Kingdom of the Netherlands

Functional Food, Big Players and Consumer Trends

Agrifood in Japan

Market Report 2017

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Summary

Innovations in Japanese Agriculture and Food Industries and the Functional and Health Food Sector; Principle Industry Players; Actual Consumer Trends, etc.

On market size and trends in:

1. Health food market and the impact of society aging: organic food and functional food markets (in relation to produce)
2. Latest trends in innovative food: macular degeneration, seaweed examples, the bifidus bacteria (*Bifidobacterium*), Yakult, umami, miso, etc., (fermented food) development
3. Product packaging–latest marketing trends and concepts and consumer preference in Asian Region
4. Crossover with other industries (Such as Bioscience and Logistics)
5. Latest trends in sustainability in foods (food safety, security, environment and sustainability)
    - Animal welfare action and * market potential of anti-biotic free meat
6. Quality standards and origin labeling

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1 Health food market and the impact of society aging

What is an aging society? According to the definition used by World Health Organisation and the United Nations, when the ratio of those 65 years of age or older within a society against its total population size (aged population ratio) exceeds 7%, the society is said to be an "aging society"; while calling a society with an aged population ratio exceeding 14% an "aged society" and a society with an aged population ratio exceeding 21% a "super-aged society", respectively.

Japan became an ageing society in 1970 and an aged society in 1994. Japan's aged population ratio became 21.5% in 2007, indicating the beginning of a super-aged society status. Japan's aged population ratio reached 23.1% in October 2010, and expected to continue its upward trend under global observation.

1.1 Aging trend and Japanese situation

Next 50 years will see a rapid progress of global population aging. The global population reached 6.9162 billion in the year 2010 and is predicted to reach 9,957.4 million by 2060. The ratio of persons 65 years of age or older (aged population ratio) in the global population increased from 5.1% in 1950 to 7.7% in 2010, and is predicted to rise to 17.6% by 2060.

	1950	**2010**	**2060**
Total population	2.525.779.000 people	6.916.183 people	9.957.399 people
Population of 65 years or older	128.427.000 people	530.507 people	1.748.171 people
Developed regions	62.659.000 people	199.437 people	345.128 people
Developing regions	65.768.000 people	331.069 people	1.403.043 people
Percentage of people of 65 year or older	5,1%	7.70%	17.60%
Developing regions	7,7%	16.10%	26.50%
Developing regions	3,8%	5.80%	16.20%
Life expectancy (Men)	45,9 years	66,5 years	75,1 years
Life expectancy (Women)	47,9 years	71,0 years	79,5 years
Total fertility rate	5	2.5	2.2

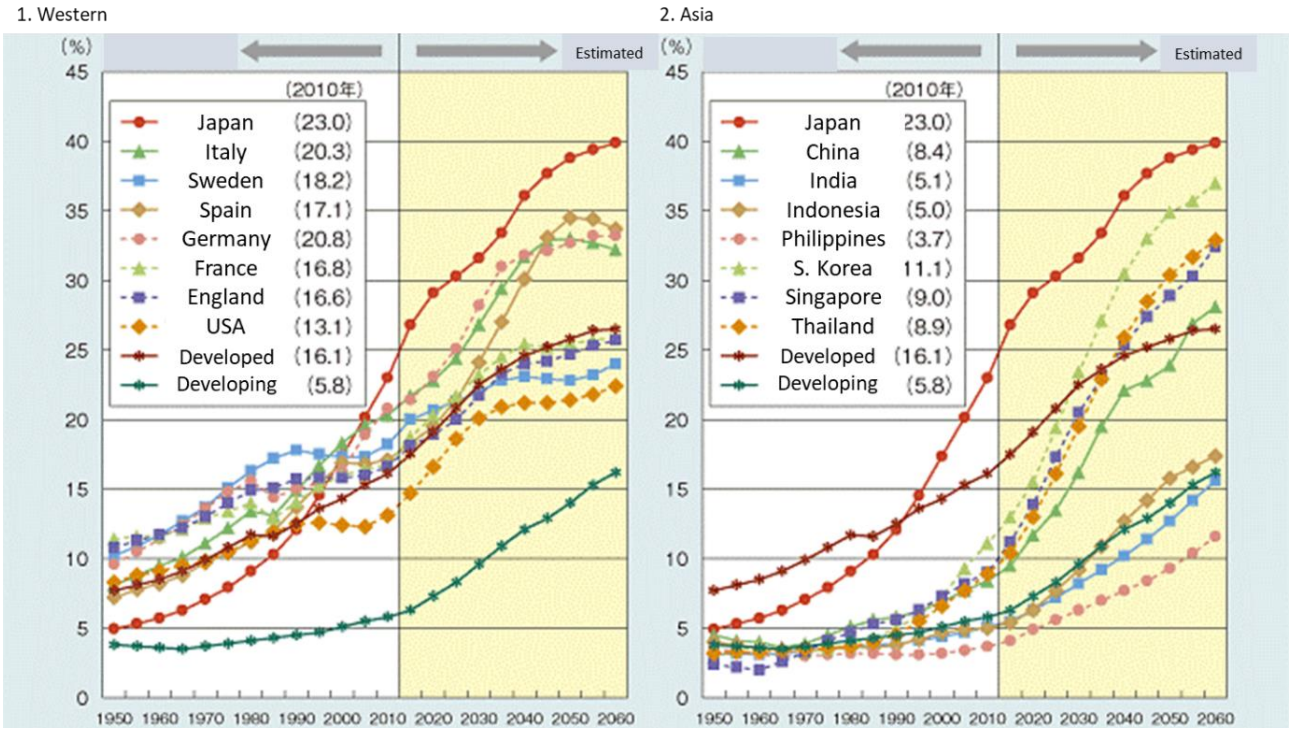
When comparing aged population ratio of developed countries, Japan ranked lower than most up till the

1980s, but moved up to middle of the group in the 1990s and then to the top level in 2005; meaning Japan has experienced an unprecedented level of society aging.

With regard to speed of population aging, the number of years required for aged population ratio to double from 7% to 14% may be compared between countries: 126 years for France, 85 years for Sweden, 40 years for Germany, and 46 years for UK. Japan, however, took only 24 years after exceeding 7% in 1970 to reach 14% in 1994.

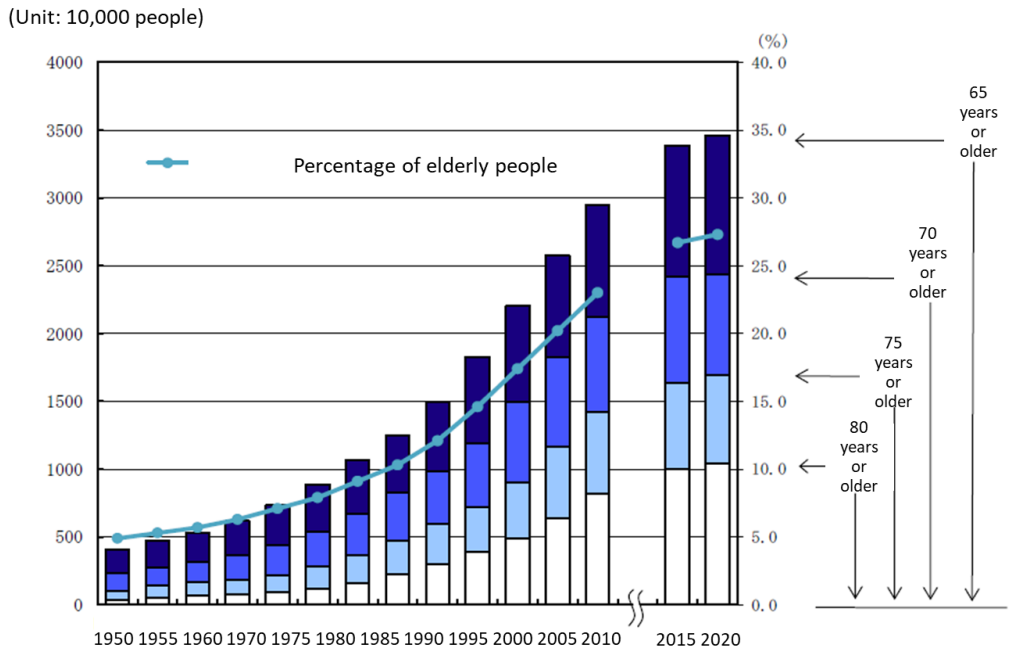
Population aging is also expected to accelerate in other Asian countries. In particular, South Korea is experiencing a rapid aging, faster than Japan, from 9.3% in 2005 to a projected 37.0% in 2060. Judging from future population aging trend in respective regions, a rapid aging will soon be experienced in developing regions.

1.1.1 Changes in the aging ratio of the world



1 Source: Ministry of Internal Affairs and Communications, "Profile of Aged Persons (65 or older) in Japan from Statistics"

1.1.2 Changes in the elderly population and percentage



1.2 Health food (supplement) market

1.2.1 Size of market

A survey by a major general consumer research company Intage Inc. found the following: Japanese health food and supplement market has a size of ¥1,578.5 billion as in year 2015, which was 2.5% larger than previous year. The figure for 2016 is estimated to be ¥1,571.6 billion, 0.4% less than the previous year. Fifty-seven million, eight-hundred and forty thousand persons (0.5% more than previous year) used health food and/or supplement, each spending estimated ¥27,169 (¥244 less than previous year).

Health food (supplement) market size changes

	2012	2013	2014	2015	2016
Market size (¥ billion) (From previous year)	14,746 (-%)	15,324 (3.9%)	15,395 (0.5%)	15,785 (2.5%)	15,716 (-0.4%)

Data from Intage Inc.

Factors that influence changes in the health food and supplement market size include changing preference due to population aging and changes in consumers, as well as: (1). Deregulations and changes in rules by the authorities allowing new products (e.g. "tokuho"); (2). Sizable impact of trendiness of a raw material or a component (e.g. "ukon" and energy drinks); and (3). Celebrity endorsement on TV show, etc., creating a boom.

1.2.2 Consideration for the functional foods

Diverse and an extremely wide range of products are marketed as health food or supplement. One may use such aspects as "function/ benefit" and/or "ingredient/component" to put this diversity into an order, or use the criteria provided by statutes or other institutionalized rules.

Following is an excerpt of a presentation given at "The 59th: Foods Labeled with Function Claims and Role of Health Promotion Industry"[1]

[1] Source: http://www.kobecity-lawoffice.com/upfile/pdf/1429611024_1.pdf

1. Background of introduction of new food function claim labeling

A new set of rules to regulate function claim on food labels was instituted on April 1, 2015. Within a week, over 80 notifications were received, indicating the high level of interest within the health promotion industry.

* Background of introduction of new system of food function claim labeling:

As both birthrate decline and population aging progress, there has also been annual increase of health care expenditures. As 30% of the healthcare expenditures are for the lifestyle diseases, a national health strategy has been developed aiming to create a health management service industry that does not use the public medical insurance and thus promote citizens; health and reduce healthcare expenditures.

Previously function claim labeling was only allowed to Foods for Specified Health Use (FOSHU or "tokuho") and Foods with Nutrient Function Claims. As becoming nationally certified as FOSHU is expensive and time consuming, small and medium-size enterprises were blocked from entering the health promotion industry, except for those with some supplement products (Foods with Nutrient Function Claims).

The government unblocked the path to food function claim labeling as a part of its New Growth Strategies for healthcare expenditure reduction and stimulating of consumption, in addition to creation of new industries (Healthcare–Agriculture–Commerce–Industry partnership).

2. Overview of the new system

The new system for food function claim labeling now allows general health food labels to carry claims about efficacy and effectiveness, which was previously banned. The new system is characterized by allowing function claim labeling for general foods including perishable food and produce, while not requiring national permit or certification provided a notification that meets Consumer Affairs Agency guideline has been received 60 days before sale. However, the applicant needs to satisfy following conditions before submitting notification: i. to determine the product is within the scope of Foods Labeled with Function Claims (FLFC); ii. to present clear evidence of safety; iii. to establish quality control system in production; iv. to establish health injury data collection framework; v. to present clear evidence of the functionality; and vi. to label properly.

	Foods for Specified Health Use ("tokuho")	Foods with Nutrient Function Claims	Foods Labeled with Function Claims (new system)
Allowed to	Claim to lower disease risk	Claim about functions of a component	Claim function of a component related to the function
Example	"… control sugar absorption, suitable for those watch their blood glucose level"	"Calcium is essential nutrient for building bones and teeth."	"… contains lycopene and support functions of blood vessels"
Character	Government's assessment and certification are required, expensive and time consuming.	Scope limited to nationally designated minerals, vitamins and certain other components.	Submission of a notification that meets Consumer Affairs Agency guideline allows function claim labeling for a general food.

3. Scope of "Foods Labeled with Function Claims"

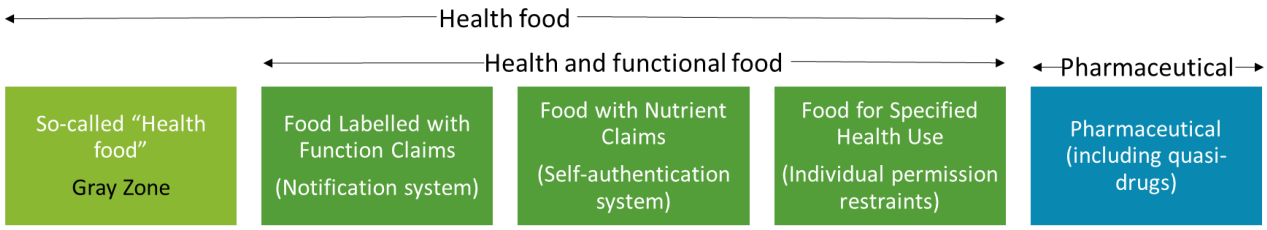
Scope of the new system covers general foods, though excludes "Food for Special Dietary Uses (FSDU)" and FLFC, which need to undergo national government's assessment, alcoholic drinks and products that may lead to overconsumption of a nutrient provided in Regulation for Enforcement of the Health Promotion Act (such as cholesterol). Furthermore, as the system is for allowing labeling of a claim of a function that facilitates "maintenance and promotion of health of a person who does not suffer a disease," it does not permit any expression that suggests therapeutic or prophylactic effect (such as "recommended for those with hypertension") or a claim to exceed an efficacy outside the scope of health promotion (such as "rebuild your body" and "white beauty".)

A claim to lower disease risk, which is permitted to FOSHU, is not allowed under the new system. Well, then, though a claim for therapeutic or prophylactic cannot be made, can a claim be made for recovery or alleviation in a person who is in a border area between health and disease? This point is not clear by the guideline; though the view of an officer at the Consumers Affairs Agency was "permitted appropriately stated."

1.3 Health foods and functional foods

1.3.1 Health foods definitions according to Ministry of Health, Labour and Welfare (Government)

Not every class/type of "health foods" in Japan has a statutory definition. The chart below shows coverage of product classes as stipulated by the Government. Within the scope covered under "health foods", the green colored "Foods with Health Function Claim" are under the national system. The blue area, indicating not covered by the national system, indicates what MHLW calls "so-called "health foods", i.e. a gray zone."

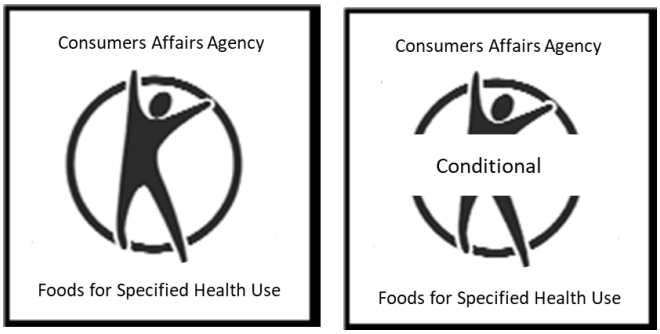


1.3.2 Foods for Specified Health Use

Foods for Specified Health Use (FOSHU) is well known by its abbreviation "tokuho". This class was instituted in September 1991. Each product has to undergo effectiveness and safety assessment, and, when passed, labeling of the claim is permitted by the Government. This class of Foods with Health Function Claim has to meet most strict criteria, and is the only one to be given the permit logo. Its assessment imposes a major financial burden and requires long time to complete, making it a difficult undertaking unless the applicant is a large corporation.[2]

[2] Consumers Affairs Agency: http://www.caa.go.jp/foods/pdf/syokuhin86.pdf

A product in this class meets the criteria to carry a label with a claim that it is food that contains a functional component that influences a physiological or other function in human body, used for a specified health use. Label for food in this class may, for example, include such a statement as "… helps you maintain normal blood cholesterol level" or "… useful in conditioning your gut"; etc., indicating it is a food that contain a component with a heath function that influences body's physical function or another aspect, such as helping to maintain normal blood pressure and/or blood cholesterol level, or to be useful in digestive conditioning.



Foods for Specified Health Use (Conditional) / Foods with Nutrient Function Claims (FNFC)

Unofficial translation of FOSHU logos (For actual labeling, the official Japanese logos are used.)

1.3.3 Foods for Specified Nutrient Claims

This class was instituted in April 2001, requiring only to meet the national standards; no application for permission, notification or similar necessary. There is no permit logo. A product in this class meets the criteria to carry a label with a claim that it is a food used for replenishing a nutrient (vitamin or mineral), alongside the statement on the function of the said nutrient appearing alongside. Only the function of the nutrient(s) contained in the food can appear in the label. It is not allowed to claim "to be useful for a specified health purpose", unlike the case with FOSHU.[3]

[3] Consumers Affairs Agency: http://www.caa.go.jp/foods/pdf/syokuhin830.pdf

1.3.4 Foods Labeled with Function Claims

This is a new class, instituted in April 2015. A business can label a food with this class of function claim, provided it has submitted the CAA with a notification that meets the requirements under the national rule, including safety of the food and scientific evidence on the function claimed. Not to be marked with a permit logo.[4]

It is assumed the business has correctly validated its own label according to the rules, which makes this class of food labeling a simplified version of FOSHU. The initiative for this class was informed by United States' dietary supplement labeling system already existed. It allows business an easy entry to the market as there is no difficult national assessment to pass.

The consumer also benefits by an increase of foods with information on their functions and subsequent increase of options. Consumers can view the explanation of scientific evidence of each function provided by the business (content of business's notification) on such medium as CAA website.

This labeling system is groundbreaking as the scope it covers extends beyond health foods: almost all processed foods and perishable foods other than alcohol, etc.

* On "サプリメント ("*sapurimento*")": Word derived from the English word "supplement". A *sapurimento* refers to a food for easy supplement of a nutrient or other component not sufficiently available in one's day to day meals, and can be rephrased as "*eiyo-hojo-shokuhin* (nutritional supplement food)". Legally speaking, the scope of this class extends to non-specialty foods that are not allowed to carry a claim of a function in its label; though many others also meet the criteria for FNFC and labeled with function(s) of respective nutrients. In some cases, this term also referred to packaged health foods that come in a medicine like form such as capsule, soft-gel or powder.

1.3.5 Future market

The introduction of the new system is thought to reduce the number of the "so-called "health foods", appeared in the gray zone in the chart above, as it improves health and quality of the market. Though it will need a few more years to confirm as the system is still only a few years old.

[4] Consumers Affairs Agency: http://www.caa.go.jp/foods/index23.html

1.4 Health food market (companies)

1.4.1 Main health food companies

The table below shows ten top ranked companies in health food market-share list.

Name	Sales channel	Turnover (¥ million)	Brands
Suntory Wellness Ltd.	Mail order	63,500	Sesamin EX, DHA&EPA + Sesamin EX, Glucosamine & Chondroitin
MIKI Corporation	MLM*	53,600	MIKI Prunes
DHC	Mail order or shop front	52,600	Fosukori, Protein diet
Japan Amway	MLM	41,900	Nutrilite
FANCL	Mail order or shop front	33,500	Karorimitto
FORDAYS	MLM	32,400	Natural DN Collagen
Yazuya	Mail order	22,000	Mature Yazuya Kozu, Nourishing Aojiru
Naturally Plus	MLM	20,300	SUPER LUTEIN
NU SKIN Japan	MLM	19,600	Life Pack
Yamada Bee Farm	Mail order	19,300	Royal Jelly King

Source: Complete Encyclopedia of Health Food Business

* MLM (Multi-Level Marketing) is often referred to as "Network Business" in Japan

In addition to those on the listed above, following health food companies are also known for their respective brands': (1) Egao "Egao no Kurozu", (2) Wakasa Seikatsu "Blueberry Eye", (3) Ever Life "Kojun", and (4) Setagaya Natural Foods "Glucosamine+Chondroitin"

1.4.2 Efficacy of health foods and function specific markets

Generally a health food market is categorized based on health benefit and functional raw material (ingredient/ nutrient). Intage Inc. identified 49 types of health benefits and 65 types of ingredient or nutrient and used those to analyze market trend.

The most claimed health benefit in the said study is "Beautiful skin/ skincare", with the estimated market size of ¥ 150 billion. Many a products in this category list collagen and/or placenta in its label, e.g. "amino-collagen" supplement from Meiji and "The Collagen" mini-bottle drink from Shiseido. The second most claimed benefit is "Health promotion" with the estimated market size of ¥ 121.9 billion, containing such nutrients/raw materials as multivitamins and garlic. "Eye health (excluding dry-eye control)" is the third most claimed benefit with ¥ 9.87 billion, with many listing blueberry or billberry as the source of claimed nutrient. The top 10 categories make up over a half of the market share.

The study also identifies such claims as "Cancer prevention", "Promote hair growth, control hair loss and improve hair thinness" and "Prevent dementia and improve brain functions" as having a share potential bigger than respective current estimated share sizes. On the other hand, the study identifies "Reduce tension, stiffness and pain in neck, shoulders and lower back" and "Promote hair growth, reduce hair loss and improve hair thinness" as the categories need to be carefully watched as potential health food markets, due to around a half of consumers currently use non-health food means, such as medicines, to solve those health problems.

1.4.3 Summary of health benefit specific markets

Claim category	Share (%)	Comment (market size and products offered)
Beautiful skin/ skincare	9.8	¥ 150 billion in collagen and/or placenta: e.g. "amino-collagen" from Meiji and "The Collagen" from Shiseido
Health promotion	8.0	¥ 121.9 billion in multivitamins and garlic
Eye health (excluding dry-eye control)	6.4	¥ 9.87 billion in blueberry or billberry
Joint health	6.1	–
Promote recovery from fatigue	5.3	–
Nutritional balance	5.1	–
Bowel health and resolve constipation	4.3	–
Anti-oxidant and anti-aging	3.8	–
Weight loss	3.7	–
Replenish a specific nutrient	3.3	–
Blood thinning faculty	3.3	–

1.4.4 Unique sales channel pattern and future market (with population aging)

It is said 64% of health food in US is sold in shop-front sale. In Japan, 84% is sold without a visit to physical shop. When Japan did not have a system that allowed foods to carry label with function claim, the marketers used such means as "product R&D story" and "user feedback", which cannot be part of product packaging or shop-front the point of purchase advertising display (POP) at shop-front to distinguish their product from competitors'. This trend promoted utilization of non-shop-front sales channel as the mainstream.

Now the system has included Foods Labeled with Function Claims, which allows marketers to print claim of function or efficacy on product packaging or display it in shop-front POP; a large volume display of those at drugstore may induce a major changes in expanding customer population. For that reason, the following observation is made concerning the future trend: Mass production leading to lower retail price → Consumers learn about nutrients and their characters; and become less resistant to health foods → Use of raw materials with high added value and branding nurture competitive products. → Market becomes globalized. → Health food companies with strong edge can survive.

The health food industry can expect to enjoy the benefit of overseas tourists "inbound" purchase in future. Presence of the vast Asian market, where Japanese companies are highly trusted, will be another factor for market expansion.

2 Latest Trends in Innovative Foods

2.1 The national diseases

The top three killers of the Japanese are cancer, heart diseases especially acute myocardial infarction and strokes. One's everyday lifestyle is thought to cause and allow those diseases to progress. It is said that one of the factors that allowed increase of the three major diseases is decline of vegetable consumption as people's increasing preference to western style diet leading to more meat centered meals and fewer meals with fish or vegetable (compared to a decade ago).

Prevention of the lifestyle diseases said to be accomplished by aiming to eat about 80% of full stomach, include vegetables and legume in meals, eating fish, reducing salt, avoiding excess alcohol, walk frequently, and avoid smoking tobacco.

2.2 Prevention of lifestyle diseases

For example, one hears eating foods rich in dietary fiber reduces the risks of stroke and heart diseases. In order to prevent oxidation in one's body and detox it, one can take such preventative measures as eating the traditional Japanese cuisine enriched with fermented foods (such as rice bran pickled vegetables and miso soup), exercising adequately and allowing sufficient sleep.

2.2.1 Introduction of examples of R&D initiatives in food for health promotion

Ishikawa Prefecture is an area with many unique fermented foods nurtured by the land and climate of Hokuriku Region (such as Kabura sushi, Konka pickle, and fermented horse mackerel sushi). Fermented foods are produced by many strains of effective microorganisms including the kōji mold (*Aspergillus oryzae*), yeast and lactic acid bacteria (LAB), which change components in raw materials/ingredients and give each of those foods its distinct flavor, as well as improve its storage.[5]

[5] Industrial Research Institute of Ishikawa: Isolation of LAB strains in traditional fermented foods and development of new functional foods: http://www.irii.jp/randd/infor/2012_0701/topics2_1.html

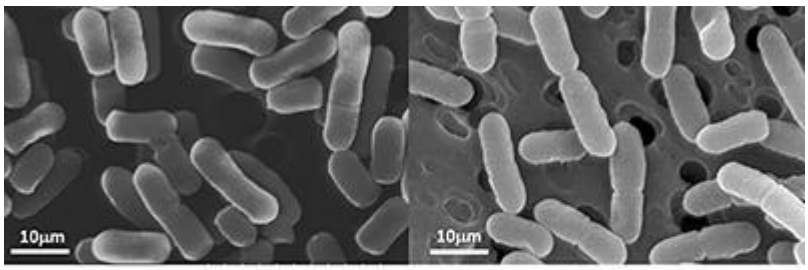
Now the functions of those microorganisms found in those fermented foods are drawing attention. Among those microorganisms, various species and strains of the LAB, found in many fermented foods such as yoghurt and Japanese style picked vegetables, are known to have such functions as improving intestine condition and anti-allergy faculty.

The Industrial Research Institute of Ishikawa (IRII) started its joint research with Ishikawa Prefectural University and Kanazawa University in 2009, working to isolate LAB strains found in the traditional fermented foods of the prefecture. IRII also worked in partnership with food companies in the prefecture in development of new fermented foods utilizing an LAB. I will list several examples of those research outcomes.

2.2.1.1 LAB isolated from traditional fermented foods and their functions

A mouse oral administration study observed changes in levels of immune mechanism related proteins (such as IFN-γ) and antibodies (such as IgE and IgG) in several strains of LAB; suggesting presence of immune-stimulating effect and/or anti-allergy faculty. In addition, the study team discovered a strain of LAB that produced a large quantity of GABA, known for its faculty to suppress elevation of blood pressure.

Photographs of typical LAB strains isolated from traditional fermented foods



あじのなれ寿し由来乳酸菌
L. plantarum ANP7-1

かぶら寿し由来乳酸菌
L. sakei KP7-11
（石川県立大学 古賀教授提供）

2.2.1.2 Example of development of new fermented foods utilizing LAB

IRII and Fukumitsuya Sake Brewery in the City of Kanazawa made prototypes of rice yoghurt using the LAB strain with immune stimulating faculty IRII had isolated. The team first used the rice–kōji fermentation starter to saccharify steamed rice, and then fermented it with the LAB to create a fermented food with fresh acidity and natural sweetness of glucose. IRII then examined the conditions in which fermentation occurred in the saccharified rice liquid; and found that one day long fermentation allowed LAB to multiply over 100 million cells, creating adequate level of acidity. In addition, the team determined the conditions for sterilization to stop fermentation, as over-fermentation would compromise product flavor. The LAB used is known to maintain its health promotion effect after sterilization. The team is aiming to create a nutrient rich functional food product that can be consumed by those with milk allergies.

2.2.1.3 Blueberry frozen yoghurt

IRII and Yanagida Shokusan in the Town of Noto worked in partnership to develop a frozen yoghurt product using an immune stimulating LAB strain for fermentation; is intended to allow consumption of live LAB. Many commercially available LAB containing foods have short longevity before exceeding the best-before date. Freezing allows maintaining LAB alive for a long duration. IRII simulates actual manufacturing process for examining pre-processing conditions in the raw material blueberries before fermentation as well as fermentation conditions, conducts microbial count test so that the product will clear legal requirements, and provides advices in the effort to improve on the prototype; thus supporting the firm in developing it into a new product.

2) Rice yoghurt

3) Blueberry frozen yoghurt

2.3 Other initiatives

Japan has many other fermented foods, being researched utilizing local character.

For example:

2.3.1 Akita University Institute of Fermented Food (natto)

Fermented foods industry is one of the main industries of Akita Prefecture. The Institute of Fermented Food, a part of Akita University's Innovation Creating General Research Organization, discovered in a fermented food a component that possesses molecular chaperone inducing effect and anti-microbial effect, and suppresses proliferation of cancer cells; identified the substance and obtained a patent. (*1: Newspaper article).[6]

Natto has a well-balanced essential amino acid profile, abundant nutrients such as vitamin group nutrients such as B2, E, K; and minerals such as, potassium, zinc, calcium and iron, as well as dietary fiber. In addition to those nutritional benefits; one gram of natto contains over a billion cells of the natto bacterium, *Bacillus subtilis var. natto.* (It is thought natto, as well as its raw ingredient soy beans, has a unique nutritional profile and is highly beneficial to health. Natto has been one of the well-regarded health foods since old times.)

Natto's health benefits as a fermented food is well published in non-specialty books: promoting recovery from fatigue, conditioning intestines, promoting bowel movement, nourishing and strengthening body, promoting cholesterol metabolism, improving immunity, suppressing oxidants and preventing physical aging and cancer, keeping skin youthful, and do on. Institute studies natto's effect as FOSHU and potential as an anti-microbial product or anti-cancer drug.

[6] http://www.akita-.ac.jp/honbu/project/pr_multi2.html

2.3.2 Development of Okara (soy pulp) based fermented food–Hoshino Kagaku Co., Ltd.

Hoshino Kagaku, a food R&D, food manufacturing and quality control and consulting firm in Kyoto, has developed "fermented okara": produced by fermenting okara (soy pulp), byproduct of tofu production, using own proprietary technic. The firm is also exploring the potential to use the remaining soy pulp, after soy milk was pressed out to be used as a raw material for a LAB soymilk fermented drink product, as an ingredient in cake and bread baking and in udon or soba noodles.[7]

The firm has also developed such product as enzyme processed fruit paste, using local produce as raw material, so as to offer agricultural processed foods in an easy to use form to local food manufacturers, restaurants, cafes, hotels and inns.

(Local food action: Kyoto Vegetable Function Promotion Network)

2.3.3 Other examples from regions

There are many other examples of local food initiatives (development of fermented foods using local specialty produce). Here is a few examples of such work:

1. Miyazaki Prefecture Industrial Technology Center developed a taro-based fermented food: a yoghurt like taro drink, marketed by "Yofurutofido" as "Taro Yoghurt" and by Aliment Milk as "Tuber Yoghurt". (*2 Product example)
2. Shizuoka Prefecture University aimed to utilize fermented foods for better function and palatability, and developed a product using the local specialty produce wasabi in sake dreg. Shizuoka Prefecture's food processing research center's collaborative work with the Hokkaido Research Organization in development of a local specialty product using fermented fish sauce is another example.
3. Nagasaki Prefecture's work, in partnership with Kyushu University and University of Nagasaki Siebold Campus, to develop a new fermented food utilizing plant based LAB is another example.

Other examples include development of scallop based fermented food by Hokkaido Research Organization Food Processing Research Center.

[7] http://tamuto.jp/foodandmachinemas/fermentedokara/

*1 Akita University

Soy Isoflavone anti-microbial peptide Taro (tuber) yoghurt (Fermented beverage with lactobacilli of plant origin)

*2 Taro Yoghurt

3 Product Packaging–Latest Marketing Trends and Concepts

3.1 Product packaging–Industry trend

Japan Food Packaging Association is an industry organization related to product packaging. JFPA promotes cooperation and collaboration between food packaging sector of the food industry and industries related to packaging materials, the education sector, academic organizations such as public research institutes and universities, environment groups, consumers and other stakeholders. JFPA aims for proper social systems, etc., related to food packaging, stronger production and utilization, and more energized economic activities; and provides the necessary services for promotion of food packaging related science and technology, better food safety and security, maintaining or improving the environment, offering the consumer appropriate information, promotion of international cooperation, and so forth.[8]

3.1.1 Trend in the packaging industry

It is often said, "Package is the barometer of economic climate." Food packaging is a sector somewhat shielded from the economic climate; approx. 60% of packaging materials are said to be for food packaging. Volume of food distributed grew at steady pace even after 1991, when the bubble economy burst, and peaked in 1998, before entering a gradual declining trend in reflection of such factors as economic downturn, declining birth rate and population aging.

Food packages come in many types of varying nature from perishable food or highly processed food; consequently, food packaging is extremely diverse using differing packaging material, packaging form and packaging technic.

Food industry consists of food manufacturing, restaurants and food transport sectors. Food industry once grew as large as approx. 90 US trillion in 2000, before shrinking to approx. 80 US trillion in 2009. Food packing material cost is thought to make up a 5% of that figure: approx. 4 US trillion.

[8] Japan Food Packaging Association: http://shokuhou.jp/

Although food packaging is a very important issue for the food industry and an important vast technology area; Japanese universities hardly teach or research food packaging, which is rather puzzling.

3.1.2 Trend of package distribution (Paper and plastic make up 80 %.)

	2006	2008	2010	Ratio %
Paper cardboard products	12,695	12,463	11,635	61. 7
Plastic products	3,998	3,834	3,644	19. 3
Metal products	1,950	1,836	1,654	8. 8
Glass products	1,466	1,399	1,359	7. 2
Wood products	741	790	557	3. 0
Total (1000 tons)	20,850	20,324	18,849	100. 0

Source: Japan Packaging Institute

3.2 Latest trends in packaging

3.2.1 Single serving packaging (Eco Mark certified products)

The Eco Mark Office, Japan Environment Association (JEA) has issued the Eco Mark certificate to "Container for Sterile-Packed Cooked Rice" as a lightweight, resource saving form of container.[9]

Recent years saw increase consumption of single serving food, driven by increasing numbers of single and/or elderly households. As the content to package ratio is increasing, making packaging container lighter is an important challenge.

Although it was difficult to objectively assess and determine how the lightweight-ness was achieved; the certification criteria were established by weight measurement of commercially available packaging containers before setting a weight criterion that covers top 20% products in the market (based on number). The first of those to be certified was "Container for Sterile-Packed Cooked Rice"

Sterile-Packed Cooked Rice has a long shelf-life and only needs a microwave oven to prepare one serving any time and is loved by many as the "ding rice"; often consumed as a single serving food. Currently there are about 200 products in this category in market. The size of market share as in year 2010 was ¥ 43 US billion.

[9] Source: https://www.ecomark.jp/pdf/PR13-010.pdf

Materials for Container for Sterile-Packed Cooked Rice are plastic tray, plastic sheet as lid and deoxygenating agent. There are multi-pack types: several trays come in an outer bag.

Eco Mark certified Container for Sterile-Packed Cooked Rice achieves both lightweight, resource saving ability and gas-barrier container packaging enabling long shelf-life in room temperature.

Asahi Kasei Homes Kurashi Innovation Institute has published a series of reports on study of views about eating and related behaviors. This institute carries out studies on such topics as achieving bountiful life and energy saving through innovations in how each family member spends time at home thorough changing environmental parameters such as seasons and time how home is arranged; and on how comfortable home is in relation, not only to light and thermal environment, but to family; and has made suggestions from a unique viewpoint about how to set up living space for comfortable living.[10]

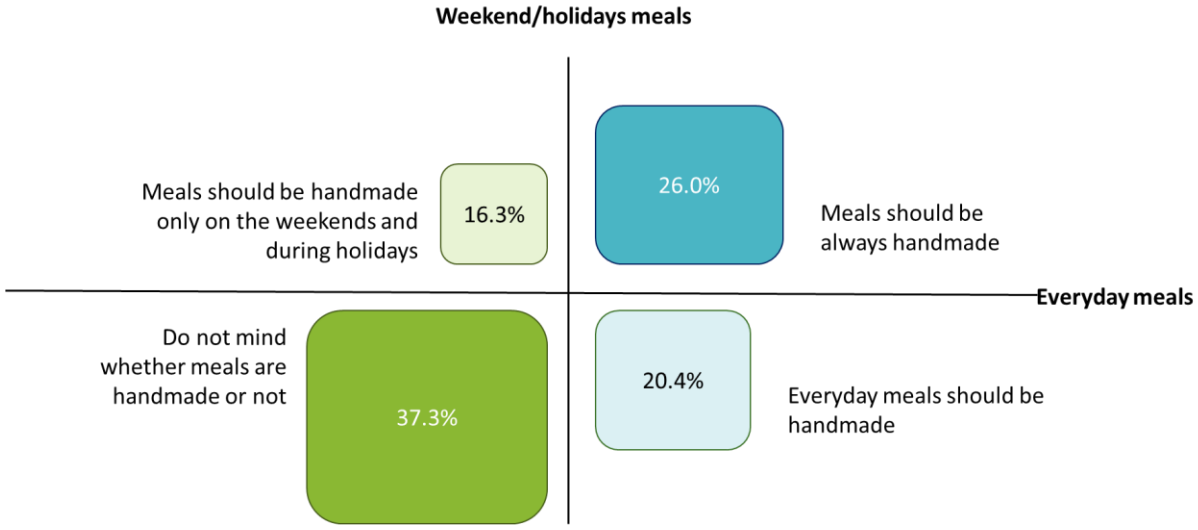
Their 2011 "Home Comfort Study Report—To Create Comfortable Home Living" showed those in their 30s to 50s would list "Eating meals" as the moment that signified home comfort most. Eating, not only a mere scene of eating but, as the backdrop to many moments of family living such as relaxing and family conversation time, can be said to occupy the center of home living. As family type is changing due to increasing number of married couples with respective jobs; following findings on food culture in modern dining table in that report drew my attention.

[10] Related information Source: http://www.asahi-kasei.co.jp/j-koho/press/20141203/index/

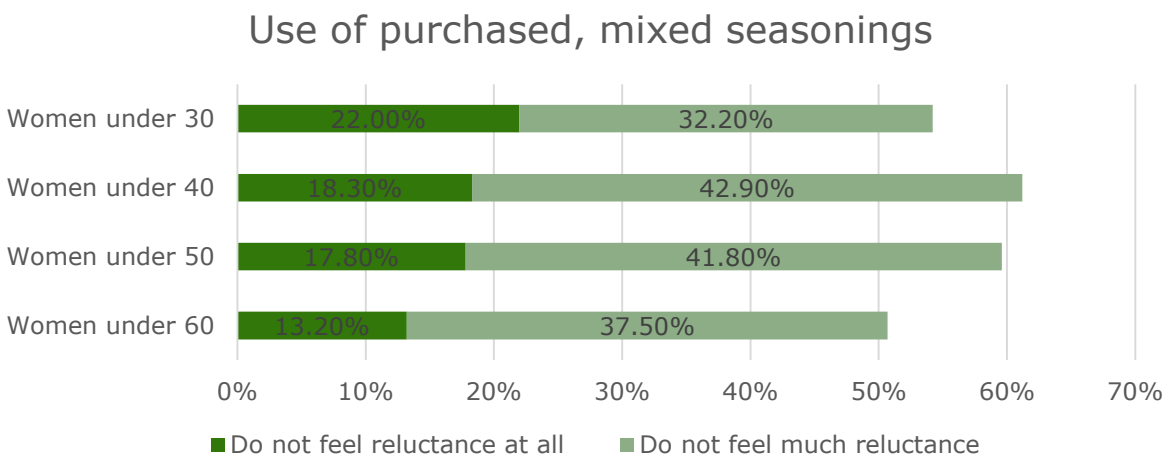
3.2.2 Summary of findings

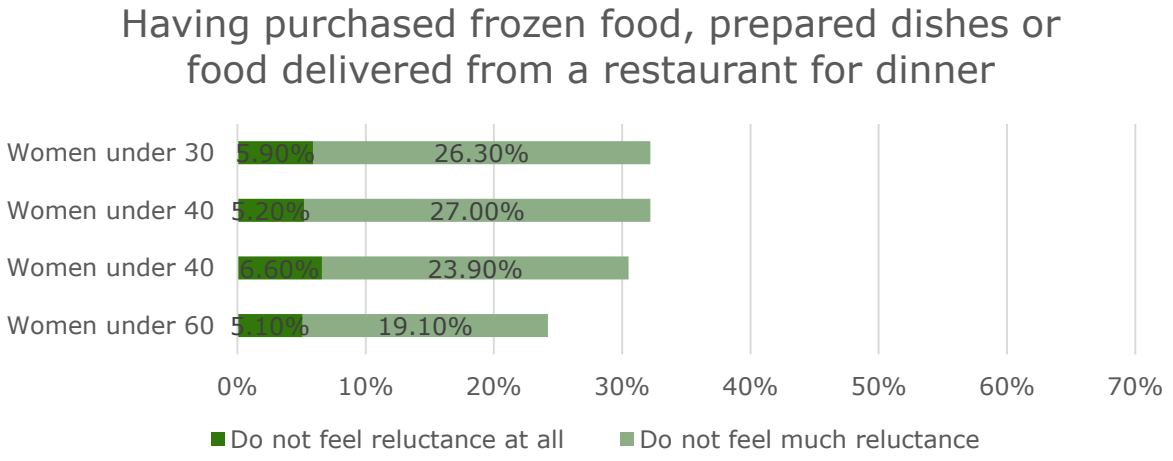
- There are polarized views about meals (A 37.3% said they do not mind whether a meal was cooked at home or not vs. 26% wanted their meals to be hand-prepared;)
- Everyday meals are becoming simpler and prepared outside home;
    - Just over 30% said to "prepare dinner every day;"
    - About 30% said to "have eat dinner of bought frozen and/or pre-cooked foods;"
    - About 20% of those in their 40s said to "make own stock for miso soup" and to "gut (, fillet) and prepare fish myself;"
- Many would like to value eating and to intend passing on it as a part of food culture;
    - About 40% said, "Our house has a cooking tradition and/or mother's home cook taste;" and
    - A 90% had "experience in making preserved food" including jam making, rice bran based pickling and plum liquor making.

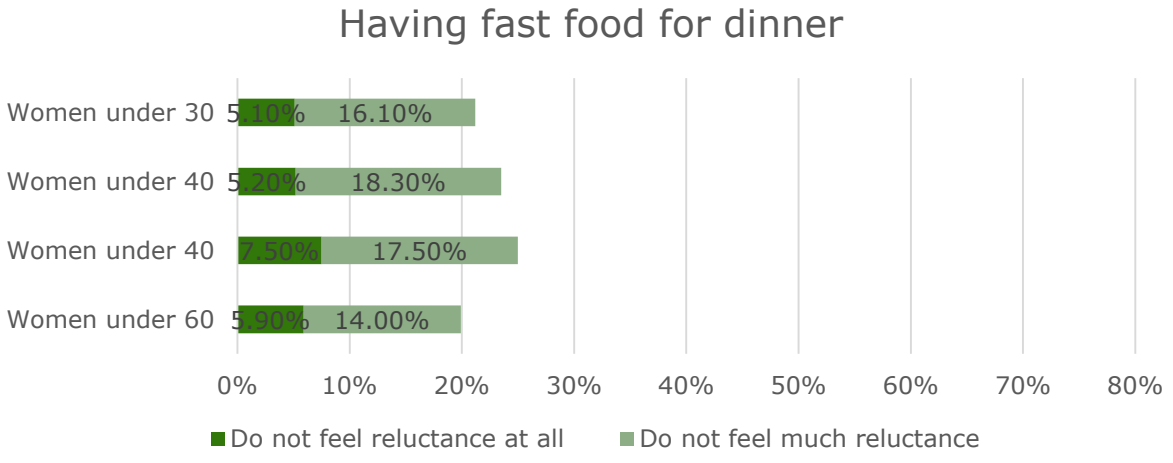
3.2.3 Views on meal preparation



3.2.4 Reluctance concerning everyday meals







Source of diagrams above: Study of views about eating and related behaviors, Kurashi Innovation Institute

3.2.5 Trend in single serving package

3.2.5.1 Scales

Scale manufacturers offer various types of single serving container production units. For instance, Teraoka Seiko Co., Ltd. believes this age of population aging and declined birthrate demands people are eating single serving food more, in more diverse packaging, which means there is an increasing need for perishable food packaging to handle smaller quantity in more variety of containers. This belief has made Teraoka to prepare a full range of stretch film container packaging machines that allow food trays to be packaged beautifully under optimal packaging conditions thus ensure preservation of product freshness.

Similarly, Kojima Food has developed and offered a line of single serving containers and small pillow packaging containers for jam products; Shinwa Kikai the Sinwa single serve tray rice cooking system; and Toyo Jidoki automated scales, various packaging machines, packaging related system components, packaging plant, etc.

- Teraoka Seiko: https://www.teraokaseiko.com/jp/solutions/SOL00015/
- Kojima Food: http://www.kozima.co.jp/
- Shinwa Kikai: http://www.shinwa-kikai.co.jp/product/product02.html
- Toyo Jidoki: http://toyojidoki.com/

3.2.6 Single serving food packaging

A noodle manufacturer retailer Munechika in the City of Echizen in Fukui Prefecture packed "hiyashi-chuka" noodles, little known prefectural staple to outsiders, as single serving food and selling it as "Sesame-sauce hiyashi-chuka", which has been the topic of town. Usually hiyashi-chuka is sold in a 2–3 serving packs. However, this enterprise aims "to pursue the potential of new sauce flavors, starting with the sesame sauce" in their single serving hiyashi-chuka range. With a target of a million servings an year in the sight, they envisage a "noodle theme park", where the boundary between soba and hiyashi-chuka noodles is broken.

3.2.6.1 Better packaging container for better transport

Strawberries are enjoyed throughout year, but their fragile nature demands delicate handling. What damages strawberries? Its thin skin, soft flesh, post-harvest high temperature damage (ideal storage at 3–5 °C), stacking berry on berry, washing, etc. Large sized strawberries are especially prone to damage from own weight. In order to avoid those issues, the producer has tried such measures as harvesting before fully ripe and using cushioning material when packaging. Still those measures cannot make the risk of damage during distribution zero.

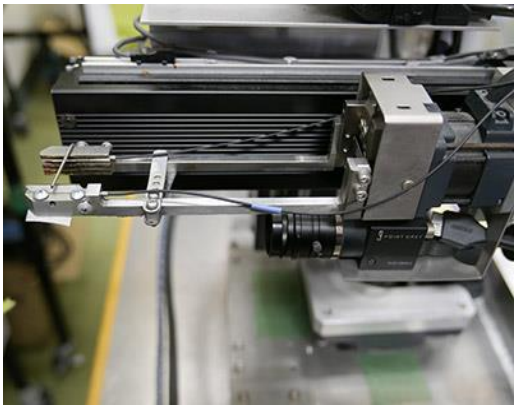
Case 1: Development of new technology: new system by Utsunomiya University's venture enterprise, i-eat Co., Ltd.

They developed a system comprised with strawberry harvesting robot and specialized container. The robot technology eliminates instance of the edible flesh part of strawberry coming in contact with human hand or container from harvesting to distribution process. One strawberry, if can be delivered fully ripe, has a high product value of ¥1600. Their aim is at export business.

Non-contact strawberry harvesting and packaging technology to protect edible flesh; a system comprising of a robotic harvester and a specialized container named "freshful". This system was developed by a bi-School research team at Utsunomiya University, headed by Professor Koichi Ozeki of Faculty of Engineering and Associate Professor Masaru Kashiwazaki of Faculty of Agriculture. Prof. Ozaki was responsible for developing the robotic strawberry harvester. Assoc. Prof. Kashiwazaki was responsible for the packaging technology.

Brief description of the system: When the robotic harvester detects a fully ripe strawberry, it harvests it by cutting the stalk. The robotic arm holds only the stalk, cuts it and carries it to the storage component of the harvester body. The storage component has several freshel bases, where the harvested strawberry is placed. At no time during harvesting and placement, the arm comes in contact with edible part of the strawberry, thus no damage is caused in this system.

Scene of harvesting (Tochigi Prefecture is the Strawberry kingdom, has kept the crown of top strawberry producing prefecture in Japan for the last 48 years)



Camera detects position of strawberry.

Robotic arm holds and cuts the stalk.

Non-contact container freshel and super-large strawberries "sky berry"

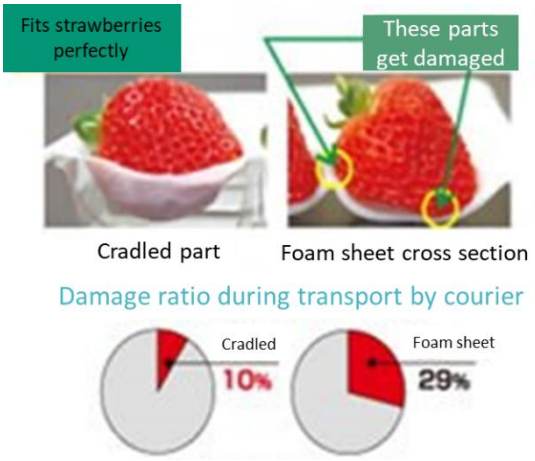
Case 2: Better container, better naming

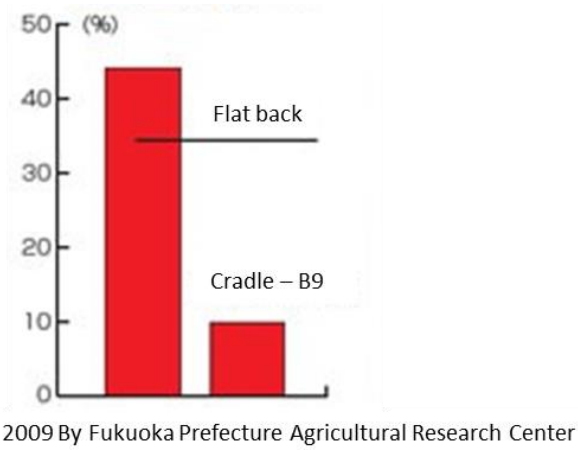
Oishi Sangyo is a general packaging material manufacturer, offering a new strawberry container "yurikaago". This strawberry container is designed with a new vision to utilize suspension packaging to protect strawberry, characterized by:

- Soft film material, creating a perfect fit to shape of each strawberry and thus maximize cushioned area for minimal surface damage; and
- Suspension structure to mitigate vibration during transport and to prevent friction damage. The unique stretchable film holds berries and absorbs impact.

Research by Fukuoka Prefecture Agricultural Research Center

Protection of soft strawberries with new packaging design – Damaged area ratio





Product examples

Thin film suspending the part of strawberry that is in contact.

"Food pack" designs: The cushioning effect of the top-and-bottom packaging design is confirmed to have a good effect in transport study; now used for export.

3.3 Overview of consumer preference in Asia

3.3.1 Consumer Preference Orientation Survey (Survey in Japan by Japan Finance Corporation)

Japan Finance Corporation carries out periodical consumer surveys (online questionnaire survey, respondents: 1000 males and 1000 females between 20 and 79 years old)[11]

- Food orientation has continued to be "health oriented"
- Over 60% said to "buy made/produced in Japan", indicating continuation of the trend to support Japanese product/produce

Their Consumer Orientation Survey for 2015Q3Q4 found respondents food orientation is most likely "health oriented" (41.7%), followed by "economy oriented" (36.4%) and "convenience oriented" (31.2%). When asked what price level they would choose Japanese product/produce over imported ones, over 60% of the consumers would "choose Japanese product/produce even it is dearer." Showing a continuing high needs for Japanese product/produce.

3.3.2 The Nielsen Global Out-of-Home Dining Survey

Nielsen conducted this survey, polling more than 30,000 consumers in 61 countries throughout the World, and published the report of findings.

- About two thirds of consumers across the globe practice special diet without certain ingredient(s).
- About 70% said they would not mind spending more on food excluding specific ingredients.

It looks that more consumers across the globe are choosing special diet. (The term "special diet" includes such orientations as organic, low-fat, low-carb, etc., as well as the diet avoiding specific ingredient due to sensitivity, allergy or personal belief.)

[11] https://www.jfc.go.jp/n/findings/pdf/topics_160229a.pdf

The Nielsen survey reported about two thirds of the respondents practice special diet without certain food(s) and/or ingredient(s). This group makes up for 84% in Africa Middle East and 72% in Asia Pacific Regions; both regions show above global average trend.

Regions specific preference data indicates higher ratio of dietary restriction in both Africa Middle East and Asia Pacific Regions due to cultural or religious customs, such as practicing a special diet of vegetarianism.

Food as medicine: Seventy per-cent of respondents around the world said they actively select what they eat in order to prevent such diseases as obesity, DM, hypercholesterolemia and hypertension. According to World Health Organisation, deaths of such chronic diseases as DMⅡ, cardiovascular diseases and cancer are predicted to increase from about 60% of all global deaths -in 2001 to 73% by year 2020.

As Asia Pacific Regions are home to many Muslims, observing halal restriction on food, which is thought to be the reason for the above result.

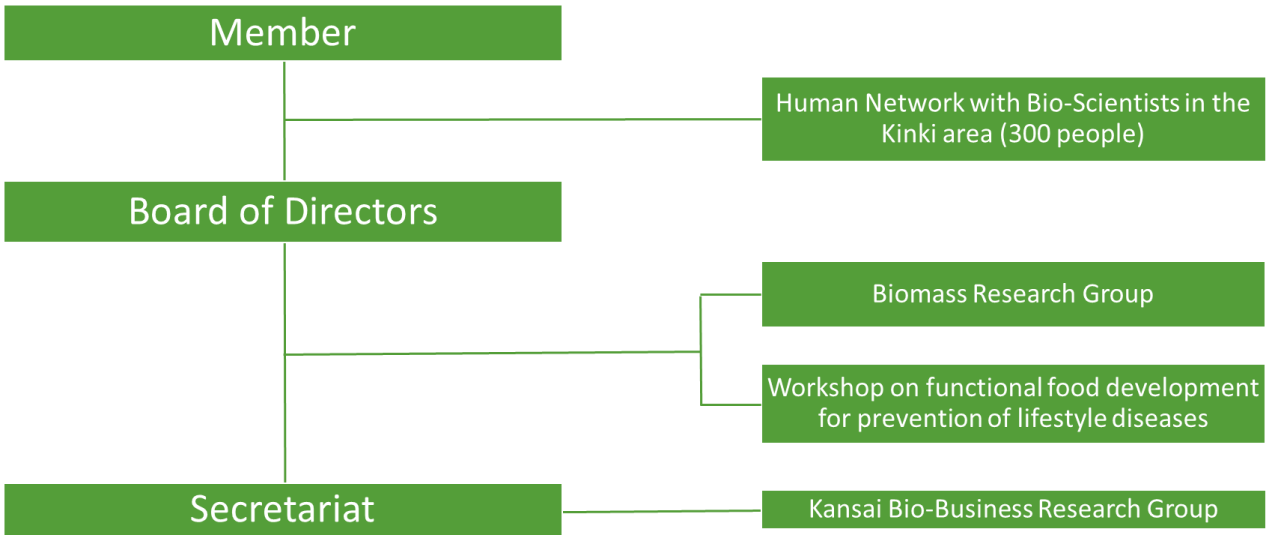
4 Crossover with Other Industries

Multidisciplinary research concerning bioscience, biotechnology, etc., in partnership with private companies are already being carried out by the University of Tokyo and most other national universities and university with agriculture related faculties in regions. Following is a report of movement by designated non-profit organizations and the Government (administration).

4.1 Kinki Bio-industry Development Organization

Kinki Bio-industry Development Organization promotes various services pursuant to provisions of Act on Promotion of Specified Non-profit Activities, including activities to promote healthcare or welfare and activities to facilitate protection of the environment. Below shows its organization and content of activities.[12]

4.1.1 Organizational chart of the Kinko Bio-industry Development Organization



[12] http://kinkibio.com/index.html

4.1.2 Activity policies

Kinki Bio-industry Development Organization (KBDO) has following activity policies with the aim to create a bio-industry cluster:

(1) As an organization that promotes "Intellectual Property Strategy Support Program for Bio-industry Venture Businesses in Kinki Region", implemented by the Kansai Bureau of Economy, Trade and Industry (METI-KANSAI); KBDO promotes support for nurturing and developing venture businesses in that area in in Kinki Region.

(2) KBDO actively connects seeds of biotechnology such as universities and national laboratories with the needs of industries, thus promote industry–academia–officialdom partnered business.

(3) While facilitating organic industry–academia–officialdom partnership, KBDO contributes to development of bio-industries through promotion of R&D, human resource development, and educational motivational activities at workshops and symposia.

(4) KBDO maintains close partnership with bio-related organizations, not only in the Kinki Region but across the nation, facilitate stronger cooperation between them, and, actively targets bio-related measures, not only national policies but in regional actions and measures, etc., so as to facilitate their wider acceptance.

As a part of its activities, KBDO hosts workshop on functional food development for prevention of the lifestyle diseases. This workshop started in August 2006, is now 11 years old as of 2017. Its activities aim to elucidate functions of eating in prevention of the lifestyle diseases, to gain understanding of and collaboration from those related to medicine and pharmacology such as medical practitioners; and to launch a new food health industry while obtaining information from the officials.

4.1.3 Workshop on functional food development for prevention of lifestyle diseases

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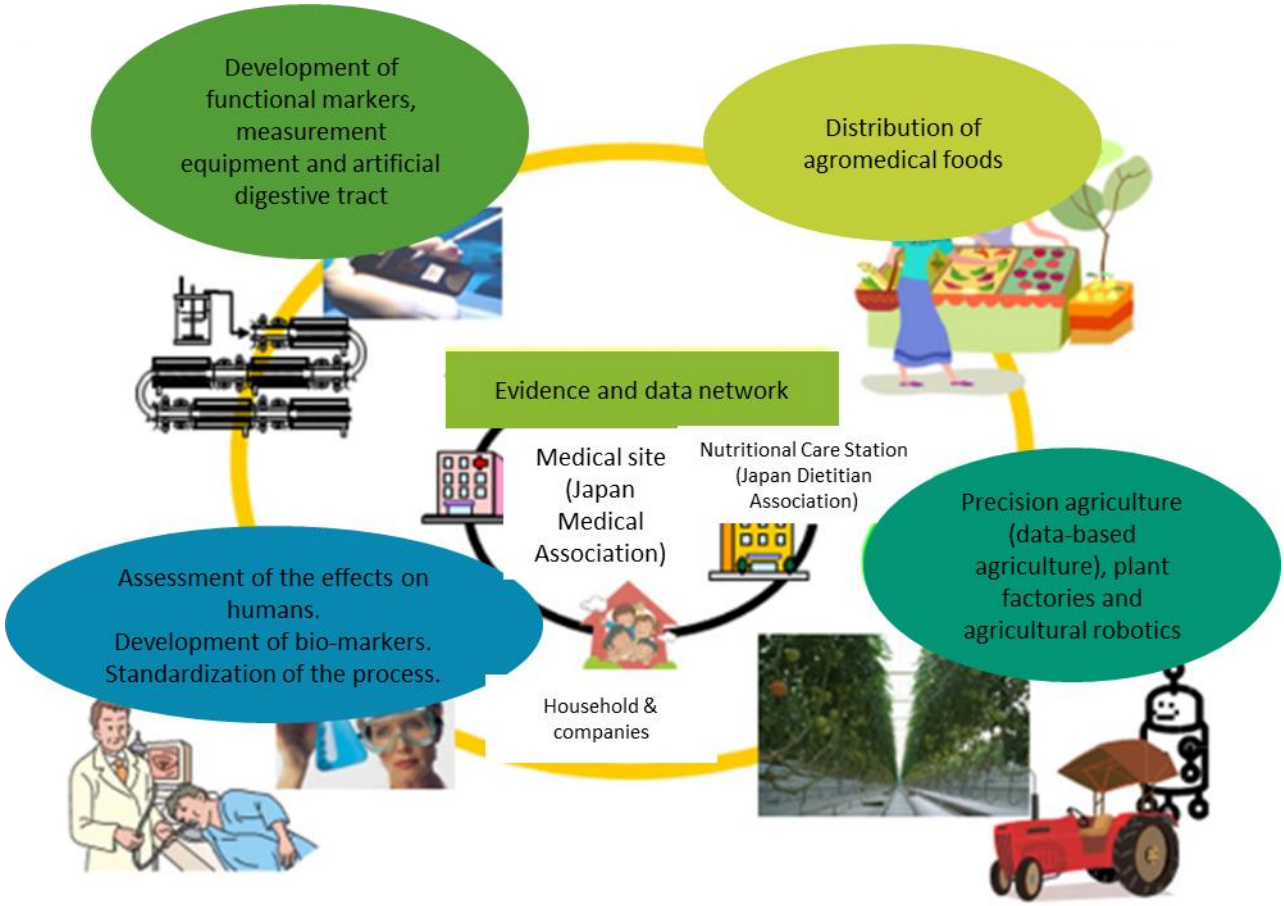


4.2 National trends

Ministry of Education, Culture, Sports, Science and Technology (MEXT) budgeted ¥4.4 billion in year 2016 to advance "Program to Promote Chiho Sosei at Intellectual/Local Hub Universities"

Background – Issue

There is a fear for falling into a negative spiral: "Population decrease calls for the reduction of the regional economy. The decrease of the regional economy will accelerate the population decrease."
The widening disparity between Tokyo and the rural areas has resulted in a concentration in Tokyo and caused youth to move out of the rural area.

Business summary

Rural universities: Working with regional municipalities and SMEs to make plans for the creation of local jobs and improvement of the retention rate of the local college graduates.

***Universities in Tokyo*:** Working with local universities, local governments and SMEs to make plans for improving the appeal of the rural areas.

Universities collaborate with various institutions in the region to create interesting jobs and reform education to meet the human resources needed by the rural areas.

The COC + Promotion Coordinator will manage progress in cooperation with regional enterprises.
=> In order to achieve the target set by the business cooperation agency, the power of universities (in education, research and contribution to society) will be mobilised.

4.2.1.1 Program background and challenges

It is a concern if a region falls down the negative spiral of "population decline shrinking regional economies, while shrunk regional economy accelerates population decline". The economic gap between regions and Tokyo encourages unipolar concentration to Tokyo, inviting the young people to leave regions.

Local governments and SMEs in region are consulted in formulation of a plan concerning regional job creation and improving the ratio of graduates staying in their own regions.

Universities, colleges, public organizations, and SMEs in a region are consulted in formulation of a plan to improve regional attractions.

- Universities to consult with various organizations in the region and to review how to improve their education in order to develop the types of human resources the region demands, while creating and exploring jobs that attract their students.
- To document COC + Promotion coordinator, and to strengthen collaborations between program cooperation areas and manage progress in the action

→ In order to attain the K slip set by program cooperation organization, gather the power of universities (education, research and contributions to the society).

4.2.2 Initiatives by Chiho Sosei Innovation Hub universities

4.2.2.1 Agriculture, produce related initiatives by universities

University	Initiative description
Obihiro University of Agriculture and Veterinary Medicine	Programs that prepares students for global actions and contributes in ensuring food safety are offered in veterinary medicine, agriculture and livestock farming; Partnership with over 10 food related companies developing immediately useful human resources; the newly established, Research Center for Global Agromedicine has researchers invited from Cornell University and others, advancing global joint research.
Nagahama Institute of Bio-Science and Technology	Built in the Science Park (special zone established by Shiga Prefecture/Nagahama City) a facility that has become a core institution of bio-education research and also forms a biocluster adjoins several companies. Practical education in partnership with industries and officialdom, including incubation center facility, applied research, and support for venture businesses.
Keio University	One of the venture business (in the City of Tsuruoka, Yamagata Prefecture, an off-shoot of the Institute for Advanced Biosciences) synthesized an artificial version of spider silk (, which is a high-performance protein material) and is carrying out R&D aiming to it into a next generation bio-material.

4.2.3 Note on Kampo medicines (University of Toyama Institute of Natural Medicine)

"Kampo medicines" is the term used to refer to the traditional medicines; called Chinese medicines in the Peoples Republic of China and Korean medicines in the Korean Peninsula. Kampo Medicine has a unique history of development over a long period under the national isolation policy. Another factor influencing Kampo is component analysis research promoted by the statute regulating pharmaceuticals and medical devices; allowing prescription of ingredient combination that are not normally prescribed in China. We now see a reverse phenomenon of Chinese buyers coming to Japan to purchase Kampo medicines prepared in Japanese prescription.

University of Toyama Institute of Natural Medicine is the only research center for traditional medicine in Japan and the only institute for medical/pharmaceutical research run by a national university corporation. The institute carries out scientific research in traditional medicine, fully utilizing the cutting edge science technology, with the aim to develop a new system of healthcare through merging Eastern Medicine with the western counterpart. It also aims to deepen industry-academia-officialdom partnership, by advancing joint research while developing relevant human resources therein, and thus to contribute widely to the health of the society.

4.2.3.1 Kampo medicines: current ingredient status

Japan Kampo Medicines Manufacturers Association's 2008 study found, out of 248 types, approx. 20,000 tons of crude drugs used in Japan as ingredients of medicines, only 12% were procured within the country. Especially notable is the case with *Glycyrrhiza*, used in over 70% of Kampo prescriptions. As only *Glycyrrhiza* species that grow in wild in specific regions such as the Inner Mongolia Autonomous Region in China satisfy the Japanese requirement, the industry has relied on imports from China. China's action to place harvest restrictions to protect this resource steeply raised the import price. In response, Japanese national research institutes and private companies are carrying out research for growing *Glycyrrhiza.*

4.2.3.2 Most used crude drugs and countries of production (kg)

		Domestic use	Japan	China	Other	Self-sufficiency rate
1	**Kanzou**	1,267,395	0	1,267,395	0	0.00%
2	**Shakuyaku**	1,164,126	41,019	1,123,107	0	3.50%
3	**Keihi**	1,033,793	0	836,645	197,148	0.00%
4	**Bukuryou**	996,311	0	961,722	34,589	0.00%
5	**Taisou**	675,997	0	675,997	0	0.00%
6	**Hange**	629,063	0	629,063	0	0.00%
7	**Ninjin**	610,092	498	608,946	648	0.10%
8	**Touki**	580,607	204,471	376,136	0	35.20%
9	**Maou**	568,686	0	568,686	0	0.00%
10	**Koui**	555,718	555,718	0	0	100.00%
11	**Kakkon**	553,999	61	546,098	7,840	0.00%
12	**Soujutsu**	501,647	0	501,647	0	0.00%
13	**Yokuinin**	449,253	600	373,528	75,125	0.10%
14	**Saiko**	443,811	23,244	399,212	21,355	5.20%
15	**Daiou**	439,590	95,418	344,172	0	21.70%
16	**Byakujutsu**	427,357	0	419,624	7,733	0.00%
17	**Senna**	426,230	0	0	426,230	0.00%
18	**Jiou**	397,512	2,715	394,659	138	0.70%
19	**Ougon**	383,969	15	383,954	0	0.00%
20	**Sekkou**	380,348	0	380,348	0	0.00%

21	**Senkyuu**	373,432	313,739	59,693	0	84.00%
22	**Takusha**	358,951	0	358,951	0	0.00%
23	**Shoukyou**	343,660	162	343,408	90	0.00%

Source: Excerpt from page 8 of "Survey Report on the Amount of Raw Material Substance Usage etc."

(7/2011, The Chinese Medicinal Products Agency 's Pharmaceutical Committee)

4.2.3.3 Corporate initiatives (Recent examples)

Company (university)	Description
Osaka University of Pharmaceutical Sciences and Takeda Pharmaceutical Company Limited	Report on a crude drug periodical about selection of superior individual plant of *G. uralensis*
KAJIMA CORPORATION and The National Institute of Biomedical Innovation, Health and Nutrition	Announcement of development of hydroponic technology to grow *G. uralensis*
Mitsubishi Plastics, Inc. and Green Innovation Inc.	Report on joint research on cultivation in artificial environment. Approx. ¥ 120 million investment over two years in a joint research on development and sales of *Glycyrrhiza* at Moriya Production Center (Tsukubamirai City, Ibaraki Prefecture), MKV Dream, a subsidiary of Mitsubishi Plastics
Shinnihonseiyaku Co., Ltd. and Koshi City, Kumamoto Prefecture	Trail cultivation started in Koshi City, Kumamoto Prefecture. General partnership agreement with Koshi City signed
TSUMURA & CO. and China Meheco Co., Ltd.	Establishment of mass cultivation technology in China; speeding cultivation–successful harvest in 15 months; patent obtained in China

5 Latest Trends in Sustainability in Foods

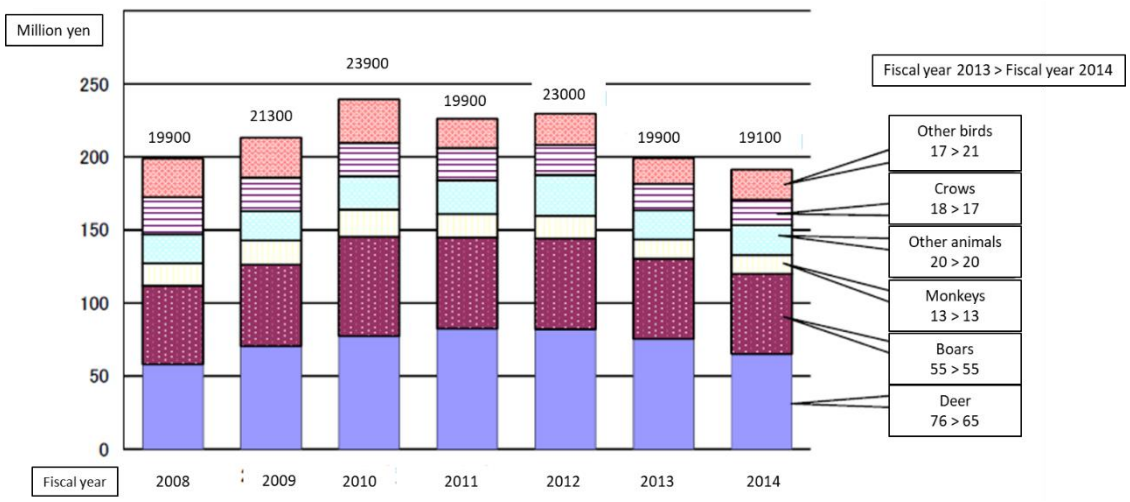
The longitudinally elongated land in changeable temperate climate means Japan has a large number of wildlife, some of which sometimes damage crops.

5.1 Wildlife damage

5.1.1 Wildlife damage figures

MAFF data indicated the wildlife caused around ¥20 billion worth of crop damages; 70% of which were caused by animals (such as deer, monkeys and boars), and 30% by birds.

Changes in the amount of damage of agricultural crops[13]:



5.1.2 Measures for prevention

For comprehensive and effective actions to control wildlife damages in regions, MAFF has created a program for wildlife damage prevention to support region-wide comprehensive actions based on the region's damage prevention plan developed by the municipality. A new range of support measures were started in 2016, including promotion of utilization of game flesh as "*jibie* (gibier)"

[13] Source: http://www.maff.go.jp/j/seisan/tyozyu/higai/pdf/h2803_meguji_zentai2.pdf

5.1.2.1 Subsidiary for comprehensive measures to prevent wildlife damages and *jibie*

- "Hard" measures that require subsidiaries include facility for processing game flesh into *jibie*, incineration facility and facilities to elevate hunting skills (i.e. shooting ranges). The subsidiaries are paid to the regional council, to fund 50% or less of the intended project.
- "Soft" measures would be new actions (in form of program, project or service) including publicity and public education activities, whose aims are to secure a certain quantity of *jibie* available in market and to extend its demand, action for information sharing among the concerned parties, and so on. The subsidiaries are paid by prefecture to regional council, private groups, etc., to fund 50% or less of the intended action, to be received by the provider. However, *Jibie* Consortium led actions are to receive a set amount.

5.1.3 Reality of state of wildlife catch and game flesh use

The wildlife caught and killed is mostly disposed of by burial or incineration. Use of the flesh as game meat is a practice found in a limited number of regions. Promotion of game meat consumption will face such challenges as ensuring safety, stable supply, securing channels of sale, etc. In the interest of promoting effective use of wildlife catch as a regional resource, MAFF has supported regional actions such as development of meat processing facility for wildlife catch, product development and establishment of distribution and sales channels, as well as compilation of a manual on and training on utilizing wildlife catch as game meat. MHLW published "Guideline on hygiene control of wildlife/game flesh" in November 2014.

Game meat consumption has a long history in Europe and a part of their traditional cuisines. In Japan, also, "*jibie*" cuisine restaurants have gained popularity.

Reality of catch disposal (interview at 30 municipalities)

Buries on site (of catch/kill):

approx. 80%

The rising interest in developing processing facilities to process wildlife catch has led to an increasing trend in development such facilities: from 42 sites in 2008 to 172 sites in 2015.

5.1.3.1 Local government level actions

Name	Description of actions
Town of Kamikawa, Hokkaido	**Target: Yezo sika deer** · Commissioned by Takasu Town wildlife damage control council and operated by Kitaken Kensetsu. · Four-hundred yezo sika deer were brought in in 2008. Bulk of the processed venison was made into such products as cans, uncooked ham and pet food; while some was sold to zoos as animal feed. · Numbers of deer processed: 350 in 2009, another 350 in 2010, around 340 in 2011 and around 500 in 2012. · Challenges will be securing stable supply and sales channel.
Gotsu City, Shimane Prefecture	**Target: boars** · Commissioned by Gotsu City wildlife damage control council and operated by Enoki-no-go Boar Meat Processing Center and Shop; started operating in March 2009 as an adjunct to existing facility. · Processed boar pork was sold as meat or in croquette. · Numbers of boars processed: 38 in 2009, 37 in 2010, 60 in 2011 and 33 in 2012. · Active product development and sales activities in and outside the prefecture are ongoing.
Hidakagawa Town, Wakayama	**Targets: boar and sika deer** · Commissioned by Hidakagawa Town council, operated by Hidakagawa Town Development Foundation · Facility started operating in May 2010, processes wildlife caught by local hunters and farmers such as boar and sells game meat mainly for human consumption, as well as making effort to develop new products and recipe books. · Numbers of boars and dear processed: 123 boars and 164 deer in 2011 and 159 boars and 136 deer in 2012.

5.2 Initiatives in private sector

5.2.1 RadishBoya

RadishBoya pioneered the business model of contacting farms across the country to supply organic vegetables, etc., collecting, packaging and periodically delivering them to the customers on contract. It had some 106000 households on its costumer list. It became a part of NTT docomo group in 2012.

* NTT docomo reported a combined sales turnover of ¥4.24 trillion and profit of ¥0.8745 trillion for the month of March 2012. RadishBoya's annual turnover and profit to February 2012 were ¥22 billion and just under ¥0.3 billion, respectively. It is also considered to give the approx. 2600 contracted farmers a docomo brand tablet device for management of production history.

5.2.1.1 Insistence for livestock products:

RadishBoya, as the member only home delivery service of chemical free or low chemical vegetables, has established a partnership with its producers to practice livestock husbandry technics that do not limit animal movements such as flat rearing and free-range rearing. RadishBoya also insists on feed safety as a part of their promises to deliver worry-free products from healthy livestock reared in a healthy manner: banning synthetic antimicrobials and anti-biotics in principle, as well as using non-GM livestock feeds where possible.

5.2.1.2 Four promises with livestock produce:

1. To rear livestock in an environment that conforms to their physiology (Japanese style animal welfare)
2. Anti-biotics use is generally banned
3. To use non-GM livestock feeds where possible
4. Environment friendly rearing practice

In order to fulfill those promises, RadishBoya implements crop-livestock combined cyclic farming practice. Stress to the environment is lessened by strengthening partnership between crop farmers and livestock farmers to have them provide livestock feeds and raw materials of fertilizer reciprocally. RadishBoya thus assists vitalizing region though effective utilization of those resources.

5.2.1.3 Insistence on husbandry practice for animal welfare




(1) Reared in a healthy environment, allowed to freely exercise in a natural setting; (2) Employing the "Summer-on-hills-Winter-in-village" model to create an rearing environment as close as the natural environment; the animals are reared on non-GM feeds; (3) Chicken, reared in a barn where natural light and winds come in, are full of energy; and (4) Eggs laid by hens that were reared under natural light, allowed to exercise actively.

6 Quality Standards and Origin Labeling

6.1 Overview of food labeling and quality standards

Food labeling concerning perishable foods are stipulated by such rules as "Perishable food quality labeling standards", "Livestock products origin labeling", and "Quality labeling standards for unpolished and polished rice". Processed food labeling are stipulated by such rules as "Processed food quality labeling standards (re packed lunch and delicatessen foods), (ingredients and origin labeling), (easy to understand labeling)", and so on. Standards for food labeling and food quality are governed by such authorities as MAFF, CAA, Food and Agricultural Materials Inspection Center (FAMIC)[14]

Food and Agricultural Materials Inspection Center (FAMIC) is an independent administrative agency that carries out services for establishing food safety and consumers' trust in foods; whose policy is to take actions through the food-chain (the series or processed from production to retail). FAMIC's activities concern fertilizers, pesticides, GM foods and other production related matters, post-production processing related matters, and food labeling at the retail end, including analyses of foods and pesticides, on-site inspections and publicizing information. FAMIC's activities cover beyond the human foods such as livestock feeds and pet foods. FAMIC HQ is situated in the Saitama City, with branch offices in Sapporo City, Sendai City, Nagoya City, Kobe City and Fukuoka City

6.2 Necessity of quality labeling

Food labeling is the source of information for buying food when making a purchasing decision. It is the source of information for protection of life and health. For food makers (producers and processing operators) need to carry out correct labeling, while food buyers (consumers) need to read the labeling correctly (to accumulate information). For that reason, if the description of the food offered is incorrect; the consumer cannot have an appropriate range of options.

[14] Source: MAFF, http://www.maff.go.jp/j/jas/hyoji/qa.html

6.3 JAS Framework

- JAS Framework is built upon the two components:

  1. the JAS System of Standards that instituted awarding of the JAS mark on the product label when it passed inspections under the Japanese Agricultural Standard; established by the Minister of Agriculture, Forestry and Fisheries for the purposes (1) to improve quality, (2) to rationalize production, to simplify and ensure fairness of transaction, and (4) to rationalize use or consumption of agriculture and/or forestry products; and,

  2. Quality Labeling Standard System, which mandates every producer, wholesaler and retailer to carry out product labeling in accordance with the quality labeling standards established by the Minister of Agriculture, Forestry and Fisheries for the purpose to aid the general consumers selection decision.

- Those two systems are instituted for smoother production and distribution of agriculture and/or forestry products, to develop agriculture production that meets consumers' demands, and to protect consumers' benefit.

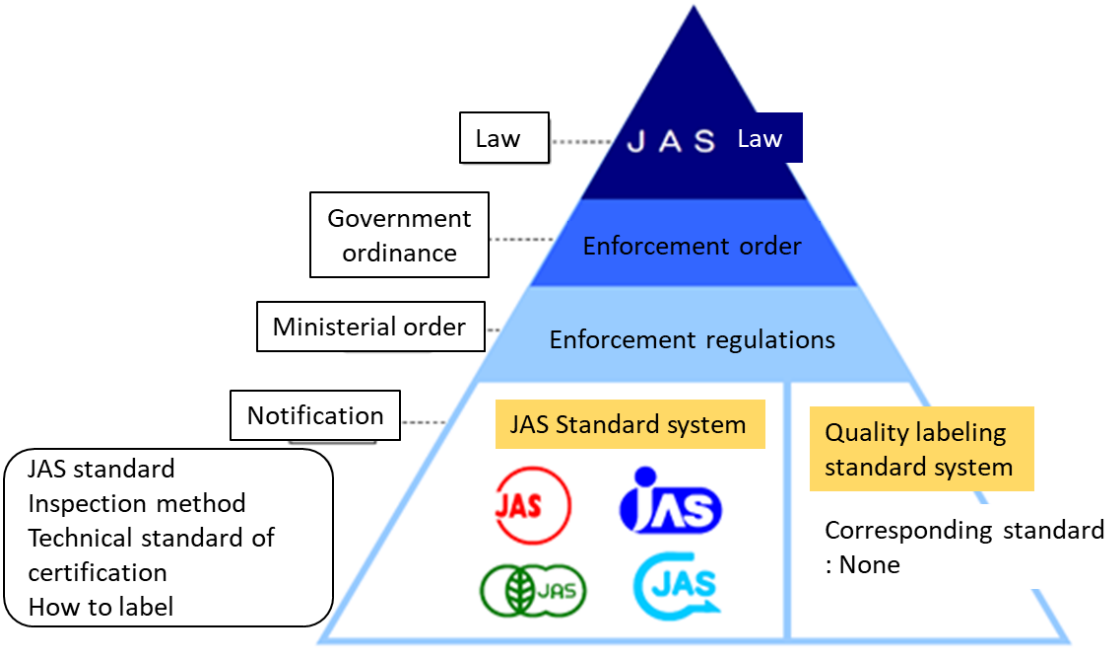
- The enforcement of Food Labeling Act in April 2015 had the effect of the food labeling related provisions transferred from the JAS Act to the said Act; while the JAS Act came to institute proper quality labeling of agriculture and/or forestry products that were not food or beverage product. As of time writing, there are no such quality-labeling standards in place yet.

  * JAS is abbreviation of the English translation, "Japanese Agricultural Standard".

  JAS is now used as the term that refers to the entire system, while a standard for individual product is called a JAS standard.[15]

[15] Source: JAS Association, http://www.jasnet.or.jp/2-seidogaiyou/2.1.1.html

6.3.1 Hierarchy of JAS Act regulations



6.3.2 JAS Act coverage of food labeling

- JAS Act compliant labeling requirements on foods and beverages for general consumption:
  - Perishable foods (since July 1, 2000)
  - Processed foods (since April, 2001)
  - Perishable and processed foods for trade use (since April 1, 2007)
- Following products are excluded from mandatory compliance to JAS Act labeling requirements:
  - Perishable foods provided through direct sales by the producer at site of production, at restaurant, and in meal catering
  - Alcoholic beverages, pharmaceuticals, quasi drugs or cosmetics (Note: labeling requirements pursuant to Liquor Tax Act or the Pharmaceutical Affairs Act still stand)
  - Processed foods not packaged in container, foods processed in-store, at restaurant or in meal catering

6.3.2.1 Related information: State of labeling regulation violations

Numbers of cases of violations of the JAS Act requirement on quality labeling standard or of Unfair Competition Prevention Act (false indication labeling) are shown below

Type / Year	2007	2008	2009	2010	2011	2012
Quality labeling violation	84	118	91	71	38	54
False indication labeling	4	16	34	10	12	20

- Person who violated is to be punished by imprisonment with work for 1–2 years or a fine of not more than two million yen.
- Many cases of false indication labeling are with origin or counterfeiting of label.

6.4 Perishable foods and processed foods

Following chart shows how perished foods and processed foods are divided, including cases of two foods mixed together.

	Single food pre-cut	**Same type mixed**	**Different type mixed (note 1)**	**Processed (note 1 & 2)**
Produce	Shredded cabbage	Shredded cabbage + Shredded red cabbage	Shredded cabbage + cut lettuce leaves	Boiled Bamboo shoot Dried shiitake
Livestock product	Beef "roosu" (cut from neck, shoulder, upper-ribs or loin; term came from "roast" to describe a cut suitable for roasting)	Beef "roosu" + Beef "karubi" (cut from lower-ribs)	Beef "roosu" + Pork "roosu"	Grilled meat (marinated and seasoned) Beef tartare Sausage
Fishery product	Red flesh of big-eyed tuna	Red flesh of big-eyed tuna + Moderately fatty flesh of yellowfin tuna	Red flesh of big-eyed tuna + Octopus	Boiled prawns, chikuwa (steamed and grilled fish paste) and dried fish

Green cells: Perishable food (name and origin)

Blue cells: Processed foods (name, names of ingredients, use by date, storage method, quantity, name of manufacturer and address)

Note 1: Processing, heating, blanching, sun-drying, seasoning, salt-curing, etc.

Note 2: When a food is processed in-store where it is then sold, it is deemed a case of direct sale to general consumers, which does not require labeling.

6.4.1.1 Important points in perishable food labeling

- Quality labeling on perishable food is required even in face-to-face sales, including those without packaging/container, though labeling format is not stipulated.
- Perishable foods through direct sale by the producer at site of production, or provided at restaurant, or in catered meal are not covered by the labeling requirements. However, labeling is still necessary during distribution process (for passing information on delivery slip and other document).

Produce	Name + Origin
Livestock	Name + Origin
Fishery	Name + Origin + Defrosted +

- Produce label requires name and origin, pursuant to the quality labeling standards for perishable food
- Fonts printed on container and package shall be at least the size provided for by JIS standard Z8305.
- The information needs to be on the produce's price card, POP, signpost, box or bag.

Origin labeling

Produced/made in Japan	Imported foods
Name of prefecture It is allowed to use name of municipality or other generally known place name	Country of origin It is allowed to use a generally know place name

6.4.1.2 Container/package

Labeling when selling produce in container or package

When legume or polished rice is sold in a sealed package, it is required the labeling carry: i. name, ii. origin, iii. quantity (in mass), and iv. name and address of the retailer.

A) When legumes (excluding immature beans) or polished rice is sold in a sealed package, it is required the labeling carry:

1. Name, 2. Origin

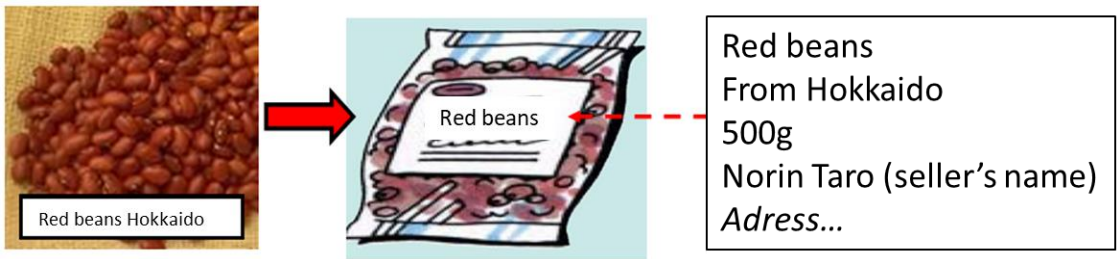
It needs to be placed somewhere easy to see.

+

3. Quantity (in mass) 4. Name and address of the seller.

A package where the content cannot be increased or decreased, unless the seal is broken

It needs to be in a transparent package and the label needs to be in sight. The font size of the information needs to be at least 8 points in a uniform font.



Sealed container

For a product/produce to be "sealed", its container or package needs to be in such states that the quantity cannot be changes unless it is broken as: (1) canned, (2) bottled (sealed with crown cap, screw top, wrapper tape, etc.), (3) in container made of tin, synthetic resin, paper (including craft paper and card), or a like, heat-sealed, clued, sawn, or secured by aluminum wire, or similar, (4) in wood box or barrel (with lid nailed, glued, hammered in or screwed on) or similar, or (5) in the so-called "plastic wrap packaging" (in a foam plastic tray wrapped with a stretchy plastic film; sealed between films or between film and tray, or secured by a take specifically prepared by the packer), and so forth.

B) When beans other than legumes (excl. immature beans) or polished rice is sold in a sealed package,

It is required the labeling carry:

1. Name, 2. Origin

It needs to be placed somewhere easy to see.

A package where the content cannot be increased or decreased, unless the seal is broken

Same as when not sealed.

Edamame beans from Saitama Prefecture

Edamame: Immature. Falls under "vegetables".

Soybean: Mature. Falls under "beans".

※ Both are the same crops

An example of a label on a specific produce. More examples for other crops to follow.

Examples of labels on processed foods

Labeling processed foods requires complying with the Processed Food Quality Labeling Standards. Such labels are required to carry name, ingredient names, name of ingredient origin(s), quantity, best-before date, storage method, producer/manufacturer, etc.

Name	Name description
Ingredients	All ingredients needs to be mentioned. Additives should be listed separately from other ingredients.
Origin	If required, country name and city needs to be mentioned.
Quantity	Describe the weight and number with the unit of quantity.
Expiration date	Describe the expiration date.
Preservation method	Describe how to preserve the product until the expiration date.
Manufacturer	Describe the name and address of the manufacturer.

The indication of the place of origin is required for products with low degree of processing (22 food categories and 4 specific items) such as pickles and green tea.

An example of a label on dried shiitake

【Name】	Dried Shiitake mushroom (Donko) *Description: Donko, Koushin, slices*
【Product name】	Shiitake (Kindoko) *Description: Genboku, kindoko, mix etc.*
【Origin】	Produced in Japan *Shiitake mushrooms need to list the country or prefecture name.*
【Quantity】	50g
【Expiration date】	2015/01/01
【Preservation method】	Keep away from sunlight. Store in a cool and dry place.
【Manufacturer】	*Company name* *Address*

6.4.2 Organic produce labeling

Organic produce, due to its small yield size, has own labeling rules in order to raise its value. In addition to the labeling requirements for other produce (Perishable Food Quality Labeling Standards), organic produce labeling has following required information:

(1) Name, (2) Origin, and (3) the claim of being "Organic" (pursuant to the provision for organic produce in Article 5 of Japanese Agriculture Standard) and grading (seal of the Organic JAS mark)

Organic JAS Mark logo (A logo designed with Sun, clouds and plant as its elements)

6.4.3 Related information: Yield of organic produce

Quantities of produce yields and the qualities graded as organic produce

(2012 domestic data in tons)

Crop type	Total yield	Grade yield	Ratio of organic (%)
Vegetables	11,974,000	42,467	0. 35
Fruits	3,027,000	2,524	0. 08
Rice	8,692,000	10,314	0. 12
Wheat, Barley, Oat, etc.	1,030,000	859	0. 08
Soy	236,000	1,306	0. 55
Tea	85,900	2,167	2. 52
Other produce	150,000	1,627	1. 08
Total	25,194,900	61,263	0. 24

6.4.3.1 Further information: Examples of organic labeling violation

A. A non-certified organic company labelled a product as "organic" because one of the raw materials had an organic certificate.
    - (Background) Lack of recognition of the organic JAS system. Expectation for increased sales because of advantageous labeling.

B. Initially organic raw materials were used to produce an organic JAS-certified product. However, the increase in sales caused a shortage of organic raw materials. Therefore, non-organic raw materials were mixed to produce the product.
    - (Background) Product planning without much consideration of the purchasing of the raw materials. Pressure from the sales side of the company. Pressure from customers to continue to supply at the right price. Lack of recognition of the organic system.

C. A non-certified organic company used the organic JAS mark for a product because a similar product from another company had the mark.
    - (Background) Easy imitation. Lack of recognition of the organic JAS system. Expectation for increased sales because of advantageous labelling.

D. A certified organic company used banners and pop-up displays to market all of their product as organic JAS-certified.
    - (Background) Expectation for increased sales because of advantageous labelling. Lack of recognition of the organic JAS system.

6.4.3.2 Consultation and inquiries on food labeling

Following offices handle questions and inquiries about food labeling.

Concerning the JAS Act	・ CAA (Food Labeling Planning Division) ・ MAFF Regional Agricultural Administration Offices (Food Labelling and Standards Surveillance Office) and Regional Centers (Food safety consumers affairs group) ・ Food and Agricultural Materials Inspection Center (IAA) (HQ and Corporate Inquiry Desk at each regional centers)
Concerning Food Sanitation Act	On labeling of food additives and allergy, manufacturer ID system, dairy product labeling, etc. ・ Public health office that governs or nearest to the manufacturer (Food Sanitation Officer)
Concerning Health Promotion Act	On nutrient labeling ・ Public health office that governs or nearest to the manufacturer (Nutrient labeling standard Officer)
Concerning Measurement Act	On quantity Prefecture measurement device verification center
Concerning the Premiums Representation Act	On incorrect claim of superiority, etc. ・ CAA (Representation Division) or prefectural office responsible for enforcement of the Premiums Representation Act
Concerning Act on the Promotion of Sorted Collection and Recycling of Containers and Packaging	On the Recycle Mark ・ MAFF Regional Agricultural Administration Offices (Business Strategy Department) and Regional Center (Promotion group)
Concerning US Traceability Acts	・ MAFF Regional Agricultural Administration Offices (Food Labelling and Standards Surveillance Office) and Regional Centers (Food safety consumers affairs group)

6.4.4 Structure of guidelines concerning notification of foods labeled with function claims

- Determine whether the product is subject to the labelling system
    - The product is not meant for people who are suffering from diseases, children, expecting and nursing mothers (including those who are planning to get pregnant).
    - Functional ingredients are clear, and they are not nutrients for which dietary intake standards are set.
    - It is not a "Food for Special Dietary Uses (FOSDU)", Food with Nutrient Function Claims (FNFC), beverage containing alcohol or a food product which may lead to excessive intake of lipids, sodium, etc.
- Basis for safety
    - Evaluate safety by one of the following:
        - Explain safety based on record of eating
        - Explain safety by research of existing information
        - Explain safety by conducting a safety test
    - Evaluate interaction of functional ingredients
        - Interaction between the functional ingredients and drugs
        - Interaction or the absence of interaction between functional ingredients
        - If there are interactions, it needs to be reported why it would be safe to eat the food
- Manufacturing and quality management
    - Describe the following information (for processed food and perishables)
        - Hygiene control system for manufacturing facilities and employees in case of processed foods.
        - Hygiene control system for production, harvesting and fishing in case of perishables.
        - System that prevents shipping of products not meeting standards
        - Method of analysis of functional ingredients
    - Set product specifications appropriately and verify conformity by conducting product analysis.
- System to gather information regarding health damage
    - There is a system to gather information about health damage.
- Basis for functionality
    - Explain scientific basis for the functionality to be labelled, by using one of the following:
        - A clinical study that uses the final product
        - A review of research concerning the final product or the functional ingredient
- Contents of labeling
        - Proper labeling is done on containers and packaging.
        - (In addition, please refer to notifications about food labeling standards and Q&A.)
- Notification