

## DSM Japan Sustainability Forum Vol. 3

# Sustainable Food System, Nutrition and Health: Creating Healthy Planet for Healthy People

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# DAY1

20 May, 2021

## ■ Opening Address

President and Representative Director, DSM Japan K.K.

Kazunori Maruyama

## ■ Guest's Address

Deputy Assistant Minister, Deputy Director-General, International Cooperation Bureau, Ministry of Foreign Affairs of Japan

Ms. Keiko Okada

## ■ Guest Lecture

Senior Executive Officer, SIGMAXYZ Inc.

Mr. Hirotaka Tanaka

## ■ Guest Lecture

Minister's Secretariat Director General for Technological Affairs, Ministry of Agriculture, Forestry and Fisheries, Director-General, Council's Secretariat, Agriculture, Forestry and Fisheries Research Council

Mr. Yoshihisa Hishinuma

## ■ Keynote Address

Co-CEO, Royal DSM

Jacobine Das Gupta

## ■ Panel Discussion

[Moderatour]

FAO Goodwill Ambassador, Project Professor at Keio University Graduate School

Ms. Hiroko Kuniya

[Panelists]

Mr.Hirotaka tanaka  
Mr.Yoshihisa Hishinuma  
Jacobine Das Gupta

## ■ Closing Address

Ambassador Extraordinary and Plenipotentiary of the Kingdom of the Netherlands to Japan

H.E. Mr. Peter van der Vliet

※ The divisions and the titles of speakers are based on the event date of the symposium

## Opening Address

# Food System Transformation and Nutrition Improvement: Call for actions

## Kazunori Maruyama

President and Representative Director, DSM Japan K.K.

The DSM Japan Sustainability Forum is held for the third time since its inception in 2016. This year's forum upholds a major theme of "Food System Transformation and Nutrition Improvement".

Royal DSM is a global, purpose-led science-based company. DSM's purpose is to "create brighter lives for all" today and for generations to come, and therefore all our business is rooting in Sustainability. We often use the words three Ps: People, Planet, and Profit, which means doing good for people and the earth, and at the same time, making a profit from it, to make our efforts sustainable and scalable. DSM has been recognized as a leader of sustainability in business for more than a decade.

Our food system is facing broad range of problems. It is said that the food system is related not only to SDG2 Zero Hunger and SDG3 Good Health and Wellbeing, but virtually to all other SDGs, such as climate change, poverty, education, gender equality and biodiversity.

How we should solve the problems of the food system has been actively discussed in various situations. At this forum, we will discuss "Agri/Food-tech Innovations for Sustainable Food System Transformation" on day 1, and "Healthy Living and Nutrition's Role with/ after Pandemic" on day 2.

In particular, the risk of symptomatic aggravation of people with non-communicative diseases or NCDs (such as lifestyle diseases and obesity) has become more recognized due to the pandemic of COVID-19. It is a known fact that there is a definite relationship between NCDs and diet habit. The importance of nutrition improvement has been highlighted also in developed countries such as Europe, United States and Japan, and the way of thinking is shifting from "healthy diet" to "health by diet." Probably, a growing number of people are paying more attention to nutrition and diet.

We need to decide how we should shape healthy life with nutrition or diet, and at the same time, to build a sustainable food system as soon as possible. Such complex problems in which to solve multi-degree equations are ahead of us. With a view to solving this extremely difficult social challenge, two major events will be held this year.

The first event is the "UN Food System Summit 2021 (UNFSS)". This summit is convened by UN Secretary-General António Guterres, and held in September for the first time, with the aim of mobilizing all stakeholders to seriously address the food system problems to achieve 17 SDGs by 2030.

The other event is the "Tokyo Nutrition for Growth (N4G) Summit 2021," which will be held in December hosted by the Japanese government. Given the importance of nutrition has been recognized not only in emerging countries but also in developed countries with pandemic, the Tokyo N4G Summit is increasing its importance to offer the opportunity for many stakeholders to commit in nutrition improvement for the next decade.

The 3rd DSM Japan Sustainability Forum is an official side event of the Tokyo N4G Summit, under the sponsorship of the Embassy of the Kingdom of the Netherlands, and by courtesy of the Ministry of Foreign Affairs of Japan. I would like to extend my appreciation to the people concerned.

I hope this forum can play the role of a springboard for UNFSS and Tokyo N4G Summit, encouraging Japanese and other people to go further into worldwide discussions on food system transformation and nutrition improvement.

# Towards Tokyo Nutrition for Growth Summit 2021

Ms. Keiko Okada

Deputy Assistant Minister, Deputy Director-General,  
International Cooperation Bureau, Ministry of Foreign Affairs of Japan

Thank you for inviting me for the 3rd DSM Japan Sustainability Forum today. The Tokyo Nutrition for Growth Summit 2021, which had been postponed due to the COVID-19 pandemic, will be held in December 2021. The goal of the Summit is to review the progress of and issues with nutrition improvement efforts in the world, and come up with a unified commitment to solving the problems, and I hope that high-level officials of national governments, and people representing various fields such as those from international organizations, academic institutions, civil society, and private sector, will participate in the Summit.

At the past two Summits (London in 2013 and Rio de Janeiro in 2016), discussions were held mainly on measures to cope with undernutrition. By contrast, at the Tokyo Summit in 2021, discussions will be held on measures to address not only undernutrition, but also the double burden of malnutrition where we see the co-existence of undernutrition and overnutrition, Discussions will also be taken from the viewpoint on how to contributing to achievement of the Sustainable Development Goals, SDGs.

In addition, this year’s Summit attaches importance to the participation from the private sector given the importance of the food environment. The holding of the Summit has a great significance as improving nutrition is a common global issue that all countries has been facing.

At this Summit, discussions will be held mainly along with five themes. The first theme is “Health.” Under this topic, the participants will discuss the integration of nutrition into the universal health coverage (UHC). The second theme is “Food.” This is about building healthy and sustainable food systems. The third one is “Resilience,” which is about addressing malnutrition effectively in fragile and conflict affected context. The fourth is “Accountability,” under which promoting date-driven accountability will be discussed. The fifth theme is “Financing,” where securing new investment and driving innovation in nutrition financing will be discussed.

In addition, I hope that the participants will present a commitment of actions that all stakeholders including businesses should take in the future. The commitment should be intended to take into account “SMART,” which stands for Specific, Measurable, Achievable, Relevant, and Time-bound.

Nutrition is an extremely important element that contributes to achieving the SDGs. To achieve the SDGs, the role of industry, which is among various stakeholders, is particularly important, and industry’s contribution to solving the social problems through businesses by adopting the SDGs into the main line of business will be the key to success.

At today’s forum, ideal forms of nutrition and food and the related necessary efforts will be discussed under the topics of “Sustainable food systems” and “Nutrition and healthy life.”

With the Tokyo Nutrition for Growth Summit 2021, we consider it important that all parties concerned will provide indirect support for the pursuit of necessary efforts so that a broad range of relevant stakeholders in Japan and aboard can consider what they should do to achieve nutrition improvement globally and the SDGs, and present them in their policies or strategies as goals.

We intend to make the Summit meaningful while taking into account your opinions and ideas.

# Global Trends of Food Tech

Mr. Hirotaka Tanaka

Senior Executive Officer, SIGMAXYZ Inc.

## Global Movement toward Food Tech

Investments in food tech started to grow worldwide around 2014. The investment destinations could now cover all areas, ranging from raw material production to foodstuff development, distribution, and delivery, as well as cooking appliances and personalized menus. In response to these circumstances, conferences on food tech and smart kitchens such as the “Smart Kitchen Summit” in the United States and the “Seeds & Chips” event in Italy have been held around the world since 2015. In Japan, our company and NextMarket Insights in the United States jointly held a first “Smart Kitchen Summit Japan” in 2017, and have held the summit four times so far. Recently in the United States, individual approaches, such as the emergence of conferences dedicated for food robots or restaurant tech, are also accelerating. This way, the interest in the field of food tech is growing year by year beyond the regional and industrial boundaries.

Why is the evolution of food desired now? I think that there are two drivers: “social issues and food” and “diverse values of food.” The most serious social issues posed by food is food loss. In fact, one third of the food all the world over is disposed of. Other serious problems include the protein crisis, malnutrition (health damage caused by overeating), food desert in which income disparities are linked to health damage, and soil issue. There is an urgent need to solve these problems.

One of the catalysts that have made people aware of the food crisis is warning documentary films. For example, “Cowspiracy: The Sustainability Secret,” which was released on Netflix, has caused a vegan movement, and after “Seaspiracy” was released, a supermarket in Hong Kong stopped selling fishes. Those documentaries have had such considerable impact.

What was previously desired from food was being inexpensive, tasty, highly nutrient, and safe and secure. As for electrical cooking appliances, their ability to cook food in short time and easily met the social need in those times. However, once the life expectancy started to rise, the healthy life expectancy has come to be seen as important, and the GDW (gross domestic well-being) has drawn attention in addition to the GDP (gross domestic product). Thus, values are becoming diversified, and the social issues surrounding food have started to change substantially. In addition, with the progress of science and technology, diverse needs of people have also come to the surface, and the needs of individuals for food have become more long-tailed. Food tech can respond to such needs and problems, and the base of food tech services and businesses has become widened.

## Overseas Trends Drawing Attention

The progress of food has been remarkable. Notably, various products using alternative proteins such as plant-derived meat alternatives have been put on the market. I think that what triggered this movement was the need for American meat, in other words, their soul food, hamburger. As exemplified by the growing interest in alternative proteins due to their sale started by major retailers and the notable investment in the field of culture, the alternative protein market has become a red ocean.

I also look at personalization, in other words areas such as personalized diet and diet as medicine. Food advisory services using vital data are recently

growing. For example, if you take a DNA test at the entrance of a supermarket, your personal DNA report will be prepared and the staff will give you a wrist band, and if you hold the wrist band over a food product, the system will determine whether the food product is suitable for you. Such a purchase support service was launched. Other services that recently emerged include a service in which after you take a gene test, a restaurant provides a meal that best suits you (personalized diet), and a machine that automatically brews Chinese tea that suits the user’s health condition after an interview.

In the smart kitchen world, the technology has advanced to a stage where recipes are integrated into a cooking appliance. When recipe software is connected to the Internet, the cooking appliance will cook the meal while automatically controlling the temperature, and the cooling data will be collected, allowing you to also check the received nutrition. In another service, a camera installed in a refrigerator shoots the inside of the refrigerator every time the door is opened, and the food stock in the refrigerator is thus visualized to lead to order placement.

Food robots are also attracting attention. Robots were previously seen only at the back end. But now, they perform automated cooking in the front end. For example, the user only chooses materials of food he/she wants to eat, and a robot cooks a salad according to the recipe and serves it. There is also a robot that prepares as many of 1,000 types of salads. If modular cookers, like so-called vending machines, that perform what human previously did were installed in various places, personalization of food services would become more available.

# “Measures for achievement of Decarbonization and Resilience with Innovation” Intended to Realize a Sustainable Food System

## Mr. Yoshihisa Hishinuma

Minister’s Secretariat Director General for Technological Affairs, Ministry of Agriculture, Forestry and Fisheries, Director-General, Council’s Secretariat, Agriculture, Forestry and Fisheries Research Council

### What are “Measures for achievement of Decarbonization and Resilience with Innovation (MeaDRI)”?

Currently, the food industry and the agriculture, forestry and fisheries industry in Japan are faced with political challenges such as large-scale natural disasters, global warming, ageing of producers, shortage of bearers, and decline of local communities. With the acceleration of domestic and overseas movements attaching importance to the SDGs and the environment, there is an urgent need to build a sustainable food system. Conventional agricultural policies have been implemented with a strong sense of increasing the productivity in order to improve the self-sufficiency. However, continuation of the production with the conventional method has revealed some contradictions. Chemical pesticides are one such example. Of course, there is no problem as long as they are appropriately used. However, if they are applied too much, they will pose a burden on the environment. How can we achieve a sustainable system without reducing the production capacity? “Measures for achievement of Decarbonization and Resilience with Innovation (MeaDRI),” which were formulated in May 2021, are intended to achieve these two goals with innovation.

### Ideal Form to be Achieved by 2050

In this strategy, goals to be achieved by 2050 are set. A representative example of these goals is the achievement of zero CO2 emission in the agriculture, forestry and fisheries industry. At the recent Climate Change Summit, Japan expressed that it would reduce greenhouse gases by 46% from fiscal 2013 by 2030. Under these circumstances, the agriculture, forestry and fisheries industry should aim at reducing the chemical pesticide usage by 50% in risk equivalent, and reducing the usage of chemical fertilizers by 30%, by 2050, in order to keep in step with these trends. In addition, this also includes expansion of the area of organic farming, in which chemical pesticides or fertilizers are not used, to 1 million hectares, accounting from 25% of the total farmland area in Japan. In forestry, elite tress, which grow fast, should be increased. For that purpose, innovative technological and production systems should be developed in sequence by 2040, and in the subsequent decade, greening with a political approach consisting of a tax system, a financial measure and others should be pursued and its social implementation should be addressed. The effects expected of the “Measures for achievement of Decarbonization and Resilience with Innovation” include construction of a sustainable industrial base, realization of an enriched dietary life of the population, increase of the employment and income in the region, and inheritance of the global environment where people can live with security into the future. From the standpoint of a nation in the Asian monsoon region, Japan intends to participate in the international rule formulation by working out a sustainable food system model originating in Japan.

### Specific Efforts in the Strategy

In the future, it will become important to turn four elements consisting

of not only production, but also procurement, processing, distribution and consumption, as a supply chain. In terms of procurement, substances such as kalium, phosphoric acid and nitrogen, which are used as the raw materials of chemical fertilizers, are imported almost as materials. However, it will be necessary to pursue the reduction of dependence on import, de-carbonization and environmental burden reduction in energy procurement by replacing them with sustainable materials.

It is necessary to introduce greening of materials such as shifting to electric-powered or hydrogen-powered machines, and improve the labor safety and productivity, in order also to transform to a sustainable production structure. For this purpose, it is preferable to pursue smart farming, which would realize labor-saving, precision improvement and high-quality production by utilizing robot technology and information and communication technology (ICT). Use of AI, robotics, or big data for agriculture, which has previously been performed based on experience and instinct, would hold promise for securing manpower, reducing the burden, securing new farmers and inheriting cultivation technology.

For processing and distribution, it will become important to switch to sustainable imported food or imported raw materials, and promote environmental activities. For the food loss issue, we need to pursue streamlining while using data and AI, and develop materials that respond to long-term storage and long-term transportation.

Concerning consumption, Japan should emphasize the significance of Japanese-style dietary habit, which excels in nutritional balance, in addition to the reduction of food loss, with scientific evidence, by promoting mutual understanding between the producer and consumers. In addition, I think that organic farming, which takes an approach different from the conventional mass farming, could create a new market in local communities. This is a proactive approach of local production for local consumption in which locally produced food products are consumed in school lunches or at workplaces and homes. It is important to consider the food supply as a system containing not only production, but also processing, distribution and consumption.

### “Green Revolution” in the new age

Following the World War II, much attention was drawn to the threat to stable supply of food around the world, and a Green Revolution took place. As a result, chemical fertilizers and the like were developed to increase the crop productivity, and a mass production increase was achieved. The wheat currently distributed worldwide is a variety that has been bred based on a Japanese grown wheat variety called “Norin 10.” This suggests that Norin 10 led to a driver for the Green Revolution.

Over 60 years have elapsed since the Green Revolution, and what is urgently required now is not only the increase of the production capacity, but also a sustainable food system. Now is the time for Japan and the world together to overcome this critical situation by creating innovation that goes with the times. I hope that many people will participate in the discussions so that food is stably supplied through the “Measures for Achievement of Decarbonization and Resilience with Innovation.”

# Five Priorities for Food System Transformation

## Jacobine Das Gupta

Director Sustainability Lead Nutrition Royal DSM

### DSM’s solutions for improving the food systems

Are we leading a healthy and sustainable dietary life? We are faced with various factors such as climate change and regional conflicts that continue to disrupt the food systems. Fisheries and livestock industries produce greenhouse gases that have a significant impact on the entire ecosystem. As many as 800 million people in the world are afflicted with malnutrition, while 2.3 billion people are at the risk of obesity. Today, one third of the food that we produce is wasted worldwide. There is an urgent need to transform the entire food system in order for all people to have access to an adequate nutrition intake, achieve sustainable agricultural production, and reduce food loss.

We consider the year 2021 to be crucial in the global effort to resolve these issues concerning food. For example, the United Nations Food Systems Summit 2021 (FSS) will be held in New York in September and the Tokyo Nutrition for Growth Summit 2021 (N4G 2021) will be held in December. DSM considers food system transformation to be a common global objective and intends to propose solutions toward achieving this goal.

Our company's priorities are focused on five areas in this grand scheme for transforming food systems. These areas are “Sustainable proteins,” “Affordable nutrition,” “Food loss & waste reduction,” “Healthy diets” and “Sustainable agriculture.” We aim to achieve these objectives through innovation.

With a growing world population and rising global awareness regarding environmental issues, there is more focus on plant proteins. The demand for animal proteins, however, remains very high, and if this demand continues to go up, the burden on the environment would increase further. Eventually, the limits of the planet's capacity to supply animal proteins will be exceeded. To achieve the target of “Sustainable proteins,” DSM is working to improve the sustainability of the fisheries and livestock industries in parallel with support for development of plant-based meat alternatives. We are addressing the issues faced by the fisheries and livestock industries through six solutions: “Improving lifetime performance of farm animals,” “Improving the quality of meat, milk, fish and eggs, while reducing food loss & waste,” “Reducing emissions from livestock,” “Making efficient use of natural resources,” “Reducing our reliance on marine resources,” and “Helping tackle antimicrobial resistance.” According to our survey, 30% of consumers are willing to buy sustainable food products and support our efforts.

At this point, I would like to introduce to you one such example of the solutions we are working on. We have developed a new feed additive for cows, called “Bovaer®.” It is a methane-reducing agent and adding just a teaspoon of Bovaer® to cow feed reduces burped methane emissions by 30%. Therefore, Bovaer® can contribute to a significant reduction of the environmental footprint of beef and dairy products such as cow milk. In fact, in one of the trials, after a dairy product manufacturer in California introduced Bovaer® for their cattle, methane emissions were substantially reduced, and the animals became healthier. In other words, the manufacturer was able to produce milk in a more environmentally friendly manner.

Also, our company recently launched a new intelligent sustainability service, named “Sustell™.” “Sustell™” is a consultation service for measuring and assessing the basic environmental footprint of animal production using data

on actual farms and animal feed. This service helps improve profitability and reduce the environmental burden at the same time, which enhances the sustainability of the fisheries and livestock industries.

The market for plant-based meat alternative products has been growing and creating high expectations. Consumers, however, are not inclined to be fully satisfied with the alternative products unless these items are as good as genuine meat products in all aspects. To begin with, meat alternatives have positive nutritional benefits such as low cholesterol and high dietary fiber and vitamin C. However, they also have negative aspects, for example, being short of other vitamins and micronutrients such as calcium and selenium, as well as containing significant amounts of sodium. These are some of the issues to be resolved with regard to meat alternatives. We have been active, for example, in providing comprehensive solutions that contribute to the development of plant-based meat alternatives so that the food industry is encouraged to participate in the growing meat alternative market as quickly as possible. With these solutions, we can meet the needs of consumers who desire meat alternatives that not only have the taste and texture just like that of genuine meat, but also a high nutritional value.

### Transformation can be achieved only if we all work hand in hand.

At present, over 2 billion people in the world are short of or lacking micronutrients such as vitamins or minerals in their diet. The most severely affected among people are children. If they are not provided with a satisfactory diet and cannot go to school, this could jeopardize their future possibilities. The type of nutrients lacking in the diet of these children vary from one region to another. In particular, the food in some regions of Asia and Africa lack vitamin A. Since most people in these areas eat rice as their staple food, it is desirable for them to be able to intake vitamins in their usual rice-based diet. The United Nations World Food Program (WFP) provides food aid to regions faced with a nutrition crisis. Our company contributes to improving the quality of the diet by adding micronutrients such as vitamins to the food provided to those regions. The standard of living can also be improved through such programs.

We are addressing food-related global issues by forming partnerships with international organizations, because transformation can be achieved only if we all work hand in hand. One example where this approach is practiced is “Foodvalley,” which is an innovation hub on food and nutrition where food companies, research institutes, startup accelerators and others come together under the leadership of the Wageningen University in the Netherlands.

We can no longer afford to waste time in the face of the critical state of the food systems and malnutrition. Improvement of food is essential for the health of all peoples as well as the health of our planet. In view of the fact, it is very exciting to be able to build a roadmap to a solution as we make innovations using optimal technologies. Obviously, this task cannot be accomplished by one person. This is a project that requires all consumers and societies to work hand in hand while recognizing it as their own problem. DSM intends to provide the support that enables people to live a sustainable and more fruitful life by serving as a part of the ecosystem.



# Transformation to a Sustainable Food System : Innovation and Japan’s Role

[Moderator]

Ms. Hiroko Kuniya

FAO Goodwill Ambassador, Project Professor at Keio University Graduate School

[Panelists]

Mr. Hirotaka Tanaka

Senior Executive Officer, SIGMAXYZ Inc.

Mr. Yoshihisa Hishinuma

Minister’s Secretariat Director General for Technological Affairs, Ministry of Agriculture, Forestry and Fisheries, Director-General, Council’s Secretariat, Agriculture, Forestry and Fisheries Research Council

Jacobine Das Gupta

Director Sustainability Lead Nutrition Royal DSM

## Divide Between Industries And Between Corporations A Major Issue

**Kuniya** In its present state, the global food system is neither sustainable for our planet nor for human society. Faced with this challenge, we have come to realize that we must step up our efforts to transform this food system. In addition, the coronavirus pandemic has incidentally exposed the vulnerability of our food systems. Furthermore, in Japan, the ageing of agricultural producers and shortage of a new farming generation have become major problems in the midst of a declining general population. On the other hand, projects toward solving food-related social issues with the help of technology are moving forward at a fast pace and also large-scale funding for such projects has started to flow in.

The main concern here is the speed of the transformation. In this session, while looking at the possibilities of applying technologies, we are mainly going to discuss: how fast we must transform the food system and how we should arrive at a required solution and determine its priorities. First of all, I would like to ask you, the panelists here, to put forward the issues that you consider as the most significant.

**Tanaka** As you mentioned, I think the vulnerability of the food system is the most significant issue. I think that in particular, the value chain business practice is one of the causes of this problem. I can see that efficiency and profit have been pursued so extensively that the industries have become divided. Specifically in Japan, each industry should be potentially robust, but they all seem to be working in silos due to a vertically fragmented organizational structure. The greater problem is that this kind of fragmentation has occurred not only between industries, but also between companies and even within a single company.

**Hishinuma** Collaboration and integration with entities outside the industry and company are important. It is very essential for the production, processing and distribution sectors of agricultural products to run their operations systematically. Yet at present the people of each field seem to be working in

a silo. As the importance of a sustainable food system increases day by day, I think we must urgently combine the knowledge of all players to give rise to open innovation through interdisciplinary fusion.

**Das Gupta** I think it is critical for us to focus attention on how healthy and sustainable our food should be. While addressing these challenges, not only governments, but companies too should carry out a joint action plan and try to make a positive impact on society and the environment.

**Kuniya** So far, the problems that have been pointed out are from common viewpoints such as lack of collaboration between organizations, fragmented organizational structure, and the company silo mindset. Exactly which part of the complex flow of the food system do you think causes the bottleneck?

**Tanaka** I think the Japanese business practice is a major cause of this problem because there is often a question of trade-offs in collaboration projects. If some company or department tries to implement a project activity based on a long-term viewpoint in a fragmented system, short-term losses might occur and make it difficult to advance the project forward. Therefore, I think we need a framework that can absorb such downsides. I also think that if there is a phase in the work like an intermediate goal preceding a long-term goal, any change can be clearly identified early on and make it easier for the company or department to carry on with their efforts.

**Das Gupta** It is necessary to solve problems using both tangible and intangible means based on a long-term perspective. DSM operates its business under its “Purpose Led, Performance Driven strategy” (defining the realization of sustainability for people and our planet as the ‘purpose (objective and mission)’ of our company and as our business growth drivers). As for intangible means, we are moving forward with our objectives with the understanding and empathy of internal and external stakeholders through communication methods such as creating images and stories that are intended to achieve our purpose and rendering them in videos or the like. Regarding tangible means, for example, DSM sets Key Performance Indicators

(KPIs) of sustainability such as greenhouse gas reduction. We have our performance achievement in relation to social responsibility or sustainability KPI audited by our external auditor in addition to the company’s financial performance. Subsequently, we disclose this achievement result in our consolidated annual report. This KPI achievement for sustainability is reflected, for example, in the payment of compensation for executives and employees.

Using these intangible and tangible means, DSM endeavors to carry out business operations that will contribute to sustainability for people and our planet under a common understanding and goal through cooperation across various departments including indirectly involved departments such as the Finance, Investor Relations (IR) and Purchase Departments. In this way, we ultimately try to achieve a higher goal, which is our ‘purpose (business objective).’

**Tanaka** It seems to me that collaboration within your company enables it to move forward competently because it effectively links both long-term and short-term targets and incentives. This does not mean that only American and European companies are capable of such integrated action across various sections within a company. The same is possible anywhere as long as a clear goal is set within the company. I realized this to be true as soon as I heard Ms. Das Gupta’s words.

## A Greener Political Approach Also Required

**Kuniya** When you intend to carry your business forward to achieve a long-term vision, it is possible that you may face the risk of losing a short-term business opportunity. I think a political effort can play an important role in overcoming that problem. Mr. Hishinuma, what do you think?

**Hishinuma** The importance of a sustainable food system has long been addressed, and I agree with the general idea that we should start working on this issue without delay. When it comes to a specific solution, however, no one seems to know exactly what to do. Let me take technology as an example. How should we utilize it? Up until now, we have been striving for improvement and betterment of a sustainable food system through trial and error. We have just recently become able to generate innovations in food and agriculture using the latest technologies. Under these circumstances, the Ministry of Agriculture, Forestry and Fisheries has come up with a strategy called “Measures for achievement of Decarbonization and Resilience with Innovation (MeaDRI).” MeaDRI has been designed to develop innovative food and agriculture-related technological and production systems by 2040 so that these systems can be applied to society by 2050.

The question is how to laterally expand the existing basic technologies during the time between 2021 and 2030, which is the transitional period before the actual implementation of MeaDRI strategy. For that purpose, a greener political approach is also needed. The ministry will take necessary measures such as easing various regulations including financing and taxation in order to provide a support for these efforts.

**Tanaka** A greener policy is going to be very helpful for the venture companies that develop technologies. Perhaps, more funds will flow into the market and

there will be significant increase in the amount of currency in circulation. We must remember, however, that food produced using innovative technologies will end up on the eater’s table. For that reason, it is important to link the eater’s needs to the food they eat. To be more specific, eaters must feel like eating the sustainable food produced using innovative technologies over and over and understand that such food would be beneficial toward improving the environment or their lifestyle conditions. Although funding for developing technologies is important, it is also important to raise the eater demand for such sustainable food and ensure that the eater is more aware of the situation. For that reason, the food needs to be tasty as well. We hope to provide support with technologies while attempting to raise the demand for such food from end eaters.

**Kuniya** Speaking of the situation in Europe, the EU announced its “Farm to Fork (F2F)” strategy in May 2020. F2F strongly projects a political will to realize sustainable agriculture. I have heard that consumers in the EU are also becoming more conscious about sustainable food.

**Das Gupta** I know for sure that the Farm to Fork (F2F) strategy has had a successful outcome. However, I think that more must be done to expand the food products in order to encourage the consumers to purchase them. For example, government procurement from producers who carry out sustainable agriculture would help spread this type of agriculture, which in turn will lead to protecting the environment. If the governments take such an initiative, it would have a positive impact on all aspects. In the meantime, it is necessary also for consumers to get educated about sustainability at a deeper level. For example, the consumers should learn the kind of food they should choose to reduce the burden on the environment, maintain healthy eating habits, and so on. The government should share in-depth information and explain it to the consumers. The United Nations have also circulated messages on food and nutrition. So, I think it is important for the government to begin transition toward a sustainable society by charting a new course with stronger intentions.

**Tanaka** I was wondering why have the vegan and vegetarian movements accelerated this far? Some of my colleagues in the United States and Europe say that food documentaries and food-conscious celebrities have had a substantial impact. Paul McCartney has recommended watching Netflix’s “Seaspiracy” (documentary film) on his twitter account. Leonardo DiCaprio is involved in the climate change issue through investment. Beyoncé is also actively working on promotion of SDGs. It seems that these influential views and people have mobilized public opinion and led to a larger movement.

## What Should Be Done To Raise The Awareness Of Japanese Consumers Regarding Sustainable Food Choices?

**Kuniya** The EAT Foundation of Northern Europe, which is an organization engaged in food problems on a global scale, states that ultimately, what we put on our plates is important and suggests that changes in consumers’ awareness and attitude would transform the food system. The “Measures for achievement of Decarbonization and Resilience with Innovation (MeaDRI)”

scheme has set a target of expanding the area of organic farmlands from the present 0.5% to 25%.

But a question arises whether Japanese consumers would actually turn to sustainable products? I think many consumers believe that the primary sectors of industry and food systems will continue forever in the present state. Furthermore, with the typical image of organic food products coming across as being attractive but expensive, many people say they want to keep their food costs as low as possible. Isn't that the very obstacle for Japan now?

**Hishinuma** As for organic agricultural products, in addition to the need for improvement of food production technologies, you will find that there are few markets that sell them in the first place. Therefore, I think it is necessary to widen the market for these products by building a supply chain that covers the processes including production, distribution and consumption. If a solid infrastructure is in place for organic food, the people engaged in organic farming will be able to produce organic food more confidently. Concerning organic food prices, it will become possible to reduce production cost to the same level as conventional farming by utilizing the appropriate technologies. Consumers may still feel that organic vegetables are expensive. Nevertheless, organically produced food is favorable for our environment and I do hope that consumers can be motivated to purchase food that is produced in a sustainable way. We must encourage such change in the consumers' mindset.

**Kuniya** When the consumers pick up a food product, the labeling provides information about the item. What are your thoughts on the evaluation of labeling efforts or certification of organic farming?

**Hishinuma** From our standpoint, we want to increase the area of farmlands with Organic JAS Certification, and spread organic farming in a manner compliant with international standards. For that purpose, it will be also necessary to build a network in cooperation with people in the distribution sector. Government procurement is definitely necessary partly in order to encourage consumers to purchase sustainable food. I think, however, that widespread production and use of sustainable food in local communities, or in other words, the market pattern of "Local Production for Local Consumption" where locally produced organic agricultural products are sold in local markets is most ideal for regional environment-friendly circulating type agriculture. For example, there is an increase in efforts to promote school lunch programs that use the locally produced organic agricultural products. Such food procurement in each region is very effective. We must properly evaluate the kind of support the government can provide when such procurement spreads to a mass scale nationwide.

**Kuniya** I've heard that in Europe there are various kinds of food labels, such as those indicating information about the cultivation method, country of origin, and carbon footprint of food items. I wonder what kinds of efforts or approaches have been taken to implement widespread use of food labels within a short time and being able to calculate the carbon footprint with accuracy.

**Das Gupta** The carbon footprint calculation is so accurate because various companies provided various techniques to efficiently reduce CO<sub>2</sub> emissions as well as the carbon footprint. The government had previously thought that it was impossible to label the carbon footprint. But they gradually realized that labeling the footprint through calculation would lead to the reduction of CO<sub>2</sub> emissions.

Both the government and citizen groups have begun efforts to provide simpler label descriptions for consumers. A decade ago, France tried several methods of labeling food, but those labels failed to properly convey the specific information to consumers. A simple scoring system was desired, such as the use of different color labels for grades A to E, and so on. After due considerations were given to such problems and after many improvements, the present Nutri-Score and Eco-Score were developed. However, those efforts do not end with just a widespread use of food labeling and further steps are required. Consumers must get to know the kinds of nutrients that make up the total daily diet and it is also necessary to teach children at school about sustainable eating habits.

**Kuniya** Some Japanese companies have tried carbon footprint labeling, but I've heard that some companies have given up this system due to the difficulty of the calculation process. Considering that technologies such as Digital transformation (DX) are being widely used now, is there any solution that would enable us to accurately grasp the carbon footprint from food production to processing, distribution and consumption, and make it traceable and transparent?

**Tanaka** In addition to the carbon footprint, many companies are considering the use of certification labeling for fair trade products and nutrients from the standpoint of each company. When you turn your eyes to the world, you will also notice efforts being made to comprehensively standardize the labeling used for nutrients in food data, environmental costs and fair trade products. Companies in Japan are also trying to standardize the labeling systems by crossing corporate boundaries in their strategies. These efforts, however, only connect with business associates so far and I feel that standardizing the labeling system only among associated companies will not establish it as a de facto standard. I think that after all, a more specific solution will eventually be developed through a holistic approach.

**Kuniya** In an earlier discussion, we spoke about issues such as the divide between industries and separation of work into silos. In that case, how we can tackle these issues in a holistic manner do you think?

**Tanaka** I can think of two ways of tackling the problems through a holistic approach. For the first one, a parent organization can be set up for enabling multiple companies to conduct joint researches. The Netherlands' "Foodvalley" is such an organization that plays a central role in the process of developing and implementing food and agricultural innovations in a holistic manner. If Japan had such a parent organization, various problems can be solved much faster, I think. The other way is a "region-based" approach. A region is essentially an ecosystem by itself. For example, "hare" (auspicious day) and "ke" (normal day) meals in Japan are made from ingredients that

have long been handed down in the respective regions. Only the people living in a specific region have access to and enjoy certain kinds of foods that are grown in that region. I think that creating a regional circular model based on such an idea would also lead to sustainable town development. Each region can carry out its efforts through such an approach, visualize it using technologies, and develop it into a Local Production & Local Consumption model. They might even be able to export this model to the world. It is hoped that both the people and the local community as a whole will ultimately lead a more fruitful life.

**Hishinuma** The food and agriculture innovations should be developed and implemented not only in major cities, but also in provincial regions. Most regions in Japan have local government agencies, universities, publicly-funded research stations and regional center of a national research institute. It is very important for these entities to unite together and consider the kind of dietary life that can be realized using local resources with an aim toward achieving a sustainable society. Moreover, revitalization of regional resources will benefit the local economy and generate new technologies. The lives of people in the region will become more enriched and their incomes will also rise. Furthermore, they can use funds generated locally for technological development to improve the regional economy. I am certain that such an ideal cycle can be established by these policies. Regarding the efforts in promoting organic farming, which is one of the targets in the "Measures for achievement of Decarbonization and Resilience with Innovation (MeaDRI)," I think the key to spreading organic farming throughout the region is the practice of Local Production for Local Consumption, or locally circulating agriculture.

**Kuniya** What kind of urgent action must be taken as a priority in order to speedily transform the present food system into a sustainable one? Could you give us your thoughts?

**Das Gupta** First, the efforts to reduce the carbon footprint must be pushed forward by the regional and national governments. It is also necessary to promote an understanding of what constitutes a healthy dietary life. I think the application of labels is one of the ways to ensure this understanding. Our company is always ready to provide support in this field, so please contact us when necessary.

**Kuniya** Do you think that it will become possible for individuals to control their personal carbon footprint someday?

**Das Gupta** Indeed, I do. Application software that can be used by individuals to track their personal carbon footprint already has been launched overseas. I think if there are more tools that support behavioral change in consumers in a seamless manner in Japan, people will become more responsive toward reducing their carbon footprint.

**Kuniya** As the phase of implementing measures for reducing the carbon footprint advances steadily overseas with the emergence of related applications, what are the steps that we must take urgently in Japan?

**Hishinuma** We need to urgently promote the "Measures for achievement of Decarbonization and Resilience with Innovation (MeaDRI)" that was announced by the Ministry of Agriculture, Forestry and Fisheries in May. Then, we also must make the next move quickly, for example, we must further break down our tactics and strategies and implement them. We intend to step up our efforts on pursuing these tasks since they will lead to the greening of political approaches.

**Tanaka** I think companies are required to consider more deeply how to increase their capacity to implement co-creation projects even for the sake of achieving a major system change. I believe that co-creation, which determines how a company should reach out to outside parties, will become more important than ever.

**Kuniya** Paul Polman, former CEO of Unilever and the co-founder and chair of IMAGINE, which is a foundation that works on famine and climate change problems, once said that only businesses that allow people and the planet to flourish would survive in the future. I think Mr. Polman's words are an important message to all industries, and to each one of us. Technologies have evolved and money has also begun to circulate. The government too, has started taking relevant actions. I hope that the concerned parties will pursue research and development and practices while they also strengthen the collaboration efforts between them.

Thank you to all the members of the panel who took part in our discussions today.

# Looking ahead to the generation of world population reaching 9 billion

## H.E. Mr. Peter van der Vliet

Ambassador Extraordinary and Plenipotentiary of the Kingdom of the Netherlands to Japan

I am deeply grateful for inviting me to the 3rd DSM Japan Sustainability Forum today. Every speech presented today was meaningful and very informative. As a consumer, I also think about the ideal form of food every day. Above all, I think “realization of the sustainable production” is a globally very important issue.

DSM started in 1902 as the Netherlands' state-run company conducting coal mining, and has become a front runner of global science companies through major innovative changes. DSM also moved fast to work on sustainability, and has established its sustainability efforts in business. In addition, the company has been making profit while fulfilling its social responsibility in the form of sustainability as a company, for example by making its nutrition improvement program for developing countries successful in close collaboration with international organizations such as the UN Children's Fund (UNICEF) and the World Food Programme (WFP). I am impressed by such initiatives.

The United Nations recently published its forecast that the world population would continue to grow, and reach 9 billion by 2050. If the issues such as famine and malnutrition continue to be exacerbated, and the burden on the earth increases, the realization of sustainable agriculture will be a major issue that concerns our life. We have no time to lose to solve the problems of food crisis. It will be also important to pay respect to farmers, agricultural industry and its workers, and improve consumers’ knowledge on food.

Although the Netherlands is small in area, the country has become the world's second largest agricultural product exporter. This is entirely due to the efforts by multiple stakeholders including the government, private sectors and academic research institutes.

In the Netherlands, we have the area and ecosystem called “Food Valley,” where the world’s top-class agricultural and food research institutes, start-ups and large multi-national companies are working together on technological development for food of the future. The outcomes from the Food Valley has been bringing about changes to agriculture and food industry by reinventing the way of production and consumption of food.

We, the Netherlands also have been collaborating on agricultural innovation with foreign partners.

I have visited agriculture firms in Hokkaido the other day and found a dairy farmer achieved high productivity by using Dutch technologies such as a milking robot. Some farmers put great efforts into the Smart Agriculture with automated greenhouses utilizing various sensors and data developed with a Dutch company. More and more farmers know use science and technology, and I feel all these producerswill actually make the ideal form of future agriculture.

It is easy to talk about sustainability but difficult to realize. We all know that the key is in science, technology, and innovation.

To aim at achieving the 17 SDGs by 2030, it is of utmost importance to develop and maintain partnership. The public and private sectors should work more on the partnership and innovate the new way of collaboration.

I earnestly hope that by working together, all of us in this forum today can become players to make positive change to the planet.

DAY2

25 May, 2021

■Opening Address	
Sales Director, Human Nutrition & Health, DSM Japan K.K.	Francisco DeMingo
■Invited Lecture	
Healthy Marketing Team Founder & Senior Strategy Consultant	Mr. Peter Wennström
■Guest Lecture	
Professor, The Jikei University School of Medicine	Dr. Mitsuyoshi Urashima
■Keynote Lecture	
DSM Nutritional Products, SVP Nutrition Science & Advocacy	Dr. Peter Van Dael
■Special Lecture	
Co-CEO, Royal DSM	Dimitri de Vreeze
■Closing Address	
President and Representative Director, DSM Japan K.K.	Kazunori Maruyama

※ The divisions and the titles of speakers are based on the event date of the symposium

# The Post-Coronavirus World – Looking to the Future

Francisco DeMingo

Sales Director, Human Nutrition & Health, DSM Japan K.K.

On Day 2 of the 3rd DSM Japan Sustainability Forum, which upholds a major theme of “Food System Transformation and Nutrition Improvement,” we will discuss the “Roles of Healthy Life and Nutrition in the Post-Coronavirus Age.” This forum also serves as a “DSM Health Academy,” which we have held every year since 2012. It is intended to deliver fresh information on health and nutrition with the help of experts, and four experts will take the podium this year.

In supplying nutrients, DSM operates three businesses: “Human Nutrition & Health”, which is centered on nutrients for food and pharmaceuticals, “Animal Nutrition & Health,” which is centered on nutrients for animal feedstuffs, and “Personal Care,” centered on nutrients for cosmetics.

In “Human Nutrition & Health,” DSM works on the manufacturing of nutrients, functional ingredients, and premixes (nutritional additives containing vitamins or microelements) with the aim of contributing to healthy life of people around the world. These are used for medicines, dietary supplements, food, drinks, powdered milk, liquid diet and others. In addition, DSM also conducts a service intended to provide tailor-made products that meet respective health needs, such as brain function, eye health, and immunity support, which is especially desired in the present coronavirus pandemic.

Since the first encounter with the new coronavirus, we have always contemplated what we can do as a company. Consumers have become more aware of health, and in the field of science the number of papers on micronutrients and immunity has rapidly increased. In fact, vitamins and minerals play a major role in the production of antibody cells. In other words, even in vaccination, taking appropriate nutrition will support the immune function.

Amid the coronavirus pandemic, now is the time to communicate the importance of nutrition based on evidence to national organizations, companies and consumers while seeking cooperation from scientists and experts around the world, as well as to ensure stable supply of products. I think this is our mission.

The innovation pipeline in “Human Nutrition & Health” focuses on four growth platforms: precision, prevention, protein and policy. In addition, we have focused our efforts on a personalized nutrition business in cooperation with multiple companies since 2017. In this business, we work on technological development for diagnostic devices, AI and dispensers, and have launched a new company called Hologram Sciences to run a platform to check whether or not a product combining a device, AI coaching and others with personalized nutrition is actually sold.

Furthermore, we have worked on nutrition improvement intended to reduce CO<sub>2</sub> through capital investment in various plants, and to solve the famine problem in cooperation with international organization around the world. We would be grateful if we can develop products that will contribute to the world with you from the viewpoint of sustainability.

# Change in the Healthcare Market Brought about by the Pandemic

Mr. Peter Wennström

Healthy Marketing Team Founder & Senior Strategy Consultant

## Six Growth Strategies in Nutrition Science

Consumers have started to learn about healthy food, seeking diets to prevent illnesses and increase wellness. In the meantime, advances in nutrition science are fostering a new understanding of how we not only can prevent but also reverse and treat conditions with choice of foods, diets and lifestyle among consumers.

The new coronavirus pandemic has accelerated awareness raising in those people. The reason is simple. The present medicine cannot prevent infection with the new coronavirus. If your health condition is poor, your illness would become severe, and you may have a risk of death. The message that the coronavirus pandemic sent to humans is very tough.

That is why consumers have become more aware that they must improve their immunity and control their health, and started to check the ingredient labelling or functionality labelling to see what kind of effect health food products or supplements have. In fact, the number of supplements intended to prevent virus infection has substantially increased, and their sales are also growing.

Under these circumstances, how should we strategize the growth in the nutrition category? Now, let me speak about our six growth strategies in nutrition science. In the world of nutrition, diets or lifestyles directly connect to the mental health of physical health of people. And, that will lead to raising the awareness of consumers through the environment or society.

The first of the gamechanger strategies is “Active Nutrition” - food offering the effects for wellness and preventive health. The second strategy is “Sustainable Nutrition” - sustainable nutrition required amid gradual decline and shortage of natural resources. The third strategy is “Targeted Nutrition” - need for nutrition intended for a certain target. The fourth is “LifeStage Nutrition” - providing nutrition tailored to a certain life stage in the aging society. The fifth is “Natural Nutrition” - conducting production and manufacturing while utilizing nutrition derived from nature such as plants. And the sixth strategy is “i- Nutrition” - utilizing technology to lead to a nutrition solution that provides power to consumers. I would like you to think about which of these is needed for your company and is the most influential.

## Selecting a Strategy according to a Change in the Behavior of Consumers

First, for “Active Nutrition” it is necessary to educate consumers. What kind of role does nutrition fulfil in health? Nutrition is not a mere fuel for the body, but is a component, something that builds the body. Calcium grows a strong bone, and protein makes muscles. All nutrients play an important role for future health of people in some way. We must educate consumers that what they eat today will become part of their body tomorrow.

In addition, natural resources, which have previously been considered as inexhaustible, are depleting. So, Japan is required to fulfil its role as enterprise security for example by reducing the plastic consumptions, and produce sustainable products. Then, consumers can make better purchases, and the products' value will increase. It is the same with nutrition. In

“Sustainable Nutrition,” it is important to produce sustainable nutrition, and we should attach importance to such factors in product development.

In the third strategy “Targeted Nutrition,” smarter nutrition science for the future is required. Previously, nutrition has been occupied by the world of pharmaceutical medicine. However, the circumstances have started to change partly due to the introduction of supplements. For example, the quality of sleep has improved with a supplement that uses herb and is approved as functional food. This will be a major strategy as nutrition that assumes its role in terms of mental health.

In “LifeStage Nutrition,” in which to provide nutrition tailored to a certain life stage, we must pay attention to consumer sentiment about how they see aging and health. It is necessary to educate consumers about what will happen to their body as they become older, and provide them with solutions backed by optimal nutrition science in order to improve the quality of their active life.

The idea of the fifth strategy “Natural Nutrition” is that we must never destroy the ecosystem in closely examining food or supplements derived from nature such as plants. In doing so, what should we do to provide natural products, not artificial or processed products? I think that it is important in our growth strategy to combine two factors: transparency in the whole process, and clean and naturally occurring ingredients.

And the final strategy “i- Nutrition” is nutrition that utilizes technology. It is not an exaggeration to say that technology is changing the world now. We must turn our eyes from the orientation toward products, or the world of producers, to the orientation toward consumers or the world of consumers. And, we should consider how to connect that to our nutrition solutions. For example, Hologram Sciences, which DSM has launched, provides front-line and personalized solutions for health management to consumers, by combining individual nutrients through health diagnosis and digital coaching. Which of these six strategies will drive your company's innovation? You can use the most important strategy as the core and combining it with another strategy, and depending on your choice, your company's product may ultimately be differentiated in the market. We must understand consumers. The starting point of the value chain always lies in consumers' awareness about health, dietary life, lifestyle, environment and society.

And, you can understand those by using four factors: “do the customers need the product,” “do they accept the ingredient,” “do they understand the benefits,” and “do they trust the brand.” You should remember that these four factors are questions that you must definitely ask and are important.



# The role of micronutrients in maintaining the health of the immune system

Dr. Mitsuyoshi Urashima

Professor, The Jikei University School of Medicine

## Identifying the Cause of Beriberi through Epidemiological Study

I will be talking today about two topics: whether or not the intake of vitamin D can prevent respiratory tract infections, ranging from acute upper respiratory tract infection or so-called influenza, common cold, new coronavirus infection, bronchitis and pneumonia, and whether or not its intake can even prevent cancer recurrence.

Before talking about these, I would like to mention disease prevention using micronutrients. In the early Meiji period, Kanehiro Takaki, the founder of The Jikei University School of Medicine, learned nutrition science in England. In those times, many lives were lost due to beriberi in Japan. The cause of was unknown, no symptomatic therapy was effective, and the mortality was close to 3%. The disease was particularly prevalent in students and soldiers, and in the Navy where Takaki served as the Surgeon General, one in every three people was always afflicted with it. Beriberi was such a terrible disease.

Takaki wanted to identify the cause of beriberi from the viewpoint of nutrition science, and establish a preventive method and a therapeutic method. When Takaki started an epidemiological study in the Navy, he found that many beriberi patients were prisoners, followed by petty officers and privates, while only few warrant officers and commissioned officers were afflicted with beriberi. Furthermore, he also found that the nitrogen/carbon ratio in meals, or the protein/carbohydrate ratio in other words, was 1/28 in petty officers and privates, while that in warrant officers was 1/20. This was due to a difference between meals of petty officers and privates, which consisted of only rice and seasoned dried food, and those of warrant officers, which were accompanied by milk and several side dishes such as meat.

According to Parkes’ standard healthy diet, the nitrogen/carbon ratio should be approximately 1/15. Takaki thought that if meals with the nitrogen/carbon ratio close to this were served, it would be possible to prevent beriberi.

What convinced Takaki of this theory was a telegraph stating that 169 out of 376 ship crewmembers were afflicted with beriberi, and 25 of them died, which was sent from warship Ryujo on an ocean voyage on December 19, 1882. Then, after the beriberi patients were supplied with meat and vegetables loaded in Hawaii, they all recovered their strength. When Takaki checked the nitrogen/carbon ratio in the meals served before the ship arrived in Hawaii, it had been 1/20 to 28, and the ratio in the meals served after the arrival had been 1/11 to 16. Therefore, Takaki set the ratio in the meals for the ship crew on another ocean voyage at 1/17. As a result, no beriberi case occurred on the ship. In those times, the presence of vitamin C, whose deficiency is regarded as the main cause, had not been known. However, Takaki concluded that a bias in nutrients was the cause.

## Vitamin D Suppresses the Onset of Influenza

This case study also tells us that micronutrients can prevent illness or death. Since I learned at The Jikei University School of Medicine, which Kanehiro Takaki founded, I am also concerned with disease prevention with nutrients, and before long became interested in the relationship between vitamin D and natural immunity. Vitamin D has been regarded as a nutrient that strengthens bones, and began to be considered in around 2000 as probably relating to the onset of many diseases.

80 to 90% of vitamin D in the body is produced as the person is exposed

to sunlight. It has been said since before antibiotics were developed that tuberculosis patients should be exposed to sunlight, and its mechanism was clarified in a paper published in “Science” in 2006. If a person is exposed to sunlight, vitamin D in the person’s body increases, acting on immune cells called macrophages, and an antitubercular substance called cathelicidin, which is derived from immune cells, is secreted to kill tubercle bacilli. Since then, it has been considered that vitamin D has a function to kill microorganisms, germs and viruses by stimulating the natural immunity of humans.

The vitamin D concentration in blood is the highest around the end of August, and the lowest around February. The vitamin D concentration in blood in winter is half that in summer, and a substance called defensin, which develops in the respiratory tract mucosa and prevents virus infection, also decreases. It can be said that the increase in influenza patients in January to March makes sense.

I conducted an influenza prevention trial based on this hypothesis in 2008. The trial was a double-blind randomized controlled trial, and in the trial, the subjects took either a capsule containing vitamin D, or a placebo supplement, and the prevention effect was examined. As a result, it was found that in a group taking vitamin D orally, people developing influenza accounted for 10.7%, while those in a group taking the placebo represented 18.5%. This indicates that the prevention of influenza with vitamin D was proved.

In addition, a similar trial was conducted for asthma attack in children, and a finding that vitamin D suppresses the attack was acquired. This study drew attention worldwide, and developed into an international joint study with teams in countries including the United Kingdom and the United States, and it has been found that vitamin D significantly suppresses acute respiratory tract infections. Vitamin D may also have an effect for the new coronavirus infection, and research collaborators in the United Kingdom are currently conducting a trial.

## Prevention of Cancer Recurrence also Expected

Then, is vitamin D also effective against cancer? As a pediatrician, I have examined children with cancer, and looked for a way to prevent cancer, or a therapy with which people developing cancer can complete their lives. And, I have gotten to vitamin D, and published the findings of my 10-year study in “Journal of the American Medical Association,” a globally authoritative medical journal, in April 2019. The article indicates that findings showing that in the prevention of recurrence of esophageal cancer, gastric cancer and colorectal cancer, the rate of recurrence in those taking vitamin D was 8% smaller than those taking a placebo were acquired. Regrettably, no statistically significant difference was made due to a small number of people participating as subjects. However, a similar paper was later published at Harvard University in the United States. This means that the fact that vitamin D helps prevent cancer onset or recurrence and death is being proved at an evidence level.

Worldwide, 20 million people develop cancer every year, and 10 million of them die. If we can curb recurrence and death by a few percent, I think that would be very meaningful.

# Innovation to Build a Healthier, More Sustainable and Resilient Society

Dr. Peter Van Dael

DSM Nutritional Products, SVP Nutrition Science & Advocacy

## The WHO also Stresses the Meaning of Preventing “Deficiency of Micronutrients”

Our company DSM wants to develop products that are intended to maintain health of people around the world. Considering what we should do to achieve this goal, it is important after all to focus on SDGs, and pay attention to consumers, society and the environment. Further, we consider important that accuracy based on scientific findings is secured in order to achieve this goal. Specifically, the utilization of biotechnology, backing with data, and refinement and personalization of nutrition will serve as the source of such accuracy.

In the WHO’s report published 15 years ago, a world map showing nations and regions tending to be deficient in iron, and nations and regions tending to be short of vitamin A, was presented. In particular, vitamin A was positioned at that time as a nutrient that is the most subject to shortage in the world.

Today, shortages of micronutrients, including vitamin A, are considered as a problem. The WHO has declared that it is a global task for the governments of member nations and partner companies to collaborate to prevent lack of micronutrients. DSM’s mission lies here too.

In addition, “pursuit of healthy ageing” is also desired worldwide now. It is estimated that in 2050, thirty years from now, the majority of the world population will be those aged 60 years and older, and such elderly people will reach at least one third in countries with particularly many seniors. “Healthy ageing” is an approach to prevent the medical cost from running up endlessly. And, nutrition is very important also for this. The WHO report in 2015 also states that it is necessary to improve nutrition in order to pursue healthy ageing.

## If the Nutrition is Poor, the Immunity will also Decline

2020 was a special year for healthcare in the world. The COVID-19 pandemic brought afresh us questions: what can we do, and what did we have to do. We later learned that obesity and oldness could serve as elements to raise the risks of COVID-19 infection and severity increase. However, it is also necessary to add deficiency in nutrition.

Virus infection is a global problem since it has occurred many times in history, never a new risk. 3 to 5 million people are afflicted with seasonal influenza around the world every year, and 290 to 650 thousand people die even now. With COVID-19, as many as 3.5 million people already died. Confronting COVID-19, we are now required to review the whole lifestyles of people. And I think that it is necessary to transmit information intended to disseminate it and awaken people.

For example, keeping a social distance may be regarded as a new lifestyle. However, we would like to add “well-balanced nutrition intake” here. In other words, it means that the strengthening of the immune system must be achieved through well-balanced nutrition intake.

It is known that while people with malnutrition are more likely to progress to severe COVID-19, people with good nutrition are less likely to progress to severe disease. Micronutrients result in a sound immune system and strength-

en it. A number of papers indicating the correlation between respective nutrients with immunity against COVID-19 have been published. Vitamin D is one of the especially important nutrients.

## Administration of Vitamin D is Effective for People with High Risk of Severity Increase

While it has long been known that vitamin D is important for bone health, its connection with immunity is drawing attention now. Vitamin D is generated if the human body is exposed to sunlight. But you can also replenish it with a supplement.

Studies in Europe have found that older people are more subject to vitamin D insufficiency, and a survey conducted in the United Kingdom in 2007 indicates that the sufficiency level is low in winter and early spring (period with less sunlight).

In the meantime, some other data show that the serum vitamin D levels in COVID-19 positive patients are low. One data in France shows that after people infected with COVID-19 took vitamin D, the survival rate improved. It has been found through various other studies that vitamin D may prevent COVID-19, and prevent the post-infection symptoms from becoming severe. I think it is extremely important to sound the alarm about vitamin D deficiency for the present public health.

The United Kingdom has started to administer vitamin D for those more likely to progress to severe COVID-19. Since vitamin D is hard to generate without exposure to sunlight, the government encourages those who stay home to take 15 micrograms of vitamin D per day. The government also calls for vitamin D replenishment with a supplement during winter, when sunlight is weak. People who have risk factors such as people not exposed to sunlight, people with dark skin, vegetarians, and people with malabsorption in some form need to consciously take vitamin D.

Your vitamin D intake can be easily measured on-line. We recommend constantly checking the intake, and replenishing vitamin D with a supplement or the like if it seems the vitamin in your body is insufficient. It is considered that to take an appropriate amount of vitamin D, it is necessary to eat four oranges every day at regular meals.

Proper nutrition intake is essential for health. Among the nutrients, vitamin D is an important nutrient related to various functions of the body including the immune system. Raising the vitamin D level would help prevent infections and progress to severe disease. However, well-balanced diet alone will not be enough for that purpose. We should take advantage of supplements. Supplements are particularly necessary in winter and for people having risk factors, such as people with underlying diseases, elderly people, and people with dark skin.

# Creating a Healthy Planet for Healthy People – DSM’s Commitment

Dimitri de Vreeze

Co-CEO, Royal DSM

The year 2020 was the hottest year in history. The average temperature in the Asia-Pacific region is rising year by year, and we are faced with the problem of climate change. Therefore, in the Paris Agreement adopted in December 2015, it was decided that the nations acceding to the United Nations Framework Convention on Climate Change (UNFCCC) (197 nations/regions) should purse efforts to control the rise of the average temperature below 2 °C , preferably to 1.5 °C . In addition, 123 nations and one region, including Japan, have declared carbon neutral, which means that the greenhouse gas emissions need be reduced to net-zero by 2050.

Also in the private sector, over 2,000 global companies, and more than 130 international investors and various organizations, have set a goal of net-zero greenhouse gas emissions. If these are all combined, they will account for one fourth of the total world carbon dioxide emissions, exceeding half of the total GDP. DSM is also one of the companies that set a long-term goal of net-zero greenhouse gas emissions to be achieved by 2050. With its global partners, the company has been advocating the adoption of a carbon pricing system since 2016, and in the meantime, has itself introduced an internal carbon pricing system in its management and utilized the system for investment and business evaluation. DSM raised the price per ton of CO<sub>2</sub> equivalent from €50 as of 2016, when the pricing system was commenced, to €100 in 2021.

## Contributing to Zero Hunger with Scientific Expertise

Climate change is a threat that also affects the world food situation. Currently, approximately 820 million people around the world face chronic hunger, and over 2 billion people suffer from “hidden hunger,” in which micronutrients such as vitamin D are deficient although calories are sufficient. This problem cannot be addressed with the existing food system. There are three reasons for that. First, the impact of livestock on the environment has surprisingly increased. The greenhouse gases derived from livestock account for one fifth of the emissions from all industries in the world. Second, one third of food produced worldwide is disposed of. Food that is still good enough to eat is discarded as-is, or in the course of processing. In Asia, despite a large number of people suffering from hunger, food amounting to 40% of the crop yields is wasted. What is worse, the new coronavirus pandemic has brought a major challenge to the global food supply chain. This is the third reason. Coupled with the soaring food prices, this has caused a situation where nutritious food does not reach those most in need. Due to the new coronavirus pandemic, more than whopping 1.9 billion people have been unable to take healthy food in the Asia-Pacific region. The situation has resulted in malnutrition particularly in children.

To cope with these problems, a systematic change for creating a healthy planet for healthy people is desired. It is important also for Japan, which imports approximately 60% of food, to establish food safety and supply. However, it cannot be said that the Asia-Pacific region is on track to achieve the SDGs (Sustainable Development Goals). So, DSM wants to contribute to “zero hunger,” which is one of the SDGs goals, while aiming at achieving food safety and nutrition security by providing support to various countries.

DSM has continued to utilize scientific expertise in the field of nutrients. For example, chicken eggs are a very familiar source of protein, but 19 million tons of eggs are discarded every year in the Asia-Pacific region due the fact that they are difficult to transport and store. To reduce this mass disposal and deliver protein source to many people, DSM has succeeded in reducing the loss during transportation and extending the use-by date by developing

a feedstuff additive Hy-D® to strengthen the egg shell. DSM drove innovation in the poultry farming business by deploying its solution in Indonesia through a partnership with Wahana Visi INDONESIA, an Indonesia branch of international NGO World Vision.

In addition, DSM has launched “ampli-D®,” calcifediol (25-hydroxyvitamin D<sub>3</sub>), in Oceania and Singapore. Vitamin D is a nutrient that is important for immunity enhancement necessary to protect the body from infections such as the new coronavirus infection. Most of vitamin D is produced through exposure to sunlight, and it is difficult to take the required amount from diet. ampli-D® can raise the vitamin D concentration in blood three times faster than ordinary vitamin D<sub>3</sub>, and has drawn attention as it can improve the immune health in a short period. DSM will launch this in other countries in sequence in the future.

## Solving Problems through Partnerships

As shown in the above example in Indonesia, DSM not only pursues innovation by itself, but also realizes sustainable innovative solutions through partnerships with governments and companies. For example, in Africa, where over 250 million people are in a state of poor nutrition, DSM has established a company called “Africa Improved Foods” through a public-private partnership in Rwanda. This company has been able to support the improvement of the nutrition status of over 2 million children in Rwanda and the livelihoods of farmers, by producing and selling nutritious porridge made from corns or soybeans purchased from small farmers as the raw material, and added with essential vitamins and minerals.

In addition, to address the problem of hidden hunger in the form of micronutrient deficiency, DSM has continued to provide technology for more than a decade through the global partnership with UN World Food Programme (WFP), and to develop solutions with which nutritious food can be supplied for an affordable price even under difficult situations.

To achieve such an influential partnership also in Japan, DSM has started its efforts. For example, in “Nutrition Japan Public Private Platform (NJPPP),” which is operated in a public-private partnership, DSM has provided support for delivering nutrition to people in developing countries, for example, by participating in a nutrition improvement project for workers in Southeast Asian countries such as Cambodia. In addition, DSM has been discussing on solutions with companies in the food industry, and will present a joint proposal concerning nutrition improvement at the Tokyo Nutrition for Growth Summit 2021, which will be held in December this year.

Japan has advanced technologies and is expected to contribute to building a low carbon society. On the other hand, one third of its population are aged 65 years and older, and has a health problem caused by aging. How should we supply nutritional supplementary food, or supplements, for health maintenance, which people will require as they become older. In the meantime, we have also set a goal of halving the cost of food loss from that in 2000 by 2030.

DSM intends to also address problems unique to Japan in cooperation with its like-minded innovation partners while making the most of its experience in the Asia-Pacific region. And, we believe that the sharing of data through partnerships will help Japan to build a sustainable future.

# Tough times bring opportunity

Kazunori Maruyama

President and Representative Director, DSM Japan K.K.

Thank you for participating in the 3rd DSM Japan Sustainability Forum, which was held for two days under the topics of “Sustainable food system” and “Nutrition and Healthy Life.” I feel very encouraged since many people from various quarters, including those taking the podium, and people from the government, companies and academic circles, empathized to our hope to Create Healthy Planet for Healthy People. In the meantime, I renewed my awareness that it is important to maintain these discussions, instead of ending them with this two-day event.

The year 2021 is very important for food and nutrition. In September, a first “United Nations Food Systems Summit 2021” will be held concurrently with the UN General Assembly. In December, the Tokyo Nutrition for Growth Summit 2021 will be held in Tokyo. At both summits, leaders from around the world, such as those representing national governments, companies, NPOs and research institutes as well as students will gather to discuss sustainable transformation of the food system and global nutrition improvement. Previously, nutrition improvement in developing countries has been an important theme. However, in the midst of the ongoing coronavirus pandemic, nutrition improvement has now become a topic of debate even in advanced countries. The summits will consolidate commitments to this, and determine an action plan for the future.

As you may have felt in the discussions during this forum, the food system problems are complexly associated with multiple issues, and will not be solved easily. It is necessary for us to collaborate with all stakeholders around the world to set common goals, and tenaciously tackle the problems toward solving them. For example, the government must consider how to improve the food security, or the food self-sufficiency. As Mr. Yoshihisa Hishinuma of the Ministry of Agriculture, Forestry and Fisheries mentioned on the first day of the Forum, the government must consider how to guide the nation with political measures including a productivity improvement approach.

I think private companies also have roles. Their most important role is innovation. It is important for private businesses or those such as startups to give rise to innovation, and provide it to consumers. Some say: “consumers do not pay for sustainability” or “sustainability is not profitable.” However, as many say: “tough times bring opportunity,” I think companies should positively perceive it as an issue that they should tackle. DSM's purpose is to “create brighter lives for all by force of science.” In formulating our business strategy toward that purpose, we place particular focus on one of the SDGs goals: “Partnerships for the Goals.” To cope with the problems of the food system and global warming, we also need to join our forces in addressing them.

Japan has been working on the problem of super-aging society ahead of the rest of the world. How should we secure manpower amid the declining working age population? This is a question that is arising in not only Japan, but also China and Europe. DSM intends to tackle these problems in partnerships with our stakeholders in Japan, and deploy innovations or new solutions that are generated from such efforts to other countries. To solve social problems concerning food and nutrition, and create new business opportunities, let us make a change to Japan by carrying out further discussions while taking advantage of this Forum.



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**NUTRITION  
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SUMMIT 2021

Food, Health, & Prosperity for All

Tokyo Nutrition for Growth  
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Official Side Event

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