European Communities –Measures Affecting the Approval and Marketing of Biotech Production, WT/ DS291/R; WT/DS292/R;WT/DS293/R, (adopted 29 Sept.2006)

⁶² (Moltke, Von p.100)

Member States and the EU Community. Therefore, when this principle applied in the national policy, national state should address to the EU. The European Council confirmed in the Resolution that the Precautionary Principle needs satisfy both EU and national policies.

The regulation applies to “all stage of production, processing and distribution of food, and also of feed produced for, or fed to, food-producing animals”⁶³. The GFL states range of application as “law, regulations and administrative provisions, whether at Community or national level”⁶⁴ Shortly, the food safety legislation applied all the food, both EU and national level. In conclusion, whenever it requires, the EU and member states can invoke the precautionary principle in the food safety measurement.

In consequence, the food safety policy indissolubly linked with risk assessment because it is composed with both scientific opinion and decision making process. Although, the immediate scientific risk analysis is crucial, many part of the policy reflect social value rather than the fact. Hence, just depending on the science information is not enough to manage risk situation.⁶⁵ Public recognition of risk could be different with scientific risk assessment. Therefore, considering public conception is crucial to balance between sciences and politic in the risk management. In other words, open communication enables broad understand of existing risk and policy came from this process embraces social and economic risks together. Scientific Steering Committee (SSC) of the European Commission concluded in the 2000 First Report on the Harmonization of Risk Assessment Procedures that current risk assessment should take into account three main issues: animal welfare, sustainability, and human quality of life.⁶⁶ According to the view of Committee, the life quality is multifaceted. This view is coincide with the WHO definition of health as “a state of complete physical, social and mental well being, and not merely the absence of disease or infirmity..”⁶⁷ The General Food Law also

⁶³ Art. 1(3) GFL

⁶⁴ Idem. Art. 3(1)

⁶⁵ (Ansell, pp.329-349)

⁶⁶ (SSC, First Report on Harmonization of Risk Assessment Procedures, p 110)

⁶⁷ (SSC, Final Report on Setting the Scientific Frame for the Inclusion of New Quality of Life Concerns

recognized assessing list, such as societal, economic, environment, and ethical issues should take into account in the assessment process. Shortly, food safety policy not limited in scientific opinion but it includes other factors that can affect on. Although, the recognition extended, 'sustainability' has limitation to apply the precautionary principle since the definition of the principle requires "scientific uncertainty" as a prerequisite factor. The problem is that definition of 'scientific uncertainty' is flexible.

2.2.5. Lesson from the BSE crisis and further question

The BSE crisis mainly caused by animal feedstuff thus human health deduced by animal welfare include animal feed. Indeed, grain-fed cattle have no immediate harm such as vCJD disease, such causation by animal feed is undeniable. However, negative effect of corn-fed cattle or cheaply manufactured beef is enough to apply management for public health practice. When the BSE crisis visualized as actual harm, government could not respond the situation properly because the bureaucratic system had less communication. One positive change after the crisis was that the precautionary principle introduced into the GFL of the EU. Therefore, the principle presumed to offer a ground of applying the feed label policy (either corn-fed or grain-fed) to inform consumer proper information.

From the BSE case, EU food policy is confirmed that it can control food policy with the principle although regulatory initiated in the EU level requires agreement within member states. If there is consensus within member states, operating EU policy is possible, but applying regulation until outside border is problematic. For example, requiring feed-label to the meat product from outside of the border can occur trade conflict because it can be considered as trade restriction. Therefore, it needs to research application of the precautionary measure in the WTO rule context.

2.3. Precautionary principle in the WTO context

The World Trade Organization (WTO) established by the Uruguay Round of

Multilateral Trade Negotiations on 1 January 1995. Sanitary and Phytosanitary Agreement (SPS) is included in WTO at 1994 to protect food safety. The SPS Agreement is an exceptional measurement based on scientific assessment because it allows trade restriction. Thus, the SPS Agreement is considered as a contemporary barrier for the liberalized trade. Indeed, compare to the other argument concern trade barrier decreased but argues for the SPS measure increased.⁶⁸ The WTO did not accept the precautionary principle in the *hormones* case. The European Community banned hormone fed beef which produced in the US, but the WTO judged that prohibition measure is impermissible because of the lack of scientific assessment.

On 29 January 2000, 130 countries select a protocol at Montreal to protect environments from the trade of living modified organisms. The Cartagena Protocol on Biosafety (CPB, 2000a) is pursuant the Convention on Biological Diversity (CBD). This protocol includes the precautionary principle which the European representatives delighted of the inclusion.

The SPS Agreement is an international institution regulates free trade concerning economic benefit. The CBD is also an international institution regulates environmental issue. The former regime has a guiding principle for scientific risk assessment and the later has the precautionary principle in environment. Although the two regimes control different areas, international trade and environmental law, but they could conflict in food safety issue that contains both economic and environment (or, health) benefits. Since the economic hostility intensified between the United State and the European Union, the conflict became serious. Indeed, the *Hormone* case (WTO, 1998 a) initiated the conflict between the precautionary principle and the SPS Agreement which represented as a conflict of the EU and the US.

Both trade and environment regime has been developed through a long period. As a trade regime, the GATT has codified and unified a single agreement to remove trade barriers. The WTO succeeds the GATT, created in 1994. The WTO concretes its regime

⁶⁸ (Kennedy, Kevin C.pp81-83)

by adding rules which can cover overall international trade. For examples, the WTO rules cover trade in services, trade-related intellectual property and foreign investment. Moreover, advanced dispute settlement system introduced to adjust rules efficiently. Their decision is legally binding 130 states. Dispute settlement system strengthened the WTO regime as most influential international governance.

On the other hand, international environmental regime has different developing history compare with the WTO regime. At begin, the numerous international non-governmental organizations initiated their activities. They increased recognition of environmental issue in the international society hence the series of international treaties adopted which addressing environmental problems. The United Nations Environmental Program (UNEP) is prominent regime among the international environment institution, but it has less effective power than the WTO regime. In conclusion, international environmental regime focused on cognition of the problems and understandings, whereas the trade regime creates concrete rule-based regulation.⁶⁹

Although the trade and environmental regime are not always conflict, environmental issue is increasingly tangled with trade concerns. Particularly, food safety and health concerns are the highly sensitive issues because different stakeholders conflict each other and the conflict became pressing power to the government. In the view of the European Union which suffered the BSE crisis, safety of the agricultural product became highly politicized decision. Hence the conflict of the two regimes was not simply represents the difference of two principles. This conflict implicates political power game between the United States and the European Union.⁷⁰

2.3.1. The *Hormones* Case

Food safety policy can restrict trade liberalization with the reason of ‘necessary to

⁶⁹ (Hansenclever *et al.* pp181)

⁷⁰ (Winham, Gilbert R. pp131-134)

protect human, animal or plant life or health.’⁷¹ The BSE crisis in the European countries became a precedent of applying the precautionary principle in the EU food law. The hormones beef poses further question that how government should balance between food safety and trade liberalization. In 1987, the United State appealed in dispute settlement process of the GATT against the European Community. The European Union banned to import the US beef which fed growth hormones. The United States have been using hormones to promote growing speed of livestock, since 1950s. The EC gradually banned using hormone for animals in 1981, and totally banned hormones for animal growth purpose from 1985. The Scientific Working Group concluded that if the hormone usage properly controlled and monitored, it is not harmful to consumer’s health. The US consistently invoked case in dispute settlement proceedings, in 1996; finally the WTO Hormones panel established.

The main argument of the US was that only available scientific evidence can determine health risk assessment, according to the SPS Agreement. The EU agreed inclusion of scientific evidence, but the EU and the US could not agree the condition of ‘scientific evidence’. Also, the EU wanted to include the precautionary principle to transfer the burden of proof to the exporting countries.

The SPS agreement stressed ‘scientific’ measure in the several articles.⁷² According to the perspective of the WTO, allowing trade protectionism based on scientific evidence does not a matter. Science itself does not decide risk policy, but it just analyzes risk by quantitative methods. Final determinations came from political bodies in the most legal systems because scientific result often leads conflict rather than objective result.⁷³ Although the policy adjusted by the exceptional provision of the SPS Agreement, trade conflict is unavoidable depend on the interpretation of scientific measure. Hence, the *Hormones* case demonstrates that SPS regulation is difficult to address both

⁷¹ GATT 1947 Article X X(b)

⁷² [Article 2.2] ‘necessary to protect human, animal or plant life or health, is based on *scientific* evidence’, [Article 3.3] ‘If there is a *scientific* justification,’ [Article 5.2] ‘In the assessment of risks, Members shall take into account available *scientific* evidence’. etc.(WTO, the SPS Agreement)

⁷³ (Beck,Ulrich 1992)

adjudicatory phase and implementation phase.⁷⁴

According to the Article 5.2, it allows 'available scientific evidence'. Thus, evidence widely opened when it is in the 'scientific categories'. However, the SPS Agreement is not allows lack of scientific measurement, such as the precautionary principle which EU desired to introduce as a part of risk assessment. Member states can apply SPS Agreement exceptionally in the case when the 'relevant scientific evidence is insufficient', but there are conditions to apply this exception. Importing member state, or prohibiting measurement acted country, should take 'burden of proof' include additional information.⁷⁵

According to the claim by the United States, the panel established and reported the case since May 1996 to August 1997.⁷⁶ After that the case went to appeal at the WTO Appellate Body⁷⁷, Panel decided that the EU policy of banning hormone fed beef was a political decision rather than scientific measurement. Thus, the EU did not comply the SPS agreement. Penal judged that the EU regulation is inconsistent with the WTO rule it breached Article 5.5, preventing arbitrary distinction. Also, the Penal argued that the EU violated harmonization requirement of Article 3, by not complying the Codex Alimentarius standards which list safe hormones. However panel's verdict softened in the Appellate Body (AB). Risk assessment of the article 5.2 still upheld by the AB, but arbitrary distinctions (Article 5.5) and harmonization (Article 3) reversed the interpretation.

Although the final decision of Appellate Body paralleled with panel's decision that the EU hormone banning policy is inconsistent with Article 3 and 5 of the SPS Agreement, the AB widely opened interpretation of scientific test for the risk assessment. Thereby, the WTO weakened the authority of the SPS measure by oneself. According to the AB's report, the risk assessment is not required mainstream scientific view, but divergent

⁷⁴ (Wuger, Daniel pp.778)

⁷⁵ Article 5.7 WTO, the SPS Agreement

⁷⁶ (WTO, 1997)

⁷⁷ (WTO,1998a)

opinion of the qualified resource is enough. Also, the AB stated in the report that risk assessment is not only defined to ‘scientific evidence operated under laboratory’, but also to ‘risk in human societies, in the real world where people live and work and die’.⁷⁸ The AB’s *hormones* case moved the debate from existence of scientific evidence to acceptability of the scientific evidence. However, it is sure that ‘science’ still required as a minimum condition.

The Appellate Body did not states in the final decision whether the precautionary principle is necessary to include as customary international law. The *obiter dictum* of the report refers that the precautionary principle is reflected in Article 5.7 and 3.3 of the SPS Agreement implicatively. This interpretation of the AB allows member states to set up high protectionism independently in accordance with international standards. However the standard has no consensus and implicitly referred principle has no binding power.

Although AB opened the definition of the ‘science’, the EU had no scientific ground to depend the SPS agreement. After the Dispute Settlement Body (DSB) makes a decision, the European Commission initiated scientific research project on the disputed hormones to complement risk assessment.⁷⁹ The Committee on Veterinary Measure relating to Public Health (SCVPH) camp took responsibility of research. They concluded that all six hormones disputed in DSB, have potential adverse effects on human health, but the effects of hormones are not equal. Especially one hormone demonstrated damaging effect causes cancer; thus other five hormones were not enough to dispute in the risk assessment. In May 2001, the new legislation of Council Directive 96/22/EC totally banned one hormone that has adverse effects on health. The Commission admitted the necessity of further research of the other five hormones to limit them for consumer’s health reason.

⁷⁸ (WTO,1998a: para.187)

⁷⁹ (Proposal for a Directive of the European Parliament and of the Council Amending Council Directive 96/22/EC, 2000)

After the *Hormones* case, European Parliament recognized that the amendment of EC measure could be disputable in the process within the WTO negotiation. The parliament reports stated that the precautionary principle does not require to demonstrate direct harmful effect of the hormones. The adverse effect to the environment, animal welfare and ethnic can offer ground to apply this principle to ban the hormones. However, scientific evidence, or data is the least conditions which allows the Commission to support the further research. Therefore, the precautionary principle “encourages a proactive approach by the Commission to seeking and developing its own new scientific information, with a view to avoiding any impression that the EU intends to continue using the current inadequacy of scientific information to maintain its ‘provisional’ measures in force indefinitely.”⁸⁰ The EU compromised with the US by appeasement policy of importing the US beef. As a result of the negotiation, the EC and the US agreed co-operating programs to guarantee and to monitor the hormone residues.⁸¹

At the early stage, implementation of these programs had trouble since 12% of the beef imported from the US still contained hormone residues.⁸² Thereon, the EC initiated 100% testing of beef importing from the US. In February 2000, they ameliorated hormone monitor programme thus test resulted ‘no hormone residue’ often after 2002.

The *Hormones* case proved that trade conflict thriving concerns the consumer’s health. The US and European Union, both the two leading trading powers, conflicted with this protective measure. However, the WTO dispute settlement mechanism lacked mediation power thus it resulted disagreement from the members. Above all, interpretation of the SPS Agreement is not coherent. Thus, the WTO requires set a clear standard for health concern. Also, dispute body should act as a judicial body rather than political body.

2.3.2. GMO case

⁸⁰ (Parliament Report A5-0002/2001 pp.24)

⁸¹ The Non Hormone Treated Cattle (NHTC) Program and the Additional Residue Testing Program.

⁸² (Wuger, Daniel pp.802-803)

Since the Genetically Modified Organisms first appeared in the EU market in mid-1990, GM food became controversial issues, which regarded as new threats of consumer health. European community just recovered from the BSE crisis, thus GM food was not evitable issue among food safety measurement. GM food production is the case of representing modernized and globalized food production. Traditionally local and national government controlled food regulations, but increasing global production system became impossible to trace their complex network by former food governance. Therefore, the European Union demanded EU level of governance which monitoring food circulation to deal with public concern. Studying GM food case in the EU regulation helps to understand how protection of local environments and food safety combined to international food trade rules. Compared to *hormone* case, GM food regulation asked soft measurement, which is not totally ban but regulate by label rule. Thus, the GM case study would give understand how labelling rule settled as food safety regulation in the WTO context and possible limitation of labelling rule as restrictive measurement.

The European Community Law has a possibility of danger the free movement rule in order to protect consumer's health of the Member States. According to the Article 30EC and Article 153 EC, the measurement for health protection depends on national policy. Above all, the consumers' preference is different from countries. Also, the acceptance of new technology involving food production is various depend on the consumer's concern and producer's economy situation. Therefore, making general standard adjustable overall European member states is a difficult task.

According to the legal definition, genetically modified organisms (GMOs or GM) are "any life form, except a human being, in which genetic material altered artificial way that does not occur by natural reproduction."⁸³ Developed DNA technology allowed adding novel genes to the various crops, such as corn, soy, cotton, tobacco, potatoes and

⁸³ Article 2(2) of Directive 2001/18/EC of European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms and replacing Council Directive 1990/220/EEC (2001) OJ L 106/1

canola. The advantages of GM crops are advertised to the farmers that they are herbicide-tolerant and productive than naturally reproduced crops. Therefore, among other GM products which include genetically modified fish and mammal, GM crops spread their gene the most rapidly by agricultural activity.

GM products have potential risks to human health and the environment. First of all, GMOs inevitably contains antibiotic which conferred genetically to resist the herbicide and harmful insect. Although the danger effect is not yet identified, spreading antibiotic-resistant bacteria from the GMOs is the main concern as a potential health risk. Another health concern of GMOs is potentialities of occurring allergy to sensitive individuals. Thus, public doubts GMO foodstuff and animal feed that can have adverse effects on human health. Although, there is scientific research demonstrate the GMO food has little or no harmful effect, consumer groups opposed to consuming GMO food and feed.

Alongside, three risks referred concerning GMOs: hybridization, harm to non-target species, and disruption of ecosystem.⁸⁴ Hybridization means that GM crops and wild plants or other plants can be hybridized by pollen or other possible method. Since human cannot control wind and bees, unintended spread of the GM genes occur naturally thus it can result born of abnormal hybrids, which called Frankenstein crops. Hence, GMOs distribute natural habitat, also it dangers ecosystem. Indeed, Mexico reported that the GM corn ruined biodiversity of the maize species, although Mexican government ordered a moratorium of using the GM corn.⁸⁵

Such as the BSE crisis, potential danger of GM food had similar social risk step, which defined by Beck (1992). Above all, the GM technology interfere nature much radically than any other modern food technology. The problem of regulating GM food is providing scientific evidence. Demonstrating that GM food ruins environment and human health is much complicated than the BSE crisis. Compare to the GM food, BSE case had much clear link between cause and effect, although it had a long period of the

⁸⁴(Lofstedt et al, pp. 388)

⁸⁵(Dalton pp.337-413)

incubation period. Scientists observe that risk of GMOs requires long-term research. Thus, GM food policies need to include not only scientific establishment but also the potential perspective in the risk assessment.

The European Union developed regulation of GMOs to reflect public concerns. In mid-1990s, European NGOs lifted food safety problem of GM food. Recognized public protests against GMOs and their activities result growth of unofficial moratorium.⁸⁶ The BSE crisis proved that the European Union food law was not adequate to control risk management of food safety. Therefore, the EU needs fundamental review of the food safety policy. Also, to notify presence of GMOs in the food market, legalized labelling rule established to soothe consumer's concern. The EU regulation and directives founded traceability and labelling on the novel food⁸⁷, such as GMOs food and GM feed.

Deliberate release directive, introduced in 1990 is the first legal framework concerning GMOs, and it includes definition of GMOs.⁸⁸ Before the EU regulation initiated, there were no rules to the GMOs, and several EU member state introduced their own measurement. Different national regulations derived confusion of the common market, which became a barrier to integrate unified EU market. The European Commission recognized appearance of GM food as environmental risk rather than regulating just for food safety measurement. Therefore, legal framework assigned to the Directorate-General for the Environment. The urgent assignment of the department was to harmonize environment standard, which is acceptable throughout the EU member states. Even though, the Directive 1990/220 found regulation on the precautionary principle, vague risk assessment rule permitted member states to interpret directives depend on their preferences. Thus, the first GM food rule of common EU policy could not unify national policies.

⁸⁶ Regulation (EC) No 1829/2003 of the European Parliament and of the Council of 22 September 2003 on genetically modified food and feed (2003)

⁸⁷ "...which have not previously been used for human consumption to any significant degree within the Community." (European Commission, Novel foods and novel food ingredients)

⁸⁸ Council Directive 1990/220/EEC on the deliberate release into the environment of genetically modification organisms [1990] OJ L 117/15

In 1997 novel food regulation introduced as the EU level law ruling GMOs. Primary purpose of this regulation is to announce consumers that the novel food does not harm, but they could have less nutrition. Therefore, labelling rule to novel food is demanded to inform the consumer composition of the nutrition of the food. If member states can demonstrate harmful effect of the food, it can be refused in accordance to 'safeguard clause', even though the label informs its nutrition. The suspension should be informed immediately to the European Commission. However, with the former deliberate release directive, this regulation lead confuse of labelling legislation. For example, GM maize and GM soya could apply novel food scope rather than GMOs label. Thus, this confuse resulted some member state develop their own regulation to cover this shortcoming.

After amending former regulation several times, which still allowed certain GMOs, in 2001 the EU newly introduced deliberate release directive. The EC considered GM technology as positive contribution to increase food production, and it can fulfil food requirement; also it allows the advancement of technology. Different national regulations required unification of law to prevent making a barrier inner side of European common market. Thus, new Directive 2001/18 asked labels to GM product, but it did not prohibit commercializing these products. Former directive was not specified labelling rule, and it allowed inflow of GM food. Therefore, new directive addressed former shortcoming, and widely respond to consumer concern. Measurements of GM foods apply the precautionary principle to protect both human health and the environment. Also, the directive Article 13(2) indicates that any food contains GM food should demonstrate the fact in the label clearly. Furthermore, if the member states have ground that GM food dangers human health, they could prohibit the sale of GM food for the moment. Although, the requirement list of labelling rule elaborated, this directive was not enough to harmonize different positions of the member states toward GM products. However, at least, the Directive could prevent moratorium acted by member states which adverse to other international institutions and food exporting company.

Regulation 178/2002, or the general genetically modified food and feed regulation, is

established as a new principle of EU food law for the GMOs. The purpose of this regulation is to protect human health, animal welfare, environment and consumer interests relate the GMOs. Also, another goal is achieving effective function in the internal market. Thus, the regulation divided labelling form as human consumption food and animal feed. Although, consumers avoid GM food, the GMOs can inflow indirectly by variant directions, through the loophole which is not fully opened information to consumers.

The following regulation which named labelling and traceability regulation is introduced in 2003. This regulation allows that all stage of food production process which regarding GMOs should be traceable. Therefore, European Community can implement directions when unpredictable and adverse effect occurs in the public and the environment. Above all, risk management that based the precautionary principle became possible to adjust in the regulation. Although former regulations indicated obligation of labelling GM food, circuitous consumer of the GM product cannot confirm the label. In other words, GM food labelling is useful to farmer who consumes the feed product but meat product consumer do not have chance to see the feed label. This regulation achieved to make explicit labelling rules for the GMOs through overall operation steps which integrate former regulations.

At the beginning of GM regulations, the EU applied conventional risk assessment which based on the scientific evidence. Also, the EU policy was positive to introduce new technology. However, insufficient policies and scientific uncertainty increased public doubt of food safety; thus the EU converted policy more protective way. As a result, the EU food regulations of GMOs became unnecessarily precise and complicated over a period. Since the original remedy, deliberate release directive in 1990 appeared, and it became the compulsory labelling rule for GM products. When former regulation found shortcoming, then next regulation tries to cover this failure. The labelling rule allowed consumers explicit information of food ingredient; thus it purposed to protect consumers from misleading information. Consequently, the EU could build consumer's trust of food safety, without banning the GM food but label acted as soft barrier.

2.3.3. GM crisis extends interpretation of the precautionary principle

Genetically modified organisms are new scientific interference to nature which can result radical change of in ecosystem. Because of this potential hazard, risk assessment of GM food requires a different approach with conventional food risks management. Furthermore, the GM risk assessment has ambiguity process since the scientific uncertainty of GM food is not measurable, and long time-lag of observing GM food increased public worries. In other words, there was no scientific committee which able to deal with GM food dispute.⁸⁹ The EC recognized risk management of modern technology demands definitive decision to cope with modern complexity of global food production, and to prevent large-scale of negative effect, although scientific evidence is not clear.⁹⁰ The EU interpreted the precautionary principle widely in the decision-making process to establish a foundation of the policy. The precautionary principle became central measurement to protect health and environment policy in the EU. Although uncertainty situation cannot analyzed by the scientific method, if society requires regulation immediately, such as GM food area, agency can act regulatory action to consider various aspect of the potential effect by scenario studies. The precautionary principle also evolved the definition, along with the development of the GM food policy in the EU. However, the regulation still criticized because of its vagueness, and its character of blocking social innovation.

The GM food label opened the door to the global food market, and final choice left to the individual consumers. Extended interpretation of the principle permitted the EU can catch objects both consumer's concern and justification of the measurement at once. This policy not takes direct action against GM food, but the individual choice would expose adverse action to the GM food indirectly. However, GM food labelling is still in the heart of the controversial, since the mandatory labelling segregate food supply chain

⁸⁹ (Scoones, Ian 2001; Rowell, Andrew 2003)

⁹⁰ "a political decision must be science-based, but is essentially a political or a societal value judgement to be taken by the responsible regulatory authorities" (Dratwa, Jim pp.204)

as non-GM food and GM food. This segregation results unnecessary high cost. Another criticism of the GM label is that it left social responsibility to individual and private choice, which excludes environmental and social issues related with GM food. Indeed labelling focuses only health and ethical issue.⁹¹ Co-existing GM food with non-GM food policy cannot avoid encounter argument who want real GM-free from the European Union. Without further restriction of GMOs in the EU, small conventional and organic farm would be in danger since “genes will always travel to some extent and thus transmit their genetic properties to other crops of the same species.”⁹² Technically, co-existence of the GM and non-GM beyond the market is easy. While allowing co-existence in the market, precise division is difficult because of high cost and technical complexity. Thus, NGOs like Friend of the Earth against the EU policy of allowing the GM food in the market. To sum up, co-existence GM policy of EU food law is an innovative approach which respects both food safety regulation and international trade rule while it is undeniable that it weakened responsibility of protecting the environment.

2.3.4. GM conflict in the WTO

The US filed a complaint at the WTO in 2003, against several member states of EU which refuse the GM food. The WTO starts actively interrupt to the GM food debate. The main argument of the US was that the EU’s policy against GM food has not based on scientific evidence, and what they decided as ‘potential risks’ create *de facto* moratorium. Thus, the EU policy threatens development of new technology.⁹³ Against this argument, the European Commission answered that the European regulation stated with clear and transparent languages. Also, the labelling measurement is not discriminatory to GM product. When government activate moratorium, it requires to prove new technology, challenging the regulatory regime on GM food.⁹⁴ The dispute entered to the WTO panel because the European regulation of GM food regarded as breach of main principle in the WTO, especially the principles concerned in the

⁹¹ (Oosterveer, Peter. pp130)

⁹²(Tolstrup, Karl. 2003)

⁹³(USTR, 2003)

⁹⁴(EC, 2003)

Agreement on Sanitary and Phytosanitary Measures (SPS) and the Technical Barriers to Trade (TBT) Agreement.

The WTO was not prepared to encounter a GMO issue such a politically sensitive problem mixed with highly technical issue. One problem is that this organization is only developed to support liberal-trade, not to develop policy especially concerning the environment and ethical issue. Thus, current WTO agreement not specialized in the biotechnology sector. When member states enact policy banning certain biotechnology and the policy contradicts with WTO trade commitment, the WTO Dispute Settlement System can confirm justification. Fundamentally, the WTO maintained position not to interrupt legislative process of individual nations.

According to the SPS Agreement, the EU can build their GM food guideline to protect human and animal health. The guideline required concrete scientific evidence according to the agreement of the Codex Alimentarius Commission within the WTO.⁹⁵ If the EU labelling rule of the GM food is not satisfying the provision of the SPS agreement it could be considered as discriminatory and disproportionate measure, which defined in the TBT agreement. However, application of the SPS Agreement to the GMO is also questionable. This agreement defined that setting restrictive measure is possible to protect human health, animal health and food safety, in case it related with “pests, disease, disease-carrying organisms, additives contaminants, or toxins”.⁹⁶ One blind spot of the SPS agreement has no definition of terms “additive, toxins or contaminants”

The Codex Alimentarius Commission failed to formulate unified labelling recommendation since individual countries had different positions on the GM food. Different national policies proliferated to represent various national interests because the GM product distributes different cost and benefit to those countries. Consumer’s perception of GM food is also various. Thus, the Codex could not frame general

⁹⁵ “The Codex Alimentarius Commission includes a designated committee charged with labelling of food and setting standards for food safety that are enforceable within the WTO.”(Oosterveer, Peter pp.134)

⁹⁶ (Appleton, 2000)

labelling guideline which satisfies every member states with their various interests. Food regulation is politically sensitive issue thus the WTO remained the responsibility of establishing neutral scientific recommendation to the Codex. However, the Codex could not give solution and GM food issue still halted in political debate.

2.4. Implementation of the precautionary principle in Agriculture

From both the hormones case and GM case, the WTO's position is perceivable. They allow public health practice, but it should be less restrictive method to the free trade. When the preventive measurement applied, scientific evidence is essential, although it is not a main opinion. However, applicability of the precautionary principle is unclear in the WTO context, above all, WTO failed to frame guideline of trade conflict with biotechnology.

Does the corn-fed labelling rule applicable to public health policy, without conflict to the WTO rules? Compare to the hormones case, feeding corn is less artificial method for livestock, also corn feed does not mean GM corns, and it can be organic corn. The positive aspect of corn-fed labelling is that it has scientific evidences concerning health benefit. Corn-fed beef is demonstrated different fat constitution which can cause overweight and environmental deterioration caused by concentrated grain cultivation. According to the former cases, preventative measurement by a label for public health presumed possible as the national policy. Indeed, the WTO rules implicated profound concern of combating non-communicable diseases such as cancers, cardiovascular diseases, chronic respiratory diseases and diabetes which mainly derived by alcohol, tobacco and poor diet.⁹⁷ Hence, the WHO consistently discussed with GATT and allowed labels of calorie, fat, sugar or salt contents according to the TBT agreement⁹⁸ and Codex Guidelines on Nutrition Labelling.⁹⁹

⁹⁷ (WHO, 2005)

⁹⁸ (WHO 2004)

⁹⁹ (FAO, Codex Alimentarius, 2001)

Corn-fed label has the same purpose to protect the health with those nutrition labels. However corn-fed label does not explicitly indicates contained nutrition, but the appearance of animal feed gives consumers a clue to presume its nutrition values. Above all, the corn-fed labelling has value of protecting the environment from exploiting land by mono-cultivation, this policy includes regulating 'agriculture'. Indeed researchers argue that precautionary measure is applicable to the modern 'agriculture'.

Agriculture invented more than 10,000 years ago, it inevitably causes environmental degradation. Intensive agriculture converted farming like factories which relies on pesticide and fossil fuel energy. Although agriculture is indispensable activity for human survival it is questionable whether the industrial activity and ecological health cannot exist as symbiosis?

The precautionary principle is also applicable to the modern mono-cultural activity since the purpose of the principle designed as preventive action rather than scientific harm visualized. According to the Rio Declaration, the precautionary principle is codified "lack of scientific certainty is no reason to postpone action to avoid potentially serious or irreversible harm to the environment". Thus, the first example of adopting this principle in the agricultural sector was shown in the 1995 Agreement on Fish Stocks, which regulating fish stocks shrinking by overfishing. The Convention on Biological Diversity and the Convention on Climate Change also included the principle in the preamble and article.

Mono-cultivating agriculture ignores the standard of the precautionary principle. For example, introduction of chemical product such as pesticide, fertilizer and antibiotics are not limited their influence on certain geography. The effect would spread to land, air and water since the ecosystem is ubiquitous. Also, the principle standard prohibits activity that the potential harm is not limited to one species. Short-term economic benefit should not be a reason of introducing material or technical method which ignored ecosystem and long-term social cost. In 1996, the New York Times Magazine

issued exemplary case of collapse local ecosystem. European countries smuggled honeybee from the United State which regarded as highly productive in honey production. However, because of introducing different honeybee, lots of European honeybees died out. Animals and plants in symbiosis relationship such as moth, beetles, apples and cherries left in danger situation. The milestone case was in the Ireland in 1879 that mono-cultivating of potato brought serious famine. In conclusion, ignorance of the precautionary standard in the farming method results destruction of the ecosystem and environment.

Although farming activity inevitably causes harm in the environment, healthy and ecological way of agriculture method is preferable to respect precautionary principle. Thus, agriculture form requires shifting from industrial method to ecological practice. There are several efforts to change industrial farming from inner paradigm such as localizing and recycling the energy etc. However converting industrial system into the eco-friendly system has limitation, since their market rely on the industrial market.

Not only redesigning the system, but also rethinking of the discipline is essential. Food safety analysts argue that we need rethink about the technical food strategies. Nichole Fox stressed “the considerations that apply to the ecology of other environment apply equally to food...Whenever there is a lack of diversity, when a standardized food product is a mass-produced disease can enter the picture.”¹⁰⁰ Thus, the precautionary principle is applicable to the agricultural field to protect healthy environment and food safety. The Vancouver Statement on the Globalization and Industrialization of Agriculture testifies the responsibility of the industrial agriculture system.¹⁰¹

With the perspective above mentioned, precautionary principle is applicable to corn-fed

¹⁰⁰ (Fox, Nichols. pp.76)

¹⁰¹ “One of the most critical impact of industrial agriculture is climate change, which will destroy the natural basis of agriculture itself...We know that there are nontoxic and non-destructive alternatives to global industrial agriculture, and we know that these alternative can provide more food...We affirm, with the Universal Declaration of Human Rights, that the right to food is sacred. The right to food transcends basic nutrition and hunger and includes the right to produce one’s own food. We also affirm that consumers have the right to know where their food comes from, what is in it, and how it was produced.”(the Vancouver Statement on the Globalization and Industrialization of Agriculture, 1998)

system for the meat production. Intensive corn (grain) cultivation requires. Precautionary principle is measurement against destructive environment in the future. Also, consumer's concern for health can offer ground of practice public health. Scientific evidence is essential to act precautionary measurement. Scientific evidence of corn-fed beef can support labelling rule as soft measurement but applicability over the border has controversial in the WTO context since the concept of precautionary principle is not yet clearly defined. However, applying corn-fed label (include other feed label method) over the border does not always mean as restriction to the importing countries. For example, U.S consumers show their willingness to pay more for the Argentine grass-fed beef rather than U.S corn-fed beef.¹⁰² Therefore, extending corn-fed label regards on the consumer's right could avoid conflict on the WTO, and offer benefit to, *so-called*, 3rd countries. This section checked former cases related beef production in the EU law context. EU's effort to frame legal base of food safety rule make foundation to build labelling rule which is applicable in reality. In the next section, this paper would explore proper labelling rule for the corn-fed meat.

3. IMPLEMENTATION

3.1. Label to Obesity

Overweight and obesity are a condition of imbalance of body fat, which is leading concern in public health field. Nowadays, obesity is global epidemic disease which affects most developed countries. European countries early developed, as a result, obesity rate increased and it became leading health problem.¹⁰³ Urbanization decreased the physical activity and increased unhealthy food consumption which include high rate of fat, sugar and salt. Obesity has risk to increase other mortal disease, such as diabetes,

¹⁰² "Umberger investigated U.S consumer preferences and willingness to pay for domestic corn-fed beef versus Argentine grass-fed beef measured through experimental auctions. Consumers were classified based on taste-panel ranking and bid differentials between the two different steaks. Twenty-three percent of the participants preferred the Argentine grass-fed beef to the U.S. corn-fed beef and were willing to pay an average of \$1.36 more per pound." (Umberger et al, pp.491-504)

¹⁰³ "Fourteen million children are over-weighted and three million are obese in the E.U. In some member states, already half of the adults are overweight and between 20% and 30% run the risk of becoming obese. Obesity has become a European epidemic and it affects mainly children and teenagers, as a report of the European Parliament reveals. Obesity and the weight excess represent one of the greatest challenges in the field of health in Europe nowadays." (A.N. Neacsu. A.Madar. pp.69-70)

heart disease and certain types of cancers which diminishes life quality. Thus, health policy requires to effective regulation to decrease obesity rate since obesity is economically high cost disease. Indeed, international and local government practice public health policy to control overweight problems.¹⁰⁴

According to health experts, main causes of obesity have three themes: lifestyles, physical activity and diet. The analysis of causation obesity makes possible legal framework to prevent obesity. Therefore, the state regulation can improve nutrition, physical activity and health education.¹⁰⁵ Among these factors, regulating inflow of nutrition is the most effective measure than other schemes since the physical activity and health education have limitation of personal willingness. The examples activated by the government are food labelling rule and regulations to food supply at school. The European Parliament proposed in their report that offering better information can protect consumer's choice and offer healthy food to school. The report titled "Promoting healthy diets and physical activity: a European dimension for the prevention of overweight, obesity and chronic diseases" introduced the obesity debate in the food labelling regulation which drafted by the European Commission. The EU legislation and the EU food law applied food labelling rule in the Directive 2000/13/EC and revised it in 2007.

The labelling rule criticized that without EU legislation food labels already applied by organizations with self-policy and voluntary action. Therefore, EU institution increases complexity by adding labelling rules. Consumers tend to trust labels such as "reduced cholesterol", "Fat-free" and "rich in Calcium" rather than the nutrition tables. This method has risk to mislead consumer who choose "less-fat" labelled product, but it does not disclose significant sugar amount. However, the EU prohibited advertising label, and allowed only to apply nutritional table, which cannot ensure whether proper

¹⁰⁴ "In May 2007, the European Commission launched the White Paper on a Strategy for Europe on Nutrition, Overweight and Obesity Related Health Issues, The White Paper builds on the Green Paper Promoting Healthy Diets and Physical Activity. The purpose of the White Paper is to set out an integrated EU approach to contribute to reducing ill health due to poor nutrition, overweight and obesity."(Dekker Jolien, pp.2)

¹⁰⁵ (Boehmer et al. 2007)

information transmitted to consumers or not. Above all, form of the label is inefficient because single market of the EU requires several languages mixed in the label. Thus, the regulation should develop effective labelling rule which does not need decoding.

Since labelling is not an omnipotence solution, legislation for obesity demand traceability to modern food production. Philip James, Chairman of the International Committee of Action for the Prevention of Obesity, argued that current agriculture system requires radical reform. Food policies should cut subsidies for the cheap and high calorie foods. Subsidies to soybean and corn production constantly supplies cheap calories in the market. These crops added most of food and feed production to lower the food cost. In the economic view, cheap product have positive role in the market since it enlarges the consumer's choice those who are not affordable to pay high prices for foods. However, these products contain high calories and result the poor suffers obesity than the richer. Thus, not only cutting the subsidies, but also allocating budget to promote fruit and vegetable farmers should be paralleled.

3.2. Consumer's concern on organic food

Increasing food contamination occasions and ethical demand on consumption lead organic food consumption.¹⁰⁶ The European Union established labelling and advertising rule of the organic food in the Regulation 2092/1991 and the amendments. The regulation defined organic method and organic food stuff which produced by this method. Those regulations appeared in public with organic labelling rule. Organic production should be produced by at least 70% of organic ingredients, and this foodstuff may get organic label with 'X% organically produced'.¹⁰⁷

The Regulation 1804/1999 is the amendment of the Regulation 2092/1991 it specially

¹⁰⁶ "Global sales of organic food stood at €25 billion in 2005. Retail sales of organic produce in the United Kingdom alone exceed £ 1.6billion, an increase of 30 per cent on 2004. This included sales of nearly 9,000,000 organically reared birds and two hundred million litres of milk. Nearly two-thirds of all consumers in the UK buy organic foods." (Organic Market Report 2006)

¹⁰⁷ Council Regulation (EC) No 1935/1995 of 22 June 1995

includes organic standards of livestock and livestock product.¹⁰⁸ The rule implemented not only slaughtered animal for the meat purpose but also refers eggs and dairy product. Firstly main criteria decide organic product is rearing method which stands regulate minimum periods.¹⁰⁹ In other words, how long time animals stayed outdoor place can decide either organic product or not. Secondly, feed stuff must come from organic sources, and the force feeding is forbidden. Daily diets should contain roughage, such as fresh or dried fodder, or silage to all livestock organically reared. Conventional animal feedstuffs exceptionally allowed, only when similar organic feed not exists in the EU. Antibiotics and GMO feed are not allowed for organic product. Density of the stock must ensure the welfare standard which concerned animal behaviour and natural movement. Thus, enough space should be provided for natural movement, (such as lay down, stand and turn around) when animals cannot stay in the outdoor. Minimum standard for space which fit with each animal stated in the regulation. Also, the high sanitary level requires prevent animal disease.

However, organic meat production permits feedlot system before entering slaughter process. The final fattening process in the meat production less strictly ruled. At the final stage, poultry feed should contain 65 per cent of cereal in the diet. Also, cattle, pig and sheep passes final fattening process which took them in indoor, but this period should not exceed one fifth of their lifetime.

These are the little part of the organic regulation among more than 40 amending regulations of the EU. Several amendments result confusion for organic food producers. Another problem is that first regulation allowed introducing GM ingredients. Second amendment (1995) enables non-organic ingredient until 30 per cent, and still 'organically produced' labelling was accepted. These two regulations prohibited since EU introduced 1999 amendment. However, confusion of the regulations in the primary step caused distrust on organic label. Therefore, new regulation, which consolidates

¹⁰⁸ animals, includes cows, pigs, sheep, goats, horses, poultry and bees

¹⁰⁹ "12 months for horses and cattle used for meat production, six months for horses and cattle used for milk production and 10 weeks for poultry for meat production" (Macmaolain, Caoimhin., pp.257)

former numerous regulations, requires which is not misleading both producer and consumer. Also, current labelling rule have to revise misleading factors, and building reliability of organic food is crucial assignment for the current regulation.

3.3. Labelling

3.3.1. Beef Labelling

The EU labelling rules of the beef production divided into compulsory system and voluntary system. All beef product sale in the market should apply labels to give written information to customers. Offering traceability of the system is the main purpose of the labelling system. Thus, the reference number or code of the beef products enables consumers to trace the producing process. Information offers from birth date until slaughtered date of the beef. The reference code updates information such as dates of birth, the supplier, delivery note details, kill date and weight

The Beef Labelling Scheme (BLS) is the EC beef labelling system which is voluntarily added to compulsory indicators. Voluntarily labelled information¹¹⁰ includes producing method of food and pasturing time (e.g. Free-range). Therefore, compulsorily added labels mainly focused on the information 'where it came from' rather than 'how it made with'. Below picture is the sample of the current beef label.

¹¹⁰ "region or locality where the animal was born and reared, breed or cross breed, age or gender of animal, method of production (e.g. farm assured, grass-fed), method of slaughter (e.g. halal. kosher), date of slaughter, method or length of maturation. "(Beef Labelling Guide)

Label for retail:

Northern Irish beef
05/02/05/324694/1 - ref. no. / code
Sirloin Steak
Weight: 600 grams
Price: £3.00
Unit Price: £5.00/Kilo
Farm Quality Assurance NI
Slaughtered in: UK (9000)
Cutting in (or Cut in): UK (9000)
Origin : UK

Label for mince:

British minced beef*
08/07/05/346248/2 - ref. no. / code
Farm Assured
Weight: 1 kilo
Price: £4.75
Minced in: UK
Slaughtered in : UK

* Where all animals from which the minced beef is derived were born, raised and slaughtered in the UK.

(Beef Labeling Guide, Appendix1)

Animal feed label follows the Feeding Stuff Regulations 2000 derived from EU law. The feed includes additive ingredients, is recommended to list name or categories in the label. However, compound feed is not made with a single material. Thus writing all ingredients is not feasible. The committee admitted disclosing manufacturer's name and each component of the feed ingredient.¹¹¹ But providing the percentage of the composed ingredient is an unnecessary restriction and this regulation was not included in the compound feeds of the European Community's Directive 79/373/EEC. The percentage declare is controversial issues among member states because some countries worry about the BSE crisis and they consider that providing percentage would guarantee the food safety. Others concern is that quantitative information cannot offer any safety information. Therefore, the Committee concluded that disclosure of ingredient percentage is permitted by the law, but it should be optional rather than mandatory.

The labelling rules both adjusted for beef product and feed, not offers enough information to the customer who are interested either ethical consumption or health issue. Although, traceability of the beef is crucial, the compulsory label offers only regional information of the product made, rather than information how it produced.

¹¹¹ (ACAF)

Modern animal disease caused by the producing process, such as poor sanitary standards, feedstuff and slaughter process. The BSE crisis and salmonella poisoning are the examples which failed to keep the standard. However, consumers cannot avoid potential danger with compulsory label which informs only the region. Although current feed labelling rule devised to prevent inflow of the GMOs thus labels fully disclose the list of other ingredients, but the information offered only to the farmers as direct consumer not until to the beef consumers. Animal feed affect meat quality, but consumers cannot confirm it with current labelling rule. Consumers can get more information just from organic label and voluntary added labels.

3.3.2. Eco-Labeling

The priority purpose of labelling rule is offering information to consumer; thus it enables protecting consumers and empowering consumers. Label empowers consumer in the market, thus reliability of the label are crucial in a liberal democracy. When empowered consumers choose a product with their willingness, healthy economic can be created since producers would compete in fair competition. Also, labelling is not a prohibiting method in the market but a final decision left to the consumer. Therefore, rule by information became dominant in the consumer protection law of the European regulation¹¹², and empowerment of consumer considered 'win-win' strategy to protect single market of the EU.

Climate change, food safety and public welfare concerns encouraged public sustainable turn their interest into growth and ethical consumption. Organic food industry represents public desire of the modern society. Organic labelled product enlarged consumer's choice. Organic food label promotes public health standard and increases eco-friendly agriculture activity. Although, organic food market developed rapidly, it operated only as a small portion in the OECD countries.¹¹³ In France, for example, organic label developed more than 25 year, but organic food market is only 2% of total food

¹¹² (S.Weatherill,1994)

¹¹³ (F.Larceneux et al.pp.86)

market.¹¹⁴ When sales rate only focus on organic product, it increased fast, but the share of organic food market in total consumption is still around 2 % in domestic food market¹¹⁵, and the highest share is roughly 3.5% in Switzerland.¹¹⁶ The barrier of promoting organic market discussed of the high price, lack of perception and poor labels with lack of belief. High price would not be solved easily since the cheapest food production uses concentrated method to lower the price.

Although, reducing price is not feasible with organic method, properly labelled product can increase consumer's belief on the product. In other words, current labels are not enough to satisfy consumer's concern. Current system focused on full disclosure of the information. On the contrary to the purpose of the labelling rule, just providing information cannot empower consumers. First of all, too much information in the product is a waste since it is not efficient and only few consumers notice the information. Secondly, complex label is not easy to understand for all consumers. The EU regulation stated that label should be understandable, visible and clearly readable¹¹⁷ but in practice, label could not satisfy these demands.

Consumer's behaviour demonstrates that label cannot give the priority reason of their choice. According to the qualitative study of consumer's research, consumer's motivated to choose organic product because of the better taste and health concern.¹¹⁸ However, organic label not always indicates the product quality. The research demonstrates that consumers distinguish product's quality depend on the brand name. Organic product consumers do not always choose organic or ethical food. Thus, consumers concern quality (or, brand name) more than the eco-friendly in the organic label. In addition, economic crisis degraded consumer's motivation of purchasing green product. Quality of the food product is the primary concern for the consumer. Therefore, to increase sustainable and healthy consumption, education to promote understanding of

¹¹⁴ (Idem.pp.86)

¹¹⁵ (UNEP pp.23)

¹¹⁶ (Yussefi et al. 2003)

¹¹⁷ Art.13(2), Directive 2000/13 relating to the labelling, presentation and advertising of food stuffs for sale to the ultimate consumer: OJ 2000 L109/29

¹¹⁸ (Idem.pp88-89)

the linkage between 'green product' and 'high quality', also paralleled with labelling rule.

Another problem of eco-label is that the label can contradict with technical barrier to trade (TBT) of the WTO. The United States claimed the European labelling rule of the genetically modified organisms. Also certified eco-label standard is too high to developing countries thus small holders cannot keep up all the criteria which requires. Although, the WTO agreements include eco-labelling provision, proliferated labels does not ensure all provisional standards, either certified or private label overlap and conflict each other.¹¹⁹ Thus, developing countries who are in the exporter position are complaining that the labelling standards are not unified, and scientific information is not always available.

Another confusion factor of eco-labelling is that non-governmental organizations developed eco-labels with their own standard and infrastructure. Above all, both traditional standard bodies (e.g. ISO member bodies) and non-traditional standard bodies do not collaborate to develop unified eco-label standards. As a result, producers are often in difficulties to get labels of certain countries. According to the article 5.1.2 of The TBT Agreement, operating non-governmental standard in their territory is encouraged when the standard is not strict. For the developing countries, general accepting standard is limited to only confirmative assessment procedure.

3.3.3. Challenge of eco-label

Various standards of labelling criteria increased complexity to consumers and to producers. Eco-label also has misleading factors and this fact decrease consumers' belief of the label. Organic labelling rule allows that until 70 percent of ingredients should be organic. In other words, 30 percent of ingredients are not guaranteeing organic standard. Also, 'natural' label means that they avoid artificial chemical thus this label makes confuse with 'organic' label. Consumers can misunderstand both 'natural'

¹¹⁹ (UNEP,pp24)

and 'organic' labels ensure that 100 percent naturally feed and pastured outside.¹²⁰

Thus, label requires to concentrate on the objective of "what consumers want to know", and transfer the information effectively. Organic consumers also interested in the outcome of the environment which can result from their choice. They are motivated to buy organic and ethical product when they confirm that their choice visualized with a positive outcome. Therefore, setting clear definition of 'natural' and 'organic' is crucial to encourage consumer's acknowledgement. After all, regular market analysis demanded which researching efficiency or effectiveness of the eco-label, and the contribution to the environment. The goal of this process is not just providing high volume of information to consumers. Setting trust of label can encourage consumer's motivation of consuming positive-meaning labelled food (such as eco-friendly, fair-trade). Understandable labels are more effective than full information arranged label. Shortly, to encourage eco-consumption, effective and visible labelling is indispensable strategy rather than disclosing whole information.

3.3.4. Grass-fed label in The United States

In 2003, non-profit certifying-organization established in the United States, and they passed 'grass-fed label' in the U.S. Department of Agriculture (USDA). This association name is the American Grass-fed Association (AGA). They researched consumers in various way include social network, such as Facebook and Twitter. According to the research, they tried to respond consumer's belief on the meaning 'grass-fed' animals which lived in pasture and any artificial medicine added, such as hormone and antibiotic. Also, this new type of label regards takes consumers concern of modern factory farming and consumers doubt of 'free-range' and organic label.¹²¹

¹²⁰ (Greenchoices.pp.13)

¹²¹ "According the People for the Ethical Treatment of animals (PETA), 'organically raised' cows are fed 'organic feed' in the factory farm feedlot during the fattening period before they are slaughtered. Also U.K. regulations requires at least 8 hours of access to outdoor to the free-range chickens but wide area with bright sun is not preferable place for the chicken's habit rather than shelter of wind and sun. In other words, labels not ensure animal welfare standards."(<http://www.peta.org>)

When the AGA passed the label standard first time, they allowed animal feed contains until 20 percent of grain and even some hormones was still available. However, to set a higher level of certification, new standard of grass-fed label initiated since 2007. Not only beef, ruminant animal for meat product (e.g. Bison, goat and sheep) must be grass-fed 100 percent, and any hormone is prohibited. If they receive antibiotics, they are excluded from this programme. Grass is natural feed, and grain is not natural for the livestock groups which distinguished as ruminant animal. On the contrary, feeding grain is not strange for the pig and poultry. However the problem of modern factory farming fed pig and poultry intensive grain feed for the whole life. Therefore the organization planning to incorporate pork and poultry which include grass feed as compulsory diet. This label not only indicates the feedstuff but also include the breeding method as pasturing. Thus, this label ensures that meat producing process is amiable to the environment, human health and animal welfare.



(Americangrassfed.org)

Grass-fed label is derived from local and sustainable movement of the meat market. The label devised to respond consumer's choice those who want to know not just nutrition contains but also the ways cattle raised and fed. Advocators of this scheme argue that grass-fed beef is not 'grain-finished' thus it has various benefits. First of all, grass feeding is eco-friendly way than the grain-feeding method. Secondly, grass-fed beef

contains healthier fat includes much omega-3s.¹²² Lastly, both raising method and their feed are the most preferable way to animal's welfare. Animal welfare directly linked with human health. For example, grass-fed beef have less danger of contaminating E.coli O157:H7 bacteria. People who consumed E. coli infected-meat has lethal damages. Modern feedlot system criticized because frequent outbreaks of the E.coli bacteria infection.¹²³

'Grass-fed' label reflect the consumer's faithful idea of 'organic' since grass-fed beef is not passes feedlot system. Consumers confused with 'organic' label; indeed it was not 100 percent adjusted organic method. Most of livestock pastured in the nature they spend last time in the intensive feedlot as fattening process before slaughtered. This process purposes to reach slaughter weight in short times, cows fed concentrated grain mixture (corn, soy, barley etc.). John Robbins examined scientific research compared between grain-fed and grass-fed, and noted like this, "Conventional factory meat is so cheap because they've done everything to speed growth and lower the cost of feed."¹²⁴ Also the feedlot process enhances fat marbling of beef that determine taste and higher grade of the meat. Higher fat-contained meat is disadvantageous choice on the health perspective Although the cow is reared with organic method, in the end what consumer's eating is obesity beef because even organically bred animal passes feedlot system.

3.4. Consumer's concern

Most of the animals pass feedlot and 'finished' which corn and other grain diet. It is undeniable that feedlot system increased meat production in the market, and it enabled

¹²² "A Study by researcher at California State University in Chico examined three decades of research and found that beef from pasture-raised cows fits more closely into goals for a diet lower in saturated fat and higher in "good fats" and other beneficial nutrients" (Kim Cross, 2011)

¹²³ "Switching a cow from grass to grain is so disturbing to the animal's digestive system that it can kill the animal if not done gradually and if the animal is not continually fed antibiotics. As well, it is the commercial meat industry's practice of keeping cattle in feedlots and feeding them grain that is responsible for the heightened prevalence of E.coli O157:H7 bacteria. When cattle are grain-fed, their intestinal tracks become far more acidic, which favours the growth of pathogenic E.coli bacteria, which in turn kills people who eat undercooked hamburger." (Robbinsons, John, April 18th 2010)

¹²⁴ (Idem, 2011)

the industry to offer cheap price of meat. However criticism of feedlot system increased since it highly cost for the environment, for human health and the animal welfare.

Corn became main diet for livestock in modern system, and almost 40 percent of corn cultivated for animal feed. However corn farming is nitrogen-intensive; thus it contaminates soil and water like 'dead zone' in the Gulf of Mexico.¹²⁵ Also corn-centric diet for cattle feed increases cholesterol rate of the meat tissue.

These concerns raised consumer's interests of grass-fed beef include sustainable way of ranching animals. In the United States, natural and organic beef market growth rapidly.¹²⁶ Grass-fed business is one of innovative movement in the local market which represent consumers will to pay more for the natural healthy meat. Grass-fed label not only demonstrates feedstuff in the label, but also the method of rearing animal. Consumers want to know whether the livestock reared in cages or crates. During the winter season, pasturing animal outside is not feasible depend on geographic condition. Consumers accept those exceptional situations but still they prefer happily bred animal. According to a 2011 Kansas State University study, collected data demonstrated that consumers willing to pay 20 percent more for the mandatory labelled meat which informs animal welfare status.¹²⁷

3.4.1. Controversial between grass-fed meat and grain-fed meat

However, there is controversial of using the grass-fed labelling method to ruminant animal. According to the National Cattlemen's Beef Association, Shalene McNeill PH.D who conducted research in human nutrition claimed that grass-fed cow increase omega-3 content just slightly and this would not bring significant advantage to human health. Also, defender of modern feedlot system claims that organic or grass-fed beef has no

¹²⁵ (Gustin, Georgina, November 23,2012)

¹²⁶ "The market for natural and organic beef products, currently at \$350 million annually, could grow to over \$1billion within the next five years, attendees at a recent grass-fed beef conference were told." (Hay & Forage grower, 2011)

¹²⁷ (Neitzel, Janice, 2012)

exception from E.coli O157:H7 bacteria problem since there is no scientific evidence to grass fed meat. Also, the association argue that ‘green labelling’ condemns other method as harmful to the environment and human health.

The fact sheet of the American Meat Institute advocate feedstuff offered to feedlot system. They argue that animal feed include corn, soybean and forage which are balanced diet for the cattle. Also, corn feeding is not a new method since it performed at least 200 years. Background of feeding soy and corn to ruminant animal is for rancher’s economics. It is the fastest way of gain weight¹²⁸ also small feedlot system is easier for human than rotating animals in the pasture land. Above all, animal stays in the feedlot do not need waste calories by strolling pasture land. Grass-fed meat cannot lower the price in the market since farmers keep consider nutrition of the pasturing animal. Cultivating legume in the pasture land and rotating animal increases labour requirement thus grass-fed meat has limitation of access in the market. Therefore, persisting grass-fed beef has shortage in practice.

Another criticism is about the feasibility of grass-fed system. First of all, grass-fed method requires more than 2 times large land compared to grain-fed feedlot system. Furthermore, some places are not suitable for grass-fed method since the grass cannot grow as year-round. Producing grass-finished beef is more suitable for warm climate countries such as Brazil, Australia and New Zealand where grass grow all year. According to Hollidays and DeHavens, grass-fed cattle rancher in Texas of the U.S, they had to import expensive hay and grass when grass died by strong sunlight of Texas. In addition, pasturing cattle in the outside and feeding grass is not easy during the winter season.

3.5. For the consumer’s choice

Indeed, grass-fed labelling has physical limitation. Also the high price of this method is

¹²⁸ “Feeding corn and soy to ruminants made them gain weight a whole lot faster, about three ponds a day versus a pond a day on grass”(Azab Powell, Bonnie, 2007)

main concern which makes consumers hesitate to grab the product.¹²⁹ Grass-fed beef has positive nutritional composition thus it has a health benefit. However the scientific evidence of health effect is not significant between corn-fed cattle and grass-fed cattle. Above all, obesity and obesity related disease are hard to trace the cause. Also, one food is not a simple reason causing the obesity. However, organic and natural farming became spotlighted to substitute conventional method of farming. Unsustainable conventional farming has questions for environment, human health and animal welfare. Thus, consumers who concern of these factors, desires to have more information of food which can enlarge consumer's choice and empower consumers. Although they cannot affordable to buy grass-fed beef, informing other method (such as corn-fed, grass-finished) can educate consumers why concerning animal feed is worthwhile. Thus they are empowered by labelled information.

In order to respect consumer's concern, organic or grass-fed labels appeared in the market, but some labels mislead consumers hence it curtails belief of label. Meat producers argue that current labels cause narrow interpretation; thus environmental activist and animal welfare actors exploit the term of 'industrial farm' or 'factory farm' and they regard non-organic meat as unhealthy and unsafe. Although labelling regulations intended to disclose full information, they offered unnecessary information. Therefore, misleading factors in label solved by disclosing all the information what consumers wanted to know. The consumer desire information either organic or grass-fed; likewise they also wanted to know not disclosed factors by fully disclosing label, reason why the product is neither organic nor grass-fed.

Formulating clear definition of the term, such as 'organic' and 'corn-fed' is prioritized challenge before introducing new labels. Not all the consumer understands differences of farming method thus setting definition helps the consumer to understand the necessity of label. Afterward, labelling rules requires amendment to respect formulated

¹²⁹ "Both price and fat and calories have a negative effect on the choice of the product, and higher levels of omega-3 fatty acids have a positive effect. Price is the most important attribute to respondents (39.5%), a low level of fat and calories is the second most important attribute (36.9%), and the level of omega-3 fatty acid is the least important of these factors (23.6%)" (McCluskey et al. pp.1)

definition. 'Corn-fed' means farming method used conventional way, which operated in the majority of the meat production. Corn-fed (or grain-fed) does not mean that animals only eat grains with no roughage. Corn-fed cattle also spend their time in the pasture land, but before slaughter process, around 4 to 6 months they stay in the feedlot and fed compound diet which includes corn and silage for the fattening. 'Grass-fed' means cattle were fed grass until 12 to 18 months, but around 90 to 160 days, before processed, they also enter the feedlot process and fed compound feed. Therefore, regarding how livestock finished is crucial to ensure the cow fed grass nearly 100%. Modern beef production can be divided into four categories depend on their diet. A diverging point is the moment entering feedlot system; thus it divided as 'before the feedlot system' and 'after the feedlot system'. General diet of cattle could be divided as corn-fed (or grain) and grass-fed. For 60 to 160 days before processing also divided as two types; corn-finished and grass-finished. To combine all steps together, meat product can be categorized as three parts: corn-fed (include corn-finished), grass-fed or organic (corn-finished) and grass-finished (100percent grass-fed).

It is indispensable filling the gap between definition and standard to intensify labelling rule. The complicated definitions are 'organic' and 'natural' labels which determine every definition synthetically. The reason of confusing organic and natural label is that this label satisfies every standard little by little, but at the same time it means left part of the standard is not organic. For example, grass-finished cattle do not always mean they are pastured in the grassy outdoor. Even though, cattle kept in confinement and fed dry hay, they can assorted as grass-fed and grass-finished. Although 'grass-fed' label indicates only feed state, the label should include pasturing condition. In other words, how much times they could access to pasture land should be counted, like egg with 'free-range' label.

It is certain that meat product, especially beef, is in the middle of the modern food safety issue. The BSE crisis, hormone case and E.coli bacteria are related with beef product, and the latest case happened in the UK is that TESCO burger contained horse's

DNA.¹³⁰ Although, there is perfect regulation, it cannot control unexpected situation, which came out through loophole. Therefore, precise labelling rule requires as soft regulation. Above all, frequent examination of newly settled regulations makes policy reliable. Organic product consumers are not always consuming 'organic' labelled food. Consumer's choice is not decided with simple reason. It depends on consumer's life style, their budget, nutrition and taste etc. Another problem is that organic market is still small, thus finding 'organic meat' is not practical since franchising supermarket do not display uncompetitive product. That is one reason demanding fully disclose by corn-fed label on behalf of consumer's right. Whether consumers prefer organic meat product or not, trustful information is crucial since it ensures consumer's choice as right to citizen.

There is criticism that certified organic label discriminated no-labelled food as unhealthy or industrial food. Thus, 'corn-or grain fed', 'grass-fed' and 'grass-finished' labels would offer accurate information of meat product. 'Pasturing' and 'feedlot' label would explain rearing method of the meat. New labelling rule recommended parallel with project education programme to improve the consumer's understanding of food label. After full disclose of information in the label, direction of future meat industry depends on consumer's choice. It is assumed that enhanced understand of modern food system, and improve labelling can motivate consumers to practice ethical consumption, thus their choice would change the future world as sustainable environment and healthy life.

¹³⁰ (BBC News 15 April 2013)

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