



DSM Sustainability Forum Vol. 2

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Sustainable Food Supply Chain

Opening Remarks

Yuji Nakahara, President of DSM Japan

Keynote Speech

Dimitri de Vreeze, Member of the Managing Board, Royal DSM /
Board Member of the European Chemical Industry Council (CEFIC)

Special Presentation

Mr. Satoru Morishita, Director General, Global Environment Bureau, Ministry of the Environment

Presentation

David Nickell, Vice President Sustainability at DSM Nutritional Products, Animal Nutrition & Health

Special Presentation

Mr Kazuhiko Shimada, Deputy Director-General, Forestry and Fisheries Research Council Secretariat,
Ministry of Agriculture, Forestry and Fisheries of Japan

Panel Presentations & Discussions

Moderator

Mr. Takejiro Sueyoshi, Special Advisor, United Nations Environment Programme Finance Initiative Chairperson, World Wide Fund for Nature Japan (WWF Japan) Representative, Japan Climate Initiative (JCI)

Panelists

Ms. Makiko Eda, Chief Representative Officer, Japan, World Economic Forum

Mr. Miki Yoshikawa, Managing Officer, Chief Operating Officer of Food Business Unit, MITSUI & CO., LTD.

Mr. Yuji Tsuchihashi, Managing Director, General Manager of Quality Assurance Department, Marubeni Nisshin Feed Co., Ltd

Mr. Hiroyuki Ishibashi, Manager, CSR Department, Public Relations and CSR Division, Kewpie Corporation

Ms. Kahori Miyake, Executive Officer, CSR & Communication, AEON CO., LTD

Yuji Nakahara, President of DSM Japan

Closing Remarks

Mr. Cees Roels, Deputy Head of Mission, Embassy of the Kingdom of the Netherlands

*The original summary report was written in Japanese.

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Opening Remarks



Yuji Nakahara
President of DSM Japan

It is said that the total population of the world will exceed 9 billion in 2050. As a company, we DSM take the pursuit of sustainability as our principal value, and have continuously striven to contribute to sustainability of the earth and the human society through science technology and functional materials.

Since it started as a coal corporation of the Netherland in 1902, our company has continued to grow as a company that fuses basic chemistry and functional chemistry with materials science and life science through 117 years' history, and currently contributes to society as a major company that provides micronutrient materials such as vitamins to the food, pharmaceutical and feedstuff industries.

Further, we currently place our response to the challenges presented by the SDGs, and its contribution to achieving them, at the center of our corporate strategy, and regard our contribution to health and nutrition, climate change and energy-saving, and a sound material-cycle society literally as our business domain. In fact, we have experienced on a global level that pursuit of sustainability itself serves as the source of business competitiveness in society where

contribution to sustainability is essential. At the previous, 1st DSM Environmental Management Forum, which was held in 2017, with the enforcement of the Paris Agreement, the discussions were made from the viewpoints of how the chemical industry should respond to climate change, of how this should be taken as a business opportunity, and of the fact that a mega-competition age for the low-carbon market has begun. The discussions on sustainability have now spread also to the food industry. Under these circumstances, discussions on how we should protect the dietary life of the global population, which is estimated to reach 9 billion in 2050, and what kind of actions will need to be taken, have also begun in Europe, the United States and other countries. Under the topic of "Sustainable Food Supply Chain," this 2nd DSM Environmental Management Forum is intended to have discussions with those who are working on this topic at the forefront in companies representing various industries, governmental agencies and academic circles. I would like to say my sincere thanks for agreeing to this topic. I also would like to express my profound respect and gratitude to the speakers for bothering to deliver the lectures.

Sustainability that DSM aims at

Dimitri de Vreeze

Member of the Managing Board, Royal DSM / Board Member of the European Chemical Industry Council



Goals give us many growth opportunities

We previously had a dilemma between “doing the good” and “making a profit” in the course of growth as a company. However, we realized before long that if we wanted to do the good through our business, the good would not continue unless we made a profit to maintain the company. Making a profit and doing the good are inextricably linked.

That is why DSM attaches importance to “purposes (objectives/goals).” Goals give us many growth opportunities. And, achieving a sustainable goal means doing the good.

With these two characteristics, the direction of our strategy will come in sight. At present, we think that placing focus on the following three areas will make us grow and profitable.

The first area is “nutrition and health.” As the global population increases and the aging of society advances, nutrition and health are becoming truly important. The second area is “climate and energy.” With the enforcement of the Paris Agreement, many innovations are required in the field of energy. This is also because climate change is one of the biggest risks for society. And, the third area is “resources and a recycling-oriented society.” In the present society, you cannot use resources as if they were limitless. The idea of a recycling-oriented society must become more and more important in the future.

These three areas are all connected to the SDGs, and truly contribute to sustainability.

As long as we have already provided our products to as many as 2.5 billion people and made our solutions available to them to date, we must also assume that responsibility. In addition, we have set ambitious targets in terms of sustainability (see figure).



With true innovations, not simply with words

Off course, for the three areas on which to place focus, we not only say words, but also provide innovations that will help to surely satisfy or solve needs or problems that our partners, customers and society

have. Let me explain the idea by taking an example for each of the areas.

The first one is the energy field. The business we currently operate is in the field of photovoltaic generation. We provide solar panel back sheets in this field. The cost of photovoltaic generation has now decreased to a level comparable to fossil fuels. But, in fact this contains a contradiction. Normally, fluorine resin is used for back sheets. Despite the fact that a back sheet is used for sustainable renewable energy, fluorine resin cannot be eliminated, and that made the recycling difficult. To help solve this problem, DSM has developed and provided a back sheet that does not use fluorine resin and can be recycled 100%. With this, the carbon footprint can be reduced by 30%.

The next area is a recycling-oriented society. Diapers represent the largest amount of all waste disposed of worldwide. Do you know what represents the second largest amount? The answer is carpets. Of these carpets, 95% is disposed of as landfill. DSM considers such a thing as “ridiculous.” “Niaga” has been developed as a 100% recyclable carpet that can be perfectly cycled. As you may notice, “Niaga” can be read backward as “again.” That is to say, this carpet was named “Niaga” in the sense that it can be used while being recycled time and time again.

The last area is nutrition and health. We provide nutrition fortified rice to regions around the world, especially to regions where people are experiencing a shortage of micronutrients. If you only eat rice just to fill your stomach, you will become nutritionally unbalanced. To help improve this problem, micronutrients are added to this nutrition fortified rice to supplement the lack of necessary nutrients.

These were some of our innovations, and DSM has a track record in all the three areas. Off course, this does not mean that DSM has accomplished this only with our efforts, and we need to think at various levels in order to achieve the purpose, together with not only our employees, but also our customers, suppliers, shareholders and society. To be successful as a company, partnership is essential.

“We cannot call ourselves successful in a world that fails.” Why don’t we try our ingenuity together at achieving global sustainability?

SDGs – climate change countermeasures and a Regional Circular and Ecological Sphere(Regional CES)

Mr. Satoru Morishita

Director General, Global Environment Bureau, Ministry of the Environment



Multiple benefits with SDGs

First of all, in the background of the SDGs, there is a basic policy of “leave no one behind.” My understanding is that this derives from inclusive globalization, which was advocated by former UN Secretary-General Kofi Annan. The philosophy of this is that even though globalization may provide various benefits, there must be no people, regions or ranks left behind, and we must aim for a world where all people benefit from the globalization and lead a productive and quality life. There is a major trend in which that idea has developed into SDGs.

Environmental, economic and social problems are all connected

The SDGs consist of 17 goals and 169 targets. A large majority of them concern health, food and environment, and it is also characterized that they are connected with each other. Fig. 1 shows what the promotion of target SDG 12.3 on Food Loss and Waste Reduction would bring about. Promoting this target would bring about various problem solutions such as resolution of malnutrition and securing of a sustainable production system as a result, which would include Climate Change Countermeasures and Eradication of Hunger. In other words, pursuing the SDGs would simultaneously solve multiple goals, or bring about multiple benefits.

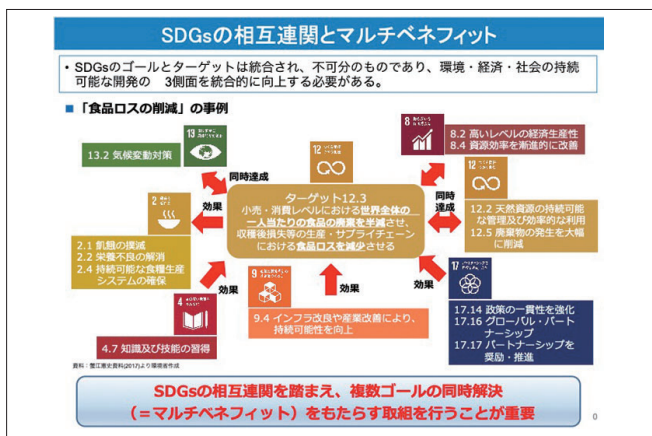


Fig. 1: Interrelation and multiple benefits of SDGs

Since the SDGs contain many environment-related targets, we at the Ministry of the Environment feel proud that our services themselves connect to everything and contribute to it, and have worked on the collection and dissemination of good practices in Japan and abroad and made efforts to achieve them since the SDGs were approved in 2015.

In fact, in Japan in recent years, various problems such as aging of society and decrease of labor production capacity have occurred in addition to global problems such as climate change, and local communities are in an

exhausted condition. We think that in these problems, environmental, economic and social challenges occur in a tangled manner. In other words, many problems are connected to each other.

We think that elaborately designing environmental policies including climate change policies and implementing them would also lead to revitalizing economic growth and local communities. To achieve that, participation of not only local governments but companies and business entities is essential. Also, if you take the SDGs as the essence of your business and grow together, it must increase your branding ability and raise the value and significance of its presence in the middle-to-long term.

Worldwide, in fields such as climate change, major changes are occurring mainly at financial institutions in particular. This is because if the average temperature rose by 4 degrees from the level during the Industrial Revolution era in the 19th century, devastating natural disasters would occur, and nonlife insurance would no longer remain profitable as business.

Judging from the above, we think that if our efforts for the environment were designed well, economic and social problems would also be solved simultaneously. We have proposed an idea called a Regional CES” (Fig. 2) based on such a concept. This idea means that with local communities being in exhausted condition, we should find out new values and resources each community has, and generate added values.

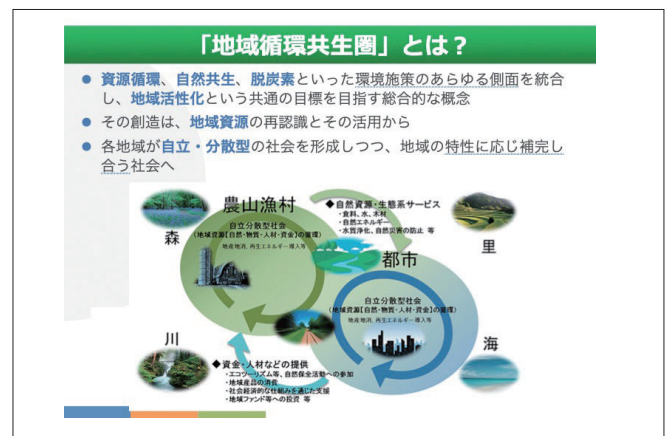


Fig. 2: What is a “Regional CES?”

By demonstrating their strengths, regions should each build an autonomous and dispersed society that varies with the regions, and each region should build a Regional Circular and Ecological Sphere according to the characteristics while complementing with the neighboring areas. I think this is an idea necessary not only for administrative personnel, but also for people at business entities. That is because, as with SDGs, if everyone becomes prosperous, it will create a virtuous cycle that will lead to economic growth involving market expansion and resource circulation.

Achievement of sustainability and innovations in animal husbandry

David Nickel

Vice President Sustainability at DSM Nutritional Products, Animal Nutrition & Health



Technological innovations for increasing the production of animal protein

To support the diet of humans whose population is expected to reach 9.7 billion in 2050, it is regarded as necessary to increase the amount of calorie by 70% from the present production.

It is without saying that to increase the production of animal protein sources such as meat, fish, milk and eggs, which are major items among the group of foods that should be increased, a new solution is essential. We must expand the food production in a sustainable manner without expanding farmlands for cereals such as soybeans, corns and wheat, which are raw materials of food. Among those, formula feed for livestock for example has a very important role. However, the currently used formula feed has a very large carbon footprint in fact. In addition, the livestock industry itself has problems such as methane emissions due to cow burps, soil and water contaminations due to phosphorus and nitrogen produced from their excreta, and drug-resistant bacteria.

To solve these problems, various technologies such as those for developing formula feed having high functionality, economy and safety by using micronutrients will be required.

Contributing with six platforms to the market

Under such circumstances, DSM places focus on the following six platforms, and are trying to make a contribution to the market.

The first one is our measure against the drug resistance problem caused by factors such as the abuse of antibiotics in livestock. DSM provides product portfolios in various fields. With this, we aim at reducing or disusing antibiotics for preventive applications.

The second platform is reduction of our dependence on marine resources. In the supply of animal protein, the importance of aquaculture will increase. Due to the recent overfishing, the marine resources are in danger of depletion. In the meantime, in the improvement of the functionality of aquatic formula feed required for aquaculture, omega-3 fatty acids such as EPA and DHA are essential. As a solution to this problem, DSM provides algae-derived EPA and DHA of Veramaris, which is a joint venture between DSM and Evonik. While 60 tons of source fish is required in the conventional method to produce a certain amount of EPA and DHA, only one ton of Veramaris' algae is required to produce the same amount. The production capacity of Veramaris' algae in terms of catch is approximately 1.2 million tons (Fig. 1).

The third platform is reduction of excreta from livestock. With balanced and highly safe formula feed, which is produced using our

new technology, the greenhouse gas emissions and soil and water contamination due to the livestock industry can be reduced.

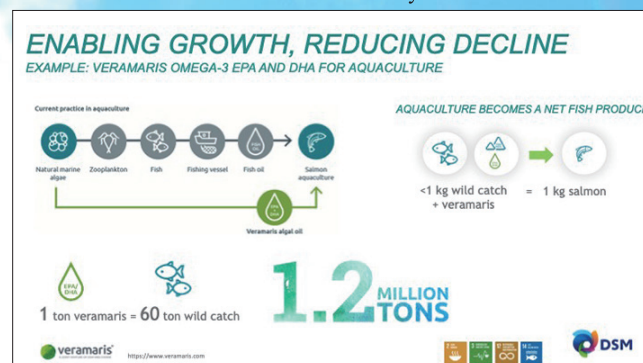


Fig. 1: Production capacity of Veramaris

The fourth one is efficient use of natural resources. This means producing more with limited resources. In livestock production, it is important to increase the feeding efficiency and raise the value of forage crop using digestive enzyme technology. DSM is the first company that industrially produced phytase. Phytase has the effect of reducing the environmental load while improving the feeding efficiency through digestibility improvement by utilizing products such as ronozyme ProAct (protease), which DSM launched recently.

The fifth one is the reduction of food loss and disposal by using safe and high-quality nutrition. For example, DSM verifies across the whole value chain that we may be able to reduce food loss by reducing egg breakage, and fortifying feed with vitamin E as shown in Fig. 2 to prevent meat oxidation and enable its long-term storage, through vitamin optimization.

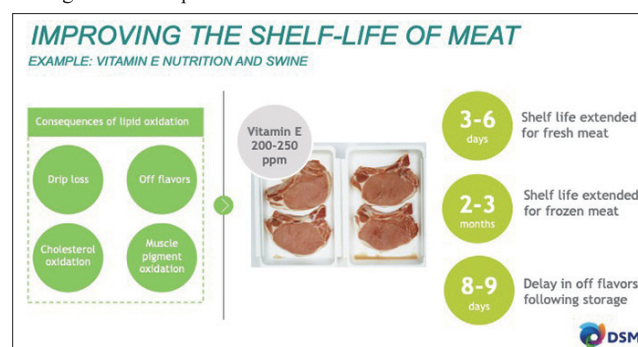


Fig. 2: Possibility of long-term storage of meat by vitamin E fortification

And, the last one is lifetime performance. This means improvement of animal welfare, and improvement of performance of animals by improving the nutrition levels of cow milk, chickens and eggs through our company's technology to help them grow.

As described above, we intend to aim for higher sustainability of livestock through these six platforms.

Guest Presentation

Toward the achievement of sustainable agricultural, forestry and fishery industries

~To pass down “food” and “environment” to future children~

Mr. Kazuhiko Shimada

Deputy Director-General, Forestry and Fisheries Research Council Secretariat,
Ministry of Agriculture, Forestry and Fisheries



Meaning and significance of protecting the agricultural, forestry and fishery industries

First of all, the agricultural, forestry and fishery industries do not simply mean producing food. To continue the activities and improve the productivity, it is essential to ensure harmony with the environment. This harmony partly means activities of “protecting the surrounding nature” such as the preservation of biodiversity. But, the essence is slightly different. Living there also involves activities intended to protect, for example, traditional culture of forest villages or coastal villages. To achieve sustainable agricultural, forestry and fishery industries, the Ministry of Agriculture, Forestry and Fisheries provides necessary support.

However, while activities to preserve areas such as forest villages are continued this way, the recent global warming and climate change are becoming a major challenge to the agricultural, forestry and fishery industries in Japan.

For example, at rice farms in the Kyushu District, where the temperature has been high from the beginning, circumstances where “white immature grain” in which the rice is tasteless and the yield declines due to a further temperature rise in summer have already occurred. Although easing measures and adaption measures are taken, the impact is no less serious.

Tight supply of grain as well as livestock products becomes notable

Next, let me talk about the prospect of the food supply and demand while looking into the future.

While the worldwide consumption of livestock products in the early years of the 2000s (2002 to 2004) was 35 kilograms per person, it is estimated to rise to 40 kilograms in 2027, which is an immediate future. This alone is a considerably steep rise. Consumption of livestock directly connects to the consumptions of grain, or to be more specific, grain as food or grain as feed. This is an estimate in 2027, only about 10 years from now. Despite such as short range, 2.91 billion tons of grain will be required. This means an increase of over 16% from the early years of the 2000s. However, although the productivity has increased thanks to technological innovations such as breed improvement, the global cultivated acreage for grain has already hit a peak in fact.

Also, a supply and demand estimate shown in Fig. 1 indicates that in particular the Asian region cannot be expected for the production volume required to cover the demand as of 2050. Among the other regions, the European region will be the only area with a capacity to export. So, it is estimated that the Asian region including Japan will need to cover the increase in the demand for livestock products with imports from the European region in 2050.

Moreover, as for the demand for food in Asia, it is said that the population of China will continue to grow further, and may reach 1.5 billion in 2050. It is

estimated that in addition to that, the demand for pork will grow to a particularly large extent.

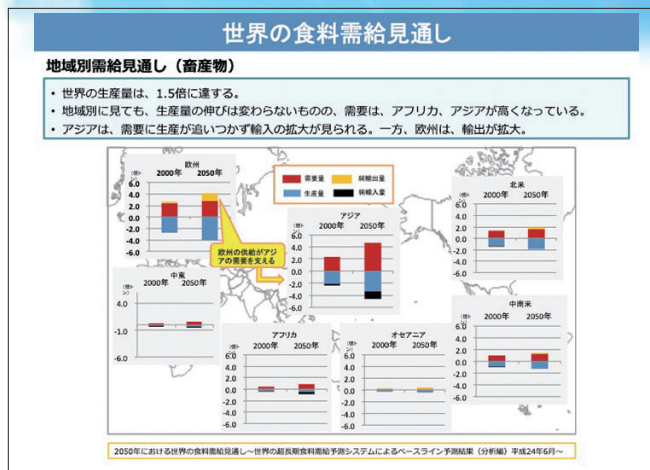


Fig. 1: Global food supply and demand estimate

Naturally, imports of grain such as soybeans in addition to pork will also increase. Under circumstances where China as an economic giant exercises its buying power, tight supply of grain on an international scale is coming in sight.

Measures for food security

In the light of these, food security will increasingly become important also in Japan. Fig. 2 shows where the risks of food security are present. The risks also include international problems such as population growth in emerging countries in the future. But, there are also those that have already come to the surface such as global warming.

The risk of the food problem never consists only of the problem of a 9 billion population in 2050. For the sake of children in the future, it will be necessary for Japan to raise the domestic production by protecting the rich natural environment of Japan and the agricultural, forestry and fishery industries, including the livestock industry, in addition to working on the prevention of global warming, in order also to ensure stable supply of food.



Fig. 2: Risks with food security

Panel Presentation I

Considering approaches to food



Ms. Makiko Eda
Chief Representative Officer, Japan, World Economic Forum

What is the World Economic Forum?

The World Economic Forum may remind you the Davos Forum first. But, the Davos Forum is only a part of our activities. The World Economic Forum is an international organization in which leaders such as those in fields including economy, politics and academia cooperatively contribute to solving various problems in the world, regions and industries.

The topics that our forum addresses are very wide-ranging, such as Global Industry, Regions and Geopolitics, Global Public Goods (environment, oceans, SDGs, development finance, and future of food), New Economy, Society (economic competitiveness, education, social inclusion, and gender), Center for the Fourth Industrial Revolution, and Cyber Security.

In the phrase “Global Public Goods,” public goods mean things that every person has, like there is no border in the sea or the sky. The environment and the future of food are also incorporated in this framework.

Three approaches in which food is regarded as “systematic”

Now then, with the world population growing to 9 billion, which is a huge number, the way we should supply food stably and sustainably is becoming a major issue. Also, in doing so, we must provide food while maintaining and protecting the environment in a sustainable manner. And, it seems that the way we should turn the food cycle in an economically meaningful manner as something extra has become an issue.

Concerning the platforms of the World Economic Forum, we see that they must all be connected together, and consider the following three approaches while regarding food as “systematic.”

The first approach is to regard food in the context of “connection and flow.” Instead of looking only at its supply, we should see factors such as the impact on the environment, efficiency of the manufacturing process, transport, and consumption in the context of a flow. We see this as also connecting beyond to the health problem and social security. And, as exemplified well by SDGs, although the goal is shared by all, there may be various ways for that. In addition, I think it is important to take a solution in a manner to fit with the region while taking into account historical and social backgrounds of the region.

The second approach is to “scale a project.” This means successfully

scaling a project launched to solve a problem in order to make waves.

And, the third approach is to “deeply pursue common elements in any region and for any food.” This is also called cross cutting, which means locally seeking mitigation or fusion through development investment, insurance, innovation or the like.

A project makes a big wav

Let me introduce a specific case example of scaling a project, which is the second of these three approaches.

Two global companies aimed at growing coffee in a sustainable manner and increasing the production volume at the same time in Vietnam. As a result, the companies succeeded in halving CO₂ emissions while increasing the production volume by 15%.

Using this success as an opportunity, the two companies involved the Ministry of Agriculture and Rural Development of Vietnam to form a business entity called the Vietnam Coffee Cooperation Board, and provided cultivation methods to local farmers who had no resources. And, in three years from 2005, the number of farmers participating in this business entity increased from 5,000 to 66,000 people. A huge wave was made. In this case example, I think it was very significant that not only was there a benefit in protecting sustainability, but also there was an economic advantage for local farmers. This may serve as the key to making the food supply sustainable.

And, the last point. Some Vietnamese coffee is exported, but a tax called VAT is imposed on the export at any rate. Although the tax will probably be returned eventually, minute farms will suffer a great loss. Therefore, the method of tax collection was changed through public-private discussions, and the VAT was finally removed. As a result, the cash flow at farms was substantially improved. This case example presented an activity in a major framework: “Grow Asia.” This approach may be adopted also for similar or different food in other countries. Such a scaling method could also be an option.

And now, we intend to continue to solve global-scale problems by linking people we would not see in ordinary frameworks as much as possible, instead of acting as a research organization that simply has awareness. Among those, the food problem is a particularly important issue. If it is certain that the population will grow in 30 years, we would be happy to contribute to solving this problem together with you.



Panel Presentation II

Sustainability in the food business of MITSUI & CO., LTD.

Mr. Miki Yoshikawa
Managing Officer, Chief Operating Officer of Food Business Unit, MITSUI & CO., LTD.

Sustainability is the basis of value creation

First of all, MITSUI & CO., LTD. understands sustainability means that each employee sharpens their sensitivity to environmental and social problems through dialogs with stakeholders, contributes to solving these problems through business, and serves as the basis of value creation. In addition, we have selected five areas: local industry, improvement of the life base, preservation of the global environment, stable supply of resources and materials, respect for human rights, and governance and human resources, which correspond to the 17 items of SDGs, which the United Nations has set toward 2030, as our important medium-to-long term tasks, and we have been working on them.

Improving soil of large-scale farms with precision agriculture

Let me explain a few specific examples of sustainability-related activities in our food business. The first one is an agricultural project. Our company has participated in an agricultural project in Brazil since 2007. Currently, we have a farmland with an area of approximately 110,000 hectares, and cultivate soybeans, cotton, and corns as a raw material of formula feed.

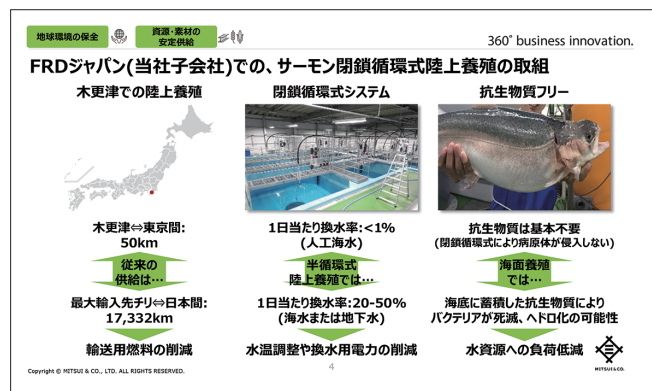
In the case of large-scale cultivation of an agricultural product, there is a difference in fertility between farmland lots in uniform fertilizer distribution, and therefore, excessive or insufficient fertilization occurs. This results in wastefulness of a fertilizer or uneven soil quality in the whole farmland. To solve this problem, our farm has worked on precision agriculture through so-called digital transformation in the past several years. The precision agriculture has enabled our farm to automatically make fine adjustment of the applied amount of a fertilizer and the application timing for each lot by performing identification of the farmland shape and analysis of vegetation using satellite photos, and analyzing and managing the soil fertility and the past yield trends through further segmentation of the farmland. This has led to not only the optimized use of fertilizers, but also the stabilization of soil quality and unit crop of agricultural products.

Taking the possibility of land culture

Next, let me introduce FRD Japan, Co., a startup in which our company has a stake and is venturing into a land culture business for salmons.

With economic growth and income increase in the world, the consumption of animal protein sources such as meat and fish is increasing. In particular, the global demand for aquatic products is estimated to increase by 4% on annual average until 2025. In the meantime, the natural fish catches almost hit a peak around 2013, and it is essential to secure a culture-based production volume. As for salmons, which are much consumed worldwide, the temperature rise of seawater in summer is not suitable for their culture, so they are exported from limited regions such as Norway and Chile to countries around the world.

FRD Japan is venturing into closed-circulation type land culture of salmons in Japan (figure).



This system is expected of in three points. First, since the culture is conducted in the consuming region, the transportation cost is minimized and highly fresh salmons can be delivered to consumers. Secondly, since this culture system uses no seawater or groundwater, but circulates artificial seawater almost 100%, the cost of energy required for seawater replacement and cooling can be reduced. And, third, since the risk of pathogen intrusion resulting from seawater can be prevented in closed-circulation type land culture, fish can be produced without use of any antibiotic or vaccine, leading to the preservation of the marine environment in the medium-to-long term.

FRD Japan plans to start shipping salmons that are currently produced at a test plant this year. Although there are still several hurdles to overcome, the company intends to work hard on the production of environmental-friendly and safe aquatic products in the consuming region through demonstrating the potentials of this system technically and industrially.

In addition to this, we have continued various efforts for sustainability such as converting waste generated in the course of producing, processing and distributing agricultural products and livestock and aquatic products into raw material of feed. As I stated in the beginning, we aim at creating new values while considering the social challenges, and are also conducting activities such as selling these by-products by adding further values to them.

In addition, our group not only gets involved with the durability of a long value chain from agricultural products to animal protein and beyond, but also works to further improve the recycle system itself by carrying out research and development, information collection, analysis and demonstration.

Securing the social environment and long-term sustainability is also our company's social responsibility to fulfil. We will continue to attach importance to continued dialogs with our stakeholders in order to correctly recognize various environmental and social challenges, and actively seek to discover or introduce new technologies and ideas that may lead to solving the challenges.

Panel Presentation III

Recent efforts of the feed industry ~from the viewpoint of SDGs~

Mr. Yuji Tsuchihashi

Managing Director, General Manager of Quality Assurance Department,
Marubeni Nisshin Feed Co., Ltd.

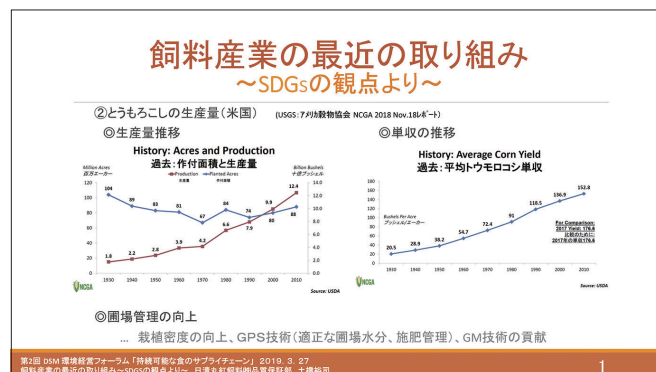


Will raw materials of feed be stably supplied also in the future?

The feed industry can be regarded as a great recycle industry where food that humans cannot eat is transformed into animal protein in one way or another.

However, the Japanese feed industry depends on imports for most of the raw materials. Soybean and rapeseed dregs from which oil has been extracted are mostly used for feed, and their global quantity is enormous. Now then, the question is whether soybeans and rapeseeds will continue to be produced well into the future in the same manner and sufficient supplies can be secured.

By contrast, of the raw materials imported to Japan, corns from the United States represent a large portion, and about 50% of the formula can be considered as corns. The production volume for corns has steeply increased. But, the crop acreage has remained the same (figure). It means that the yield increased due to technological innovation. But, it is questionable whether the yield will continue to increase.



Improvement by making a database of environmental burdens

In regard to recent efforts of the feed industry, IFIF (International Feed Industries Federation) has announced that they will actively work on the SDGs. That is because formula feed must assume a major responsibility for the environmental footprint in many aspects. LCA (Life Cycle Assessment) ranks the top of a list of IFIF's specific efforts. In short, the industry must assess how much environmental burden is caused by the consumption of each product made from a raw material in the lifecycle, make a database of the environmental burdens, and accurately grasp it. In addition, as a member of GFLI (Global Feed LCA Institute), IFIF aims at reliably pursuing data measurement and improvement.

An SFIS (Specialty Feed Ingredients Sustainability) project is intended to reliably develop functional raw materials with a high

feed effect.

And, LEAP stands for Livestock Environmental Assessment and Performance. A team will be formed to study these.

IFIF has also set a goal of controlling AMR (Antimicrobial Resistance), which is another major problem. In other words, the goal is to suppress the emergence of drug-resistant bacteria. This effort is aimed at reducing the use of antimicrobial agents intended for growth in the field of livestock, and ensuring proper use of animal drugs.

As a measure against AMR, an effort of Canada is also recommended. This is an advanced approach in which to classify those into a category of functional raw materials, and manufacture effective formula feed while utilizing such raw materials.

Efforts for feed with reduced environmental burden in Japan

In addition, Japan has also taken measures such as reducing protein and phosphorous in the field of feed for livestock, and establishing a standard (official standard) for feed with reduced environmental burden. In addition to this official standard, the feed industry has adopted amino acid calculation since long before. The effort is to reduce wasteful protein and energy by designing amino acids efficiently.

The fishery sector has also placed focus on feed with reduced environmental burden since a long ago. In particular, depletion of global aquatic resources has recently become a major concern. For the feed for fishery, fish flour, or powdered sardine, was previously used as raw material. But, since sardines have now decreased, efforts to reduce powdered sardine as much as possible must be made.

The fishery sector has set goals also for the SDGs. In particular, for goal 14 "Preserving the Bounty of the Sea," the sector lists seven points including "recovery of aquatic resources" as items of importance, and has been actively promoting efforts for feed for fishery in the form of certification by MSC (Marine Stewardship Council) or ASC (Aquaculture Stewardship Council) as third-party certification.

Finally, let me take an example. In the broiler business, feed efficiency increase, or productivity increase in other words, through breeding improvement, is practiced. More than 30 years ago, at a time when I was preparing a recipe for formula design, 2.1 kilograms of feed was required to produce one kilograms of meat. But, recently, raising a broiler requires only 1.5 to 1.7 kilograms of feed. Yet, this means that it took 30 to 40 years to make an improvement of only about 20%. So, technological innovation takes considerable time. For this reason, I feel that only by starting to work on technology now, we can steadily move toward 2050.



Panel Presentation IV

Effective use of food resources through a value chain

Mr. Hiroyuki Ishibashi

Manager, CSR Department, Public Relations and CSR Division, Kewpie Corporation

Extracting priority subjects by reviewing CSR and using SDGs as reference

The Kewpie Group has continued so-called CSR activities since relatively early times, such as starting plant tours in 1961, and supporting the Bell Mark movement since its start in 1960 as we agreed to the intent of the activity. In the meantime, problems such as the environmental issue and abnormal weather due to climate change have surfaced, and a sense of crisis that the earth might become unsustainable unless we do something has increased. In these circumstances, we reviewed our attitude toward CSR, and tied our contribution to realizing a sustainable society with the concept of sustainability as sustainable growth of the group. And, we have selected priority subjects from various subjects by reference to SDGs. Specifically, we list “contribution to extending the healthy life expectancy,” “support for mental and physical health of children,” “effective use and sustainable procurement of resources,” which includes effective use of food resources, and “reduction of CO₂ emissions” as priority subjects of our CSR. We also add “pursuit of diversity” as the basis of our group growth strategy.

Food loss also occurs at the stage of processing and manufacturing

And now, the problem of food loss is drawing attention also in Japan. Food loss generally means disposal of food due to being left unsold, leftovers and expiry of best-before period. But in fact, an enormous amount of food loss occurs also at the preceding stages, which are the stage of food production and the stage of processing and manufacturing at the manufacturer. We think that it is necessary to reduce food loss throughout the value chain from the food production to consumption. It is forecast that the food resources will be depleted, for example due to population growth and climate change. Under these circumstances, we consider such efforts as a very important mission of a food manufacturer.

Effective use of food resources

Let me introduce some examples of our efforts. First, in our mayonnaise production and our egg business, we use a very large number of eggs, accounting for one tenth the total production in Japan. And, a large amount of egg shells are disposed of at the manufacturing stage. We have used these egg shells as a soil conditioner since 1956. To use these more effectively, we separate the shell into an eggshell and a shell membrane, and use the eggshell for food and supplements as a calcium enhancer since it contains eggshell calcium, which has very high absorption. Or, it is used for chalk or anti-skid agent as an alternative to lime.

In addition, we are also working on resource circulation for vegetables. In our salad and prepared food business, large amounts of cabbage and lettuce are used. And, when cut vegies are prepared, outer leaves and the core, which are not suitable for salad, are left as residues. The residues are used as compost. But in fact, it is found that outer leaves and cores contain a lot of nutrients including phytochemical, which is said to have antioxidant action. So, we have considered a method of utilizing the residues in order to use them more effectively. Last year, we succeeded in using the residues as feed for dairy cows by lactate-fermenting the unused portions. Since the milk yield can be increased while maintaining the milk quality, the increase of self-sufficiency rate, stable supply and reduction of waste through this approach received evaluation, and were awarded with a 3R contributor commendation and a Food Industry Mottainai Awards. Currently, we are laterally spreading this within the Group.

If delivery expiration or the like inevitably occurs, we provide the product to a food bank. This approach has also led to support for facilities such as orphanages, facilities for the handicapped, or children’s cafeterias (offering free food to disadvantaged children), which are rapidly increasing recently.

This way, we conduct various activities. But, I think we are just getting underway. We wonder if there may be a more effective method. Although we utilize residues, if we consider CO₂ and the environment, we may use them in closer places. We also think that activity leading to educating consumers about ethical consumption will be needed. And, to pursue these, we think it will be necessary to have more supporters within our company, and cooperate with various people in the value chain.



Panel Presentation V

Achieving a sustainable society ~efforts of AEON



Ms. Kahori Miyake
Executive Officer, CSR & Communication, AEON CO., LTD

Our basic principles have remained unchanged for 50 years

Our company's mark, in which a phrase meaning peace is placed at the vertex of a triangle and our customers in the middle, and our basic principles: "Pursuing peace, respecting humanity, and contributing to local communities, always with the customers' point of view as its core," have remained unchanged for over 50 years as far as I know. Some customers say: "Peace with retailing business? What a grandiose philosophy!" But, it is also said that the most important element in defining peace is in fact the environment. This phrase is precisely suitable for the present age, and not surprisingly, (protection of) the environment is also a principle that our company has valued since long ago.

AEON announced its Sustainability Principle in addition to this principle in a formal statement in 2011. This idea itself had been held in the company. But, in continuing sustainable management anew, we thought we should make a contribution to environmentally and socially important issues in some way through our business. And, the company has conducted business activities based on this.

Measures for food security

In April 2017, we announced "Sustainable Procurement Goals" for 2020. At that time, the Tokyo Olympics were about to come in sight, and sustainable procurement was coming into focus again. So, we wanted to set specific target values, instead of sticking only to the concept. Although the product department seemed unwilling, our team in charge of the environment and social contribution somehow forced them to set the goals. But, two years have passed now, the product department feels that the public's view on sustainability has been certainly changing, and is working on the goals very positively.

The results in the past two years vary with the set items, but, the achievement rates are probably about 60 to 70%. We hope to accomplish the goals in fiscal 2019 and 2020 by some means or other.

Let me take specific examples. In the case of aquatic products for example, we definitely want to sell MSC- and ASC-certified products, which are procured in a sustainable manner, further aggressively. We started to sell these certified products at a very early stage, and I remember that the first of these products was displayed at our stores in 2006. At first, only one item of certified product was on the shelf, and the product was well-known only to those in the know. Currently, they account for more than 20% of our private brand products, and the items of certified products have so

increased that certified products occupy the whole one shelf (figure). We think that is far from being enough, and we should place more focus on this area.



Presenting problems for our customers

Take another example with an aquatic product. Last year, AEON announced a policy for the sales of eels. The policy mainly consisted of selling two types, Japanese eel and Indonesian eel, aiming at starting the sale of 100% traceable eels by 2023, and promoting a preservation project for Indonesian eel in order to guarantee sustainability of Indonesian eel. As the policy was covered by the mass media, I think the response we received was greater than I had expected.

Obviously, the eel problem is complex and will not be solved easily. In fact the aquatic product department was pretty against the policy. We still have to make some adjustment with the administrative body for the solution, and there is a legal difficulty. But, retailers like us, who have stores and connection with customers, have to put such an issue on the table. In a sense, we wanted to raise a question.

Important elements of sustainability include a human right issue. AEON revised "AEON Basic Policy on Human Rights" in October last year. Although human rights have not become a major issue yet in Japan, we have been working on discussions with people from some NPOs and NGOs. How should we increase the transparency of the human rights issue by tracing the issue to the upper part of the stream? How should retainers like us, who are still at the final end of the supply chain, cooperate with people to solve the problem? I think that we must work on these at all costs in the future.

Panel Discussion

Sustainability in the Food Supply Chain

Moderator



Mr. Takejiro Sueyoshi

Special Advisor, United Nations Environment Programme Finance Initiative
Chairperson, World Wide Fund for Nature Japan (WWF Japan)
Representative, Japan Climate Initiative (JCI)

Panelists



Ms. Makiko Eda

Chief Representative Officer, Japan, World Economic Forum



Mr. Miki Yoshikawa

Managing Officer, Chief Operating Officer of Food Business Unit, MITSUI & CO., LTD.



Mr. Yuji Tsuchihashi

Managing Director, General Manager of Quality Assurance Department, Marubeni Nisshin Feed Co., Ltd.



Mr. Hiroyuki Ishibashi

Manager, CSR Department, Public Relations and CSR Division, Kewpie Corporation



Ms. Kahori Miyake

Executive Officer, CSR & Communication, AEON CO., LTD.



Yuji Nakahara

President of DSM Japan

Sueyoshi Sustainability is one of today's topics. And, this panel discussion is about how we should support sustainability in the food supply chain. As I see the movements in the past several years since the establishment of the SDGs and the Paris Agreement, naturally I feel the significance of our mission to protect the global environment, or solve the problems related to our life including food. But, in the meantime, I also feel the grappling with the achievement of the SDGs and the Paris Agreement itself has become a new business requirement. Grappling with this promptly and deeply may in fact affect the outcome of the future competition between regions or countries, and between companies. I think that a new international competition has evidently started. First, Mr. Nakahara, would you tell us what kind of form a new international competition brought about by sustainability will take, from the standpoint of DSM as an international company?

Nakahara I think the fact that a sustainability market has been formed means that there is a globally major trend already. A while ago, Ms. Miyake talked that a shelf dedicated for sustainable seafood is already established. That is wonderful. Also, the previous Environmental Management Forum mentioned that a low-carbon market was being formed already in the BtoB market for technologies, and a big battle for this market was about to break out. I recognize that the strengthening of competitiveness using a technology responding to climate change is occurring in various ways in the industry.

At DSM, when we think about sustainability, we stand for three pillars: Improve, Enable and Advocate at the same time, and share them as our common brief within the company, as de Vreeze mentioned at the beginning. The most important pillar is "Enable." "Improve" is, so to speak, a CSR-like activity intended to reduce our carbon dioxide or reduce the environmental impact in the manufacturing stage by reducing our footprints. Although that is undoubtedly important, it is not enough alone. As long as we operate as a company, we have our product, and as long as we have customers who use that product, "Enable" is our largest mission. Unless we can reliably implement this, I do not think that we are working hard enough. We recognize that contributing to sustainability through our customers or end consumers or a value chain via a product or service is our highlight. Our stance is to enter the new market, which is being formed, with competitiveness based on this recognition. And, we intend to pursue the resolution of economy as a company and the resolution of the large-scale problem of society at the same time. We call this as simultaneous resolution.

Sueyoshi I would like to ask a next question based on Mr. Nakahara's comment. I think the problem we will face in the future will be how we should support the global population, which may exceed 9 billion, and how we should start the preparations for that. Now then, if we grapple with sustainability, will these problems be definitely solved?

Eda I think it is possible to solve the problems if the scale of sustainability is large enough. So, it is important to widen the overall scope of activities. I think that in the course of the widening, activities of



citizens will be the key to sustainability. For example, if a mechanism for directly connecting competitiveness or something similar in non-economic fields such as sustainability activity to the actual evaluation of the company is built, international cooperation will be made and become a major activity thanks to this. I think that although the direction is correct, it is important to focus on the volume as early as possible.

Yoshikawa I also recognize that sustainability is something very valuable that all people should share as an achievement goal, and organizations such as the World Economic Forum are conducting various activities toward that goal. But, in the meantime, I think there is a fallacy of summation. The number 9 billion is terrific, but it should be clusterized in many ways. For sustainability, what can be done or what should be done today or now should vary with the clusters. So, I think it is necessary to finely set examples there. We inevitably see rough statistic figures one after another. However, we must not get tripped by the figures, but need to observe more details.

Tsuchihashi As I am in the feed industry, I will talk about feed-related matters. For example, most of feed products that support livestock business in Japan are imported raw materials. Considering this, sustainable feed wouldn't just be maintained unless it is in that sense. So, I think sustainability as a common view in that sense is very important. Another concern is about the global population growing to 9 billion. The population increase will occur in Asian regions and Africa, not in advanced countries. The feed production capacities in those regions are still low. It is necessary to increase the capacities. For this reason, IFIF (International Feed Industries Federation) considers that one of the elements forming the basis of this sustainability is education after all. So, in perceiving the word "sustainability," we may need to be conscious of specifically what kind of elements are contained in each segment before grappling with the issue.

Ishibashi Our company also considers sustainability as an important concept, and has incorporated it in the basic idea of CSR. Then, does the company really have a structure to implement this? In fact, it is somewhat difficult for the company to implement sustainability since there are various obstacles. So, I think it is necessary to deepen the understanding and recognition within the company. As a matter of fact, I feel that many of young people entering the company recently are positive about this kind of thing. Also, given that SDGs are recently covered in elementary school classes, I think that such a way of thinking will definitely be scaled up in the future. I think it is necessary for the whole company including the present management to deepen the recognition first. For example, assuming the creation process in a consolidated report, if matters related to sustainability are firmly positioned, the movement would be further accelerated.

Sueyoshi Fairly sure. Even though everyone agrees to sustainability at

a macro level, it becomes quite difficult once going into particulars. Well then, Ms. Miyake, would you give us your comment from the standpoint of end consumers?

Miyake I clearly feel that since the concept of sustainability emerged, the circumstances surrounding companies like us have drastically changed in the past years. Behavior change of companies has also advanced, and I think that is wonderful. But, it is the customers who buy a product or service and consume it in the end after all. The reality is that even if the whole supply chain produced a perfectly sustainable product, the business would not be profitable unless customers select the product. As I usually deal with customers, honestly I feel that sufficient arguments on that, or inclusive arguments to be more specific, have not been made. Of course, we must consider what we should do to cope with this situation.

Sueyoshi I frequently hear that when a business tries to join a new trend, customers do not understand it or consumers do not turn their eyes to it. But, it is the business that created the consumers. So, the business supporting the consumers is an important subject. Now then, while the world population will increase rapidly in the future, it is almost certain the Japanese population will decrease. With the global population increasing by about 100 million a year, can we really secure food for Japan and the Japanese? Also, in terms of security of food in Japan, what kind of thing will become important? Finally, would you give your comments on matters including that kind of thing?

Eda I am not in the food industry, so I may not be able to accurately answer the question of whether food of Japan can be secured. But, the reason why I took my present job although I had been with a private company for many years is that I think the voice of Japan is essential in solving global-scale problems. Why is that? I am convinced that probably the problems the world will face in the future will not only be the population ratio and the scale of economy. I feel that the degree at which Japan will contribute to global discussions on issues such as new rule formulation, social system building and values is increasing. Perhaps, other countries will also face aging soon. And, I think that a shift from the consumption-oriented social mechanism to a society that is more inclusive, kind to each person and essential is required. That is why I am doing this job. To be honest, I do not know whether we can secure food in Japan in the future. But, I think that Japan is the most interesting place in the world from the standpoint of taking activity or action that will realize and secure that.

Yoshikawa For example, in terms of grain trade in the world, Japan is the world's second grain importing country after China. I think this is because the Japanese food industry fulfils its role and is firmly rooted in the global system, and that is a great asset that Japan has acquired. In addition, we already realize through inbound tourists that the Japanese food and dietary culture and, values changing from eating things to enjoying eating, can be disseminated and exported from Japan

Panel Discussion

and accepted by countries around the world. Rather than securing feed for Japanese people, we want more positively to become an influence that encourages people in other countries to study how Japan, which is on the leading edge in everything including aging, will change in the future. We focus on this point with hope.

Tsuchihashi From the standpoint of our industry, we definitely intend to supply domestic livestock and aquatic products so that people will eat them. So, I think we must firmly protect this. In the context of a value chain, I think it is important that people in the retailing sector acknowledge the value of these products and eat them. So, in that sense, I strongly desire that trading people will purchase these raw materials as much as possible and supply them (laughter).

Ishibashi As for the question of whether we can secure food, I think Japan has to be an attractive country for that purpose. I think that important factors to be an attractive country include the ability to properly communicate with other countries in the world. In these circumstances, now we are slightly concerned about the issue of the diet of children and young people. The Basic Act on Food Education states that dietary education serves as the basis of intellectual education, moral education and physical education. Personal abilities such as communication skills and cooperativeness develop through diet. So, we want to make a contribution through diet.

Sueyoshi Just as you say. I hope Japan will become a truly attractive country. I have heard that becoming an attractive country that is wanted by people around the world not to disappear is the best security for Japan. Now, Ms. Miyake, would you comment on that?

Miyake Perhaps, securing of food is the final mission of companies like us that operate in the food industry. I think this is because, as you already mentioned, the key to the success depends on whether we can build a sustainable supply chain, or a new business model, or supply chain model.

Sueyoshi I hope that Japan's or Asia's largest retail business will serve as the source to send information about what is important to realize the potential of the food supply chain. Mr. Nakahara, what do you think about that?

Nakahara For example, the climate change problem was not a so major topic ten years ago, or even five years ago. But now, it has become a matter-of-course topic. The situation has changed so

significantly in only five years. The same thing is occurring in the food supply chain. That is my impression. As suggested by the intent of today's forum, sustainability has emerged in the field of food, which is familiar to the public. As for the problem with security of food, I think that the problem can be solved only with technology. As I listened to each of the panelists' comments, I found that this can be applied also to technology for feed and technology for agriculture. Given that, manufacturers like us in the private sector may find there are in fact more problems and challenges if we delve further. We as business are expected to solve these using technologies, and have to work on that task as necessary for society. In other words, it seems that we must strive to simultaneously solve these.

Sueyoshi Thank you. In closing, let me say a few words about what I felt as I listened to today's speeches. The SDGs and the Paris Agreement are drastically moving the world. In terms of business in particular, I feel that they are rocking the foundation of the way of macro economy. The 20th century type economic model will be destroyed in the future, and a new, 21st century type economic model will come into existence. If that occurs, naturally, radical transformation will start also at levels of industry and individual companies under such circumstances. As you know, under the SDGs, a phrase "Transform Our World" is written. That is to say, I think, the most important message of the SDGs is creating what is different from the present world. Everything will start transforming. Existing things are destroyed, and new things are born. Such creative destruction will advance. I think the field of food cannot be an exception. But, the field of food involves procurement of what we eat every day, so I think there will be situations where we are forced to make a decision to give the overriding priority to eating. The decision will also include a price. Although many problems will occur, we should give priority to sustainability and pass a sustainable food environment down the generations. Isn't that a huge mission that we take? Even if the global population reaches 9 billion, we must build a food system in which even 9 billion people can take human food and lead human life. I think this is the task given to the present generation. With a wishful or optimistic view, I personally think we can definitely realize that.



I am grateful for listening to very interesting lectures and discussion today.

I wish I had participated in the discussion as a panelist. But, since it looks like time is up, let me make my closing remarks.

In this forum, a topic “enabling provision of food to 9 billion people by 2050” was mentioned many times. What I thought then was that we must change human behavior itself before thinking about the scale. To support food for the future, I think it is necessary not only to improve and renovate agricultural technologies, but also to review management approaches. This is because agriculture is essential to our life. And, although it is a very attractive work, I feel there is a gap between agriculture and the general public or young people who should inherit it. That is why I think something new is necessary to communicate how important agriculture is in the global food system, and how much attractiveness or potential it contains. Of course, the purpose is to improve productivity for the future.

DSM can be regarded as assuming a pioneering role for that. It supports self-sufficient livestock farming, and contributes to manufacturing self-sufficient protein. I would like to pay my respects to DSM, which has very profound knowledge on human and animal nutrition science, environment and chemistry.

Our government also actively provides support when the Netherlands’ agriculture and fishery are faced with any new challenges. I also think that to solve such new challenges and to lead to success, the involvement of not only the government, but also private companies and civil society as well as international actors like DSM, is essential.

Also in that sense, the fact that all elements or all actors talked about the chain and circulation of food in a multifaceted manner at this Environmental Management Forum can be regarded as a splendid case example.

Now, you may already know, an EPA (economic partnership agreement) between Japan and EU was enforced on February 1 this year. With this taken as an opportunity, EU, including the Netherlands, and Japan will assume further important roles internationally. Also, this unique partnership will create great opportunities. I think both parties can build smart climate change countermeasures and a logical and sustainable food system by using integrated solutions. The agendas of the SDGs must become part of this unique platform. I think it is necessary to make sure to utilize this, and accelerate it more than ever.

A new partnership was formed between Japan and EU. I think we must complete a global circulation in that, and this forum conducted in a timely fashion was a wonderful event that can be considered as an important step toward it.



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Closing Remarks



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