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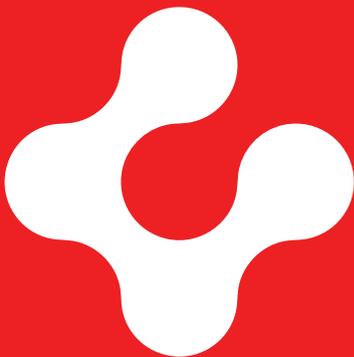
BRAZIL

Shift to healthy
and sustainable
consumption patterns

About the United Nations Food Systems Summit

The **Food Systems Summit Dialogues** enable a **standardized approach** for the convening, curation and facilitation of purposeful and organized events that encourage a broad and diverse range of stakeholders to come together and share their experiences of food systems. Through Dialogue, people will consider how their roles impact those of others and seek out ways to improve or transform food systems so they are suitable both for people and the planet. They provide an inclusive and supportive venue for debate, collaboration, consensus-building, and shared commitment making. The Dialogues were organized to allow participants and the public to engage purposely with an open exchange, among a diversity of stakeholders.

The Food Systems Summit Dialogues are an approach for enabling systematic, inclusive opportunities for stakeholders to be engaged in food systems. The approach enables participants to contribute to the Summit by building on efforts already underway, working together on pathways that lead to sustainable food systems, and setting out intentions and commitments in the run up to the Summit that took place on 23 September 2021 in New York.



About Swissnex

Swissnex is the global network connecting Switzerland and the world in education, research, and innovation. Our mission is to support the outreach and active engagement of our partners in the international exchange of knowledge, ideas and talent. The six main Swissnex locations are established in the world's most innovative regions. Together with around twenty Science Offices and Counselors based in Swiss Embassies, they contribute to strengthen Switzerland's profile as a world-leading innovation hotspot.

About the Science & Technology Office Seoul

The Science & Technology Office Seoul, based at the Embassy of Switzerland in Seoul, is an integral part of Swissnex, connecting the dots in science, innovation and higher education between Switzerland and South Korea. STO Seoul promotes Swiss excellence and supports the creation of partnerships and collaboration projects among Swiss-based researchers, entrepreneurs and students with Korea-based counterparts. In addition, STO Seoul assists the establishment and implementation of agreements between the Swiss and Korean governments in the above-mentioned fields instrumental to the stakeholders' support.

Shift to healthy and sustainable consumption patterns

A discussion on sustainable food systems and solutions to tackle the issue was organized on 3 June 2021 by Swissnex in Brazil and the Science and Technology Office of the Swiss Embassy in Seoul; it was an Independent Dialogue within the United Nations Food Systems Summit and aimed at raising awareness and looking at ways of modifying consumer behavior and proposing new products and practices for a transition to more sustainable food production and consumption patterns. Representatives from Brazil, South Korea and Switzerland shared information, knowledge, ideas and initiatives to combat different cultural and social hurdles.

The UN Environment Program estimates that around 17% of total global food production is never consumed. Household per capita food waste generation is found to be broadly similar across country income groups, suggesting that actions to tackle food waste are equally relevant in all countries across the globe. The lack of education generates confusion among consumers regarding recycling and resource circulation concepts. Other impacts on sustainability are related to agricultural production systems, causing deforestation, pollution, contamination and loss of biodiversity. Innovation also plays an essential role in the agri-food production chain, bringing new solutions to sustainability to farming, the hospitality sector and consumers' homes.





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Session 1 :

The cross-borders context

The first part of the event related to consumption, with a focus on current national and cross-border initiatives, the second to driving innovation and the comparative approach amongst sectors in the industry.

The moderator for the first session, Christina Senn-Jakobsen, Managing Director of Swiss Food and Nutrition Valley, started by establishing the gravity of the situation by saying: **“Today, it’s a matter of the planetary boundaries having been reached; the outlook looks grim, we need to accept, collaborate and make a change.”** She introduced the session’s first eminent speaker, Professor Renato Sérgio Jamil Maluf, coordinator of the Brazilian Research Network on Food and Nutrition Sovereignty and Security.



*Christina
Senn-Jakobsen,
Managing Director,
Swiss Food &
Nutrition Valley*

AS SOMEONE WHO IS PASSIONATE ABOUT FOOD INNOVATION, CHRISTINA AIMS TO HELP SOLVE SOME OF THE MOST PRESSING GLOBAL ISSUES RELATED TO FOOD. WITH A CORE FOCUS ON FOOD SCIENCE AND NUTRITION, SHE BELIEVES COLLABORATION BETWEEN SECTORS IS FUNDAMENTAL TO BETTER AND FASTER INNOVATION AND AIMS TO PUT SWITZERLAND FIRMLY ON THE MAP AS THE HOST OF A LEADING ECOSYSTEM IN SUSTAINABLE FOOD AND NUTRITION. CHRISTINA HOLDS A MASTER'S IN FOOD SCIENCE AND TECHNOLOGY FROM THE UNIVERSITY OF COPENHAGEN AND A MASTER'S IN EUROPEAN FOOD STUDIES FROM WAGENINGEN UNIVERSITY. SHE SPENT THE FIRST 12 YEARS OF HER CAREER AT MONDELEZ IN ROLES SPANNING R&D, INNOVATION MANAGEMENT, MARKETING AND STRATEGY BEFORE SHE MOVED ON TO WORKING WITH ENTREPRENEURS AND START-UP COLLABORATIONS. IN JANUARY 2021, SHE JOINED SWISS FOOD & NUTRITION VALLEY AS MANAGING DIRECTOR.



*Professor Renato
Sérgio Jamil Maluf,
coordinator of the
Brazilian Research
Network on Food and
Nutrition Sovereignty
and Security*

JUST TRANSITIONS TOWARDS SUSTAINABLE AND HEALTHY FOOD SYSTEMS: A MULTI-SCALE APPROACH

RENATO IS A PROFESSOR AT THE FEDERAL RURAL UNIVERSITY OF RIO DE JANEIRO, BRAZIL (UFRRJ) AND LEADS THE RESEARCH GROUP ON FOOD AND NUTRITION SOVEREIGNTY AND SECURITY/UFRRJ. IN 1996, HE WAS A VISITING RESEARCHER AT QUEEN ELIZABETH HOUSE, OXFORD UNIVERSITY IN THE UK AND IN PARIS IN 2000 AT THE ECOLE DES HAUTES ETUDES EN SCIENCES SOCIALES. IN 2017 HE WAS AGAIN IN THE UK, THIS TIME A VISITING RESEARCHER AT CITY, UNIVERSITY OF LONDON. PROFESSOR MALUF IS A FORMER PRESIDENT OF THE NATIONAL COUNCIL ON FOOD AND NUTRITION SECURITY, PRESIDENCY OF THE REPUBLIC OF BRAZIL (2007-2011) AND WAS A MEMBER OF THE STEERING COMMITTEE OF THE UN HIGH LEVEL PANEL OF EXPERTS ON FOOD SECURITY (HLPE, 2010-2014). APPOINTED IN 2017, HE IS CURRENTLY COORDINATOR OF THE BRAZILIAN RESEARCH NETWORK ON FOOD AND NUTRITION SOVEREIGNTY AND SECURITY.

Professor Maluf's assertion is that to transition towards sustainable and healthy food systems, a systemic, multi-scale approach to assess food systems is necessary. Food systems include flows of interdependence with complementary systems, featuring conflicts and imbalances. These systems, with distinctly different amplitudes, players and dynamics have to coexist. There are three levels: At the **international level** there are global value food chains, transnational corporations and international trade. The **national level** food system assesses food provisioning and public policies, while the **local or territorial level** is a sub-national system that is involved with biodiversity, culture and fresh food.

The coexistence of these three systems is important when it comes to food and eating, as food and eating in localities is the entry point when it comes to food provision and, taking that as read, what is seen is the overlapping of flows with various amplitudes and large retail agents offering goods with distinct characteristics in terms of origin, processing and eating habits. Then there is competition for social control of food provisioning, mainly represented by the alternative food networks.

Consideration of social differentiation among models of agriculture production, especially between family farming and agribusiness, where the major conflicts around land, natural resources and policies are going to take place, is needed.

People should have a sustainable supply of healthy food. There are obvious limits to making the current patterns of food production and consumption more sustainable, particularly when considering that they tend to be derived from large-scale monocultures and livestock and land concentrations, resulting in the compromising of biodiversity and huge outputs in terms of pollution and greenhouse gas (GHG) emissions. The end result is a poor, monotonous diet, eating copious amounts of processed food with increasing issues surrounding obesity-related diseases.

Professor Maluf emphasized that social inequalities and poverty are undeniable constraints to accessing healthy food; cheaper but poor-quality food is easy to access and for those who want to improve their diet, there is a financial cost. **There is also a need to promote, protect and support small-scale and diversified family farming in order for people to eat better.**

Integrated and participatory policies also have an integral role to play in the accessing of healthy food. According to Professor Maluf, the international focus has to be on hunger, famine and malnutrition as outcomes of highly productive food chains, over-consumption and its related diseases, losses and waste and the environmental damage being inflicted by the prevalent food system.

The Brazilian Paradox

Brazil was used as an example of difficulties currently being faced. It is one of the world's largest food producers and exporters and yet it is experiencing increasing food insecurity and hunger. This is being referred to as the Brazilian Paradox. The causes attributed to this situation are the country's current economic crisis, coupled with policy dismantling and the Covid-19 pandemic.

Data presented showed mild food insecurity in Brazil rising dramatically between 2018 and 2020, with both moderate and severe food insecurity rising over the same period along with a reduction of over 18% in food security.

In 2020, less than 50% of Brazilian households could be considered in food security. In 2013, research showed that 77.1% of households were in food security compared with 44.8% in 2020. Professor Maluf said that although the Covid-19 pandemic has undoubtedly exacerbated the situation, the downward slide had already begun before the pandemic started.

Professor Maluf argued that a processual approach is needed as opposed to the current formal-mechanistic models and the concept of food justice must be integral to the solution. There is also no doubt that food losses and waste are connected with prevailing food production and consumption patterns and directly related to overuse and subsequent depletion of natural resources and poor eating habits. The situation is a cross-border issue, a concern that demands assessment of dominant patterns of food consumption by the international community; everyone can participate in the solution by sharing experiences relating to public policies, look at lessons learned and enhance non-governmental cooperation. There is also a clear role for international organizations such as the UN and CSF (Committee on World Food Security).

Brazilian CSO's Campaign

'Real food' in the countryside and in the city: for rights and sovereignty

- Protection of life and planet, health, environment justice, human rights
- Socio-cultural dimensions of food sovereignty
- Narrowing links between food production and consumption
- Building bridges between urban and rural
- Valuing agricultural biological diversity and regional fresh foods
- Respect ethnic ancestry and traditions
- Rescue identities, memories and food cultures of the population





*Braida Thom,
Project Manager
at the ETH
Competence Center
World Food System*

BRAIDA THOM JOINED THE WORLD FOOD SYSTEM CENTER AS PROJECT MANAGER IN NOVEMBER 2019. IN HER ROLE, SHE MANAGES THE RESEARCH PROGRAMS OF THE CENTER, INCLUDING THE FUTURE FOOD FELLOWSHIP. SHE COMPLETED HER BACHELOR STUDIES IN AGRICULTURAL SCIENCE AT ETH ZURICH AND HER MASTER STUDIES IN AGRICULTURAL ECONOMICS AT ETH ZURICH AND BOKU VIENNA. HER MASTER'S THESIS WAS PART OF THE FLAGSHIP PROJECT, "ENHANCING RESILIENCE IN FOOD SYSTEMS" AND FOCUSED ON EVALUATING ACTION MEASURES TO ENHANCE RESILIENCE OF GHANAIAN COCOA FARMERS TO DROUGHT. FOLLOWING HER STUDIES, BRAIDA JOINED THE WORLD FOOD SYSTEM CENTER AS AN INTERN, SUPPORTING COMMUNICATION, OUTREACH, AND EDUCATION ACTIVITIES. SINCE MAY 2019, SHE HAS ALSO WORKED WITH THE ETH ZURICH SUSTAINABLE AGROECOSYSTEMS GROUP, WHERE SHE IS IN CHARGE OF MONITORING AND EVALUATING THE "POST-HARVEST COCOA PROCESSING & FARMERS' SUPPORT CENTERS" PROJECT. IMPLEMENTED BY CABOZ AG, THE PROJECT AIMS TO COUNTER RISKS ALONG THE COCOA VALUE CHAIN AND IMPLEMENT SUSTAINABILITY INITIATIVES IN CÔTE D'IVOIRE.

The second expert speaker was Braidia Thom, Project Manager at the ETH Competence Center World Food System, who spoke about a specific project, the Future Food Fellowship, an initiative to expand research and education in food and nutrition sciences. The project's aim is to bridge competencies from academic and industrial research, enabling the production of healthy, nutritious, sustainable and affordable food. It is an example of collaborative work to address some of the major challenges currently being faced by the food industry.

POST-DOCTORAL RESEARCH PROGRAM: THE FUTURE FOOD FELLOWSHIP

A Swiss research initiative, the Future Food Fellowship is co-managed by The World Food Systems Center at ETH Zürich and the nutrition center at EPFL with the support of Bühler, Givaudan and Nestlé and a view to expanding the industry network in the future. The initiative benefits from the involvement of key players in the Swiss food system, creating a collaborative environment for addressing some of the major challenges currently being faced by the food system. Switzerland has, according to Braidia Thom, a unique ecosystem for collaboration across the food sector with a strong, research-oriented industrial sector, an innovative start-up scene and world-class universities.

The Future Food Fellowship is structured around annual calls for proposals from young researchers who have ideas for a post-doctoral project targeting future food issues such as nutrition, production, packaging and health. Each project should last for three years and the fellows receive 390k CHF in the form of a research fund, enabling them to work on their project and collaborate with Swiss industry partners. The fellows are employed by ETH Zürich or EPFL, where they have the benefit of a host professor providing support.

The aims are to attract leading scientists in order to accelerate the realization of novel, industrial processes or products, solve ecologically important issues and improve the quality of life and health. The initiative supports projects and attracts international talent to create a critical mass of competence and research around food in Switzerland.

There were calls for applications in both 2019 and 2020, resulting in four fellowships awarded in the first call and three in the second, all extremely diverse.

2019 CALL

Project 1:	Research conducted mainly in Mexico involving enhancing the use and conservation of agrobiodiversity and looking at the impact of Covid-19 on agrobiodiversity through diversified farming systems.
Project 2:	Exploring the potential of the ancient Philippine crop, kabog millet. An under-utilized crop that is gluten-free and has great potential.
Project 3:	Sensors that can be integrated into packaging with the aim of reducing food waste. The sensors provide information of the food within the packet, allowing for intervention before spoilage.
Project 4:	Research into how natural compounds can be used to prevent obesity.

2020 CALL

Project 1:	Reduction of the astringent perception to improve the sensory quality of plant-based beverages.
Project 2:	The project investigates the effects of food- and exercise-derived lactate on muscle performance in order to ensure healthy ageing.
Project 3:	Can microbes transform raw food constituents into healthy metabolites? How the microbiome is processing the food we eat.

Interviews for the 2021 call will be conducted in the near future, with proposed topics including plant-based nutrition – protein and beyond, the microbiome, climate change mitigation – currently a topic of high priority – healthy nutrition for low-income populations and sustainable processes and food design.



*Junseok Oh,
Government
Partnerships Officer
of World Food
Program (WFP),
South Korea Office*

JUNSEOK OH JOINED THE WFP KOREA OFFICE IN JANUARY 2019. HE MANAGES PARTNERSHIPS WITH THE KOREAN GOVERNMENT AND THE PUBLIC SECTOR. HE MANAGES AN ANNUAL 50,000 MT OF KOREAN RICE CONTRIBUTION TO SIX DEVELOPING COUNTRIES, WHICH IS THE SINGLE LARGEST HUMANITARIAN ASSISTANCE FROM THE REPUBLIC OF KOREA (ROK). HIS OTHER MAIN ROLE IS TO LEAD THE ZERO WASTE ZERO HUNGER CAMPAIGN IN THE PUBLIC SECTOR. DURING ABOUT SEVEN YEARS OF EMPLOYMENT AT KOREA AGRO-FISHERIES AND FOOD TRADE CORPORATION (A.K.A 'AT'), A STATE-OWNED COMPANY IMPLEMENTING AGRICULTURAL POLICIES IN ROK, HE WAS ASSIGNED TO CORE DIVISIONS, INCLUDING STATE TRADING TEAM FOR FOOD SECURITY AND THE PLANNING BUDGET TEAM. THEN, HE PURSUED FURTHER STUDY IN THE U.K. AND WORKED AT PRIVATE COMPANIES IN LOGISTICS ABROAD. HE RECEIVED B.SC. IN AGRICULTURE FROM SEOUL NATIONAL UNIVERSITY AND LL.B.(HONS) FROM ABERDEEN UNIVERSITY.

ZERO WASTE ZERO HUNGER – CHANGING THE WORLD ONE MEAL AT A TIME

Junseok Oh of the UN World Food Program (WFP) described the human and environmental costs of food inequalities, consumption and waste, with particular reference to the Republic of Korea.

Founded in 1961, WFP is the world's largest humanitarian organization and the leading agency of the Food, Security, Logistics and Emergency Telecommunications clusters in international humanitarian response. Based in Rome, the organization works in 88 countries with 20,000 staff worldwide, of whom 90% are based in the field. It operates with 100% voluntary contributions from both the public and private sectors and provides food and nutrition to 114 million people per year. The organization's aim is to achieve Zero Hunger, the second of the UN's Sustainable Development Goals.

Junseok Oh began by stating that food security is being increasingly threatened by ongoing conflicts and climate change and, if current trends continue, the number of hungry people will reach 840 million by 2030. Covid-19 has only contributed to worsening an already dire situation, with the belief that the number of people in acute food insecurity could have doubled to 270 million during 2020.

Climate change is recognized as a major threat to food security. If the world warms by 2°C, 189 million people could experience greater vulnerability to food insecurity; and food waste and production is a major contributor to GHG emissions. Junseok Oh stated that the emissions from the production, distribution and consumption of food totals 13.7 billion tons, accounting for 26% of all GHG emissions and, in the process of producing, distributing and consuming food that is wasted, approximately 8% of the total GHG emissions is generated, with much more potent GHGs, such as methane, produced as food waste decomposes.

When it comes to waste, one-third of the world's food is lost or wasted each and every year, amounting to around 1.3 billion tons – enough to feed 2 billion people worldwide and incurring an annual economic loss of US\$ 1 trillion.

These facts have prompted actions by the WFP. Firstly, in developing countries, post-harvest loss has been reduced from 40% to less than 2% as a result of training farmers in installing and using airtight silos for the storage of their produce, along with enhancing the market power of 2 million smallholder farmers' in more than 60 countries by giving them access to a virtual market app, connecting them to markets via cooperatives.

In industrialized countries a "Stop the Waste" campaign has been implanted, providing people with tips on how to reduce waste in daily life.

Answers in Action

WFP's Korea office has implemented its own independent steps and launched the **Zero Waste Zero Hunger** campaign. The aim is to reduce leftovers and waste, resulting in a reduction in GHG emissions and thereby protecting the environment. Serving smaller portions also means that restaurants save on food waste disposal costs, the general population will be healthier as they eat only as much as they need to stay fit, and the WFP will be able to help hungry people through monetary donations.

The Zero Hunger Innovation Policy dialogue was held last year, co-hosted by WFP and Children, Population and Environment (CPE) of the National Assembly of Korea. It was attended by not only Assembly leaders but also government representatives and delegates from the corporate world and academia, including Ban Ki-moon, Minister of Unification and Chairman of the National Assembly's Foreign Affairs and Unification Committee. High on the agenda was the necessary policy support required in order to upscale the Zero Waste Zero Hunger campaign.

“[The] Covid-19 pandemic is deepening global hunger. Zero Waste Zero Hunger, a campaign to fight hunger by reducing food wastage, deserves nationwide attention.”
Ban Ki-moon, 8th UN Secretary-General (unofficial translation)

Partners and Supporters

As Junseok Oh explains, “the Zero Waste Zero Hunger campaign is designed to minimize food waste and induce changes in the user's behavior and perception.” The first stage was the creation of the restaurant menus, which involved producing smaller portions to reduce the amount of leftovers and encouraging restaurants to make a voluntary donation to the WFP using money saved from produce purchases, storage and waste disposal.

Participating restaurants carry the ZWZH logo, allowing diners to make a conscious choice to dine in a participating restaurant and support the global fight against hunger. One of Korea's celebrity chefs, Tony Yoo, was soon on board. His Michelin starred restaurant, Dooreyoo, was the first to commit to the campaign, with others following suit. Not only did Dooreyoo reduce its food waste by 20 to 30 liters of food per week, but people were also becoming more aware of the campaign. Cafeterias also participate, with a pilot conducted in Lotte World, Korea's most famous theme park, where food waste was reduced by between 27% and 37%.

The campaign also involves the use of Artificial Intelligence (AI) technology. A series of workshops, hosted by Amazon, has resulted in the development and implementation of AI scanner systems to identify food distribution and leftovers. Users are advised of more appropriate quantities; this helps restaurants with menu planning and purchasing and contributes to minimizing food waste. The scanning system was initially piloted in The Korea Agro-Fisheries and Food Trade Corporation’s (aT) headquarters and then tested in Dongseo University’s faculty cafeteria.

Education

Education has also been integrated into the campaign. Pupils learn about global issues and a waste reduction project was implemented in three schools. The pilot program only ran for two weeks in Gaon High School due to the Covid-19 pandemic, yet a 30% decrease in food waste was still observed.

THRESHOLD	SCHOOL NAME		
Standard/ school name	Nowon Elementary	Songsan Elementary	Gaon High
Food waste pp in 2019	149.4g	128.7g	Food waste decreased by 30% compared with 2020 food waste before pilot program
Food waste pp in 2020	113.2g	84.3g	
Food waste reduced (estimate w/o Covid-19)	24%	34%	*Pilot ran for two weeks due to Covid-19
Reduced GHG emissions (estimate w/o Covid-19)	4.3 tons	1.4 tons	*Number of students unclear

Rescuing food products

The final initiative highlighted involves the collaboration between partners to raise awareness of the disposal of food products; foods in cupboards, refrigerators and on shop shelves with imminent sell-by dates, weight or print errors, that may be discarded. The project aims to improve the system at both government and local levels through social media campaigns in conjunction with an opportunity to donate to the WFP.

FACTS:

In the Republic of Korea:

- 70% of food waste is wasted in the home.
- 134.32kg of food waste per person per year.
- 222kg GHG generated, equivalent to the amount of carbon absorbed by 45 trees a year.

The presentation finished on a high note, with the fact that between 1964 and 1984 South Korea received WFP help. Now, the tables have turned and it is one of the WFP's leading donor countries.

Highlights

- If wasted food were a country, it would be the third largest producer of carbon dioxide in the world, after the USA and China.
- All the food produced but never eaten would be sufficient to feed 2 billion people, more than twice the number of undernourished people across the globe.
- Consumers in rich countries waste almost as much food, each year, as the entire net food production of sub-Saharan Africa.
- In developing countries, 40% of losses occur at post-harvest and processing levels. In industrialized countries, more than 40% of losses occur at retail and consumer levels.

SESSION 1 Q & A

The first question was posed by session moderator, Christina Senn-Jakobsen, Managing Director of Swiss Food & Nutrition Valley. It concerned the advice the Republic of Korea could give Switzerland in tackling its food waste problem. Europe's food waste is around 180kg per capita but Switzerland's figure is 320kg per capita. Junseok Oh, Government Partnerships Officer of World Food Program (WFP), Korea Office's response was that schools are a good starting point as informed students extend the campaign to family and friends, increasing awareness across age groups.

Brazil's food waste challenge

Renato Sérgio Jamil Maluf, Coordinator of the Brazilian Research Network on Food and Nutritional Sovereignty and Security was asked about the food waste challenge in Brazil, with a particular focus on what was being done to counteract the negative implications. His response focused on the need for what he referred to as, “good and frequent indicators” and precise definitions of loss and waste. Christina’s follow-up question involved the fact that although there has been substantial economic growth in the food industry and acknowledging that Brazil is one of the world’s largest food exporters, she sought clarification as to why food insecurity is on the rise in Brazil and what is being done about it.

Professor Maluf’s answer was succinct, saying, “It’s not a matter of producing food, it’s a matter of accessing food and Brazil is one of the most unequal countries in the world.” He said that public policies play a central role and, with good public policies comes a decrease in food insecurity. However, since Brazil’s 2016 impeachment and the ensuing political crisis, the country is undergoing what some political analysts refer to as a policy dismantling process, which means the amount of food insecurity is increasing in Brazil. His third point concerned the question of what particular types of food should be promoted; there is a slogan, ‘Real food’, used in Brazil however, there is no clear definition of what this means.

Future food fellowship follow-up

Christina’s question for Braida Thom, Project Manager at the ETH Competence Center World Food System, was whether there was a follow-up to the Future Food Fellowship initiative, that involved taking the innovation from the laboratory and placing it in the real world. Ms Thom said that this, in fact, was a crucial part of the initiative and the program has been established with exactly this in mind. Industry partners are actively working on establishing a network allowing mutual dialogue and providing a forum for the exchange of ideas so that applications can be developed, making it a cross-sector engagement with leading industry players.

Global role models

Rapid-fire questions posed to all three speakers included which country they felt was the global role model in terms of a shift to healthy and sustainable consumption behaviors. Braida Thom said that it would soon, hopefully, be Switzerland with the help of the Future Food Initiative and similar projects. Junseok Oh agreed with her and Professor Maluf mentioned his involvement with Finnish colleagues on changing diets in Finland. He also said that this program also involves soya beans in Brazil, thus **highlighting the international connection between systems and, because of this, the need to have a more internationally integrated system.**

Impactful IT

When asked which technology would have the most impact, Professor Maluf voiced concern that there is a danger of viewing the matter purely as technical issues. His approach would be to link technology to social modes of production. “My interest is in how to connect small-scale food production with consumption.” He used Brazil’s free school meals derived from regional production as an example of how this works.

Braida Thom said that it is not just a matter of which technology is used but how it is applied, saying, “The most successful technologies to fix the food system will be those that don’t try to overrule nature but work together with it, support it, supporting a healthy food system that is within the planet’s boundaries.” She suggested that precision farming might play a crucial role and her final comment was that technology had to be used smartly and not be a case of technology for technology’s sake. The audience also provided suggestions of urban micro farming, plant-based products, and *agroecology* as alternative answers to the question.

Questions were sent in from the audience and the first one concerned how technology can be applied to connect small producers with a greater number of consumers. Professor Maluf pointed out that in Brazil, *agroecology* is increasingly important and that a mode of production would need to be chosen. He also said that as the smallholder farmers work at a local or territorial level, the technology has to be related to adequate, healthy foods. Adequate in terms of culture and eco system and finally there is the question of commercialization – how to connect local production with people who have difficulty accessing food so that they can benefit from good food rather than just the industrial products that are available in small shops.

Obstacles to solving the hunger problem

The next question focused on the main obstacles to solving the world's hunger problem. Both Braida Thom and Professor Maluf cited inequality, politics and political will as part of the main impediments. Professor Maluf said, "Every time we've had political will, the problem has been solved." Junseok Oh mentioned conflict and climate change as being the biggest risks to global food security.

The experts were asked about the ways of transitioning from lab-produced meat to it being widely available and whether this was a reality or a pipedream? Professor Maluf's response was that Brazil has millions of smallholder farmers and so both social differentiation and food production have to be considered. He feels that there is no transition without public policies and, to be successful, the needs of urban consumers cannot be ignored.

Christina Senn-Jakobsen concluded the first session, saying, "We need to do something and, through dialogue and inspiring each other, we can move faster, and we can move better and putting [sustainable, healthy eating] on the political agenda or involving academia, will make a difference."





Session 2: Innovation and Collaboration



*Gustavo Porpino,
Analyst &
Communication,
Brazilian Agricultural
Research
Corporation*

GUSTAVO HOLDS A PH.D IN MARKETING FROM FUNDAÇÃO GETÚLIO VARGAS (FGV-EAESP). HE IS VISITING SCHOLAR AT THE CORNELL FOOD AND BRAND LAB AND HAS A BACHELOR'S DEGREE IN COMMUNICATION (JOURNALISM) FROM UFRN, GRADUATING IN BUSINESS FROM QUEENSLAND UNIVERSITY OF TECHNOLOGY AND HAS A MASTER'S IN BUSINESS FROM UFRN. GUSTAVO HAS EXPERIENCE IN THE FIELD OF COMMUNICATION IN THE PRIVATE SECTOR AND CURRENTLY WORKS FOR THE BRAZILIAN AGRICULTURAL RESEARCH CORPORATION (EMBRAPA). HE IS INTERESTED IN RESEARCH IN FOOD MARKETING, RETAILING, CORPORATE REPUTATION AND COMMUNICATIONS.

Gustavo Porpino was the moderator for the second part of the discussion, focusing on innovation and collaboration. The session started with presentations by three innovative organizations, highlighting their products and services. Then, three speakers addressed a range of issues under the innovation and collaboration banner. Topics included current initiatives in the sector, the role of governance and the impact of food and science technology, followed by a Q&A.



Ladina Schröter

*Public Affairs & Co-Lead, Sustainability
at [Planted](#) (Switzerland)*

LADINA SCHRÖTER IS THE LEAD PUBLIC & REGULATORY AFFAIRS AT PLANTED FOODS AG. SHE HAS A BACKGROUND IN POLITICAL SCIENCE AND PREVIOUS EXPERIENCE IN PUBLIC AFFAIRS IN THE FOOD RETAIL SECTOR IN SWITZERLAND.

planted. PLANTED, SWITZERLAND

The first contributor was Planted from Switzerland. This young start-up is a spin-off of the ETH Zurich and was founded in 2019. It produces plant-based meat with a mission to change the way people think about meat and kick-start the necessary transformation to a move towards a more sustainable food system.

Ladina Schröter, the company's Public Affairs and Sustainability Co-Lead, explained that Planted's specialty is the creation of a fibrous structure and texture that, in the mouth, comes as close as possible to the animal equivalent and the product is also additive-free. It is made from pea protein, pea fiber, rapeseed oil and water, using state-of-the-art technology.

In 2019, Planted products were available in Switzerland's top two supermarkets, as well as via the company's online shop. Demand is growing and the company now supplies a number of restaurants in Switzerland and has expanded into Austria, Germany and France.



Pedro Alexandre Martins
Innovation Manager & Head of Sourcing
and Sustainability at [Livup](#)

PEDRO MARTINS HAS A BACKGROUND IN INNOVATION, BUSINESS AND ENGINEERING. HE IS RESPONSIBLE FOR SOURCING AND SUSTAINABILITY AT LIV UP, A HEALTHY FOOD STARTUP BASED IN SÃO PAULO WITH THE MISSION OF CREATING BETTER FOOD (ECO)SYSTEMS THROUGH INTEGRATION AND TRANSPARENCY.



LIV UP, BRAZIL

Liv Up is a rapidly growing food tech start-up with a strong focus on social responsibility. It creates natural, tasty products working in partnership with and supporting local farmers and producers. Its aim is to encourage an increasing number of people to adopt healthier eating habits.

The company operates on the premise that more people in the world care about where their food comes from, the food cycle and the impact of what they buy. There is increasing concern about how and by whom their food is produced. Customers tend to prefer organic foods and are adherents of recycling and reusing policies. They care about their physical and mental wellbeing, but they still want tasty, natural products that they can enjoy. According to Liv Up, its food is, “good for us, for others and for the planet.”



Daehoon Kim
CEO of [Nuvilabs](#) (South Korea)

DAEHOON KIM WORKED AT HYUNDAI MOTOR COMPANY FOR 8 YEARS AS ADVANCED TECHNOLOGY RESEARCHER BEFORE STARTING NUVILAB. AT NUVILAB, HE COMBINED FOOD TECH WITH KEY SELF-DRIVING TECHNOLOGIES SUCH AS OBJECT RECOGNITION AND SENSOR INTEGRATION. KIM IS UNDERTAKING INEFFICIENCY IN THE TRADITIONAL FOOD INDUSTRY BY GENERATING AND UPDATING THE INDUSTRY DATABASE. IN LIGHT OF PURSUING HIS BELIEF IN ‘EARTH CARE, HEALTH CARE,’ DAEHOON KIM IS ACTIVELY PROMOTING FOOD WASTE REDUCTION AND PERSONALIZED DIET-BASED HEALTHCARE SOLUTIONS.



NUVISCAN, SOUTH KOREA SCAN AND SAVE

The last presentation came from Nuvilabs of South Korea, the creators and distributors of an AI scanner, Nuviscan, which aims to save businesses money as well as improve the environment, making commercial kitchens smart and eco-friendly.

In just a second, Nuviscan detects the amount and type of food being disposed of. As Daehoon Kim, CEO of Nuvilabs says, “a third of food goes to waste; if we reduce 5% of that we can save 8 billion people from malnutrition.” The advantages of the scanner include reducing the amount of money spent on purchasing unnecessary produce, optimizing food preparation and servings and the ability to analyze eating habits. To date, the company says its product has reduced food waste by 140 tons and saved US \$13 millions.



*Florian Viton,
R&D Management
Executive for
Science &
Technology, CJ
Food (South Korea)*

DR FLORIAN VITON HOLDS THE POSITION OF R&D MANAGEMENT EXECUTIVE FOR SCIENCE & TECHNOLOGY AT THE CJ CHEILJEDANG R&D CENTER IN SUWON (SOUTH KOREA). HE IS RESPONSIBLE FOR DEFINING AND REALISING THE MID-TERM SCIENCE & TECHNOLOGY PROGRAMS SUPPORTING THE INNOVATION AGENDA OF CJ CHEILJEDANG, WITH A PARTICULAR FOCUS ON FLAVORS INNOVATIONS. DR VITON JOINED CJ CHEILJEDANG IN EARLY 2021 AFTER SPENDING 15 YEARS WITH THE NESTLÉ GROUP. HE STARTED HIS CAREER WITH NESTLÉ IN 2006 AS A FLAVOR SCIENTIST AT THE NESTLÉ RESEARCH CENTER, LOCATED IN LAUSANNE, SWITZERLAND. HERE, HE HELD SCIENTIFIC AND MANAGERIAL POSITIONS OF INCREASING RESPONSIBILITY, CULMINATING AS A MANCOM MEMBER. IN 2016, HE WAS APPOINTED HEAD OF SCIENCE & TECHNOLOGY FOR NESTLÉ IN SINGAPORE. FLORIAN GAINED HIS PH.D. IN ORGANIC CHEMISTRY FROM THE UNIVERSITY OF GENEVA AND COMPLETED POST-DOCTORATE FELLOWSHIPS IN BOTH THE UNITED STATES AND THE UNITED KINGDOM BEFORE STARTING HIS PROFESSIONAL CAREER IN A BELGIUM-BASED START-UP.

THE JOURNEY TOWARDS HEALTHY AND SUSTAINABLE NUTRITION – THE ROLE OF FOOD SCIENCE AND TECHNOLOGY AND OPEN INNOVATION

Florian Viton believes collaborative efforts in the field of food science and technology can help accelerate the necessary shift to sustainable and healthy food patterns at a time when population is rising, world resources are constrained and dietary-related diseases are becoming more prevalent. And yet people want food that meets their requirements; they want safe, tasty, healthy, nutritious foods with ingredients they recognize and increasingly customized to their specific nutritional needs.

He said, “Food companies are facing the obligation to radically and urgently adapt a food system that is unsustainable, unequal and ultimately de-stabilizing our planet.” So, what is the solution?

A holistic perspective

Dr Viton wants us to consider science and technology as “an essential engine” for the food industry, driving it to adapt its offering from tasty foods to sustainable nutrition. Food science and technology allows the understanding of a range of aspects from the consumer and sensory science perspectives through the flavor science – what are the molecules responsible for the flavor of foods? – to the development of new, more efficient processing methods and understanding nutrition and the health impacts of products, themselves.

In the past, competition in the sector has been far from healthy. Dr Viton gave an example of how innovation can be hampered by a lack of collaboration, citing the development of ‘hollow’ sugar, sugar that stays longer in the mouth and has an enhanced perception of sweetness. The concept was considered an important step in the development of products containing reduced sugar, tackling a major public health concern. Nestlé was the first company to develop an innovative method of production. There was, however, significant competition within the confectionary sector. Various products were launched, each with their own fanfare of publicity, yet none were commercially successful. Working collaboratively and sharing knowledge, ideas and insights would have saved a considerable amount of time and resources and have encouraged the development of more robust technology. Since then, assessment of the failure of these projects has meant the number of collaborations has increased.

Plant-based is a booming area regarding sustainable nutrition and an ideal platform for collaborative efforts. An example of collaboration in action is in the development of barley malt, a product of malt extract, historically used as animal feed but more recently has seen a rise in demand by breweries, consumers and start-ups, who have all recognized its commercial potential. The brewer is working with universities and start-ups to develop both scale and commercial viability in the manufacture of new ingredients. Products are reaching the market, a clear demonstration there is the potential to combine sustainability and better nutrition.

Further collaborations feature key industry players including Bühler and Givaudan, Beyond Meat and Pepsi, Quorn and Roquette. Bringing together various leading innovators leads to a more streamlined approach and greater sponsorship and investment opportunities. In this way, food science and technology are contributing to faster growth, in line with consumer demand for sustainable nutrition.





*Gustavo Guadagnini,
CEO of The Good
Food Institute
(GFI) (Brazil)*

GUSTAVO GUADAGNINI IS A BUSINESS ADMINISTRATOR, HE GRADUATED FROM PUC-SP, AND SERVES AS THE MANAGING DIRECTOR OF THE GOOD FOOD INSTITUTE (GFI) IN BRAZIL. GFI'S OBJECTIVE IS TO BUILD A HEALTHIER, SAFER, FAIRER, AND MORE SUSTAINABLE FOOD CHAIN BY SUPPORTING INDUSTRIES THAT ARE CREATING ALTERNATIVES TO THE USE OF ANIMAL DERIVED INGREDIENTS, WHETHER IN VEGETABLE-BASED TECHNOLOGIES OR CULTURED TISSUES. GUSTAVO IS ONE OF THE MOST ACTIVE ADVOCATES FOR THE SECTOR, WHICH HAS LED HIM TO LECTURE AT SEVERAL MAJOR COMPANIES, UNIVERSITIES, INNOVATION CENTERS, AND PROJECTS LIKE TEDX. HE HAS ALSO HAD THE OPPORTUNITY TO COLLABORATE WITH MEDIA OUTLETS THROUGH INTERVIEWS AS WELL AS COMMENTS FOR FANTÁSTICO, GLOBONEWS, ESTADÃO, EXAME, UOL AND TERRA, AMONG OTHERS. IN 2020, GUSTAVO WAS NAMED BY GQ MAGAZINE AS ONE OF THE BRAZILIANS ON THE LIST OF "25 NAMES THAT CAN SAVE THE WORLD".

FACTS:

- Industrialized animal agriculture is in the top 2 – 3 most significant contributors to the world’s most pressing environmental issues – water use, air pollution, loss of biodiversity. (Source: UN Livestock and Long Shadow Report)
- Industrialized animal agriculture is responsible for 14.5% of GHG emissions – more than the entire transport system. (Source: UN Livestock and Long Shadow Report)
- It takes 9 calories of food fed to a chicken to produce 1 calorie of meat. (Source: World Resources Institute – calorie formula)
- 75% of agricultural land is used for raising and feeding livestock and yet only provides 1/3rd of global protein supply. (Source: UN FAO – land use)
- Animals in the USA consume more than 2x as many medically important antibiotics than humans. (Source: FDA)
- Based on current trends, medical experts expect 10 million annual deaths from antimicrobial resistance (AMR) in 2050, a 14-fold increase on current deaths. (Source: United Nations IAGC)

The Good Food Institute (GFI) is a nonprofit organization, with the aim of creating a sustainable, secure and just protein supply, with agencies in North America, South America, Europe, India, Asia and the Middle East, with a total of 100 members of staff. It has three areas of work:

- **Science and Technology** – Advancing research in alternative proteins and creating a strong research and training ecosystem.
- **Corporate engagement** – Partnering with international companies and investors to drive investment, accelerate innovation and scale the supply chain faster than market forces alone would allow.
- **Policy** – Advocating for fair policy and public research funding for alternative proteins.

The question posed by Gustavo Guadagnini was: How will the world feed 10 billion people by 2050? And the answer from GFI's perspective is that instead of just dealing with issues around waste, we should also be looking at the production chain in the technology used; food production efficiency has to be improved and products have to be safe – several animal diseases are directly related to the production and manner of eating animals and global meat demand shows no sign of slowing down, as the following chart indicates:

Demand for meat in 2005 and expected demand in 2050

	2005	2050
Beef	64 million tons	106 million tons
Poultry	82 million tons	181 million tons
Pork	100 million tons	143 million tons
Mutton	13 million tons	25 million tons
Eggs	62 million tons	102 million tons

Source: Food and Agriculture Organization of the United Nations: ESA working paper No. 12-3, p.131

Cultural reasons play a significant role in rising meat demand, including the fact that people want to eat familiar, traditional foods and enjoy family recipes yet, according to the GFI, current meat, egg, and dairy production is unsustainable and inefficient and a key driver of climate change, environmental degradation and antibiotic resistance in humans.

Acceleration of alternative proteins

Rather than expecting people to give up the foods they love and are familiar with, or becoming vegetarian, GFI suggests that we make meat, eggs, and dairy more sustainably and efficiently by making them from plants, cultivating them directly from cells or producing them from fermentation. These methods would provide affordable, accessible alternative proteins. Gustavo Guadagnini said, “Create what people want. Use plants to produce food that looks like meat, tastes like meat and has the same texture.” Cultivated meat is already available in Singapore and it is anticipated that the technology will spread worldwide within the next decade or so.



*Christian Schwab,
Executive Director
of the Integrative
Food and Nutrition
Center of the EPFL
(Switzerland)*

AFTER A VERY DIVERSE CAREER AS A SENIOR LEADER IN SEVERAL LARGE MULTINATIONALS INCLUDING TETRA PAK, NESTLÉ AND FIRMENICH AND THEN AS AN ENTREPRENEUR, LIVING IN SEVEN COUNTRIES OVER FOUR CONTINENTS, CHRISTIAN JOINED THE EPFL AS EXECUTIVE DIRECTOR OF THE FOOD & NUTRITION CENTRE IN JANUARY 2019. IN THIS NEW CAPACITY, HIS MISSION IS TO MAXIMIZE THE POSITIVE CONTRIBUTION OF EPFL IN SOLVING SOME OF THE MOST PRESSING FOOD-RELATED CHALLENGES FACING MANKIND. THIS INCLUDES SUSTAINABLE PACKAGING, HEALTHY AGEING AND THE DIGITALIZATION OF FOOD SYSTEMS, WHERE EPFL HAS A GREAT DEAL TO OFFER. TO THIS END, THE ROLE OF THE FOOD & NUTRITION CENTER IS TO SECURE A DYNAMIC INTERFACE BETWEEN THE EPFL AND EXTERNAL PARTNERS, TO STIMULATE THE TRANSFER OF TECHNOLOGIES AND SCIENCE, AND IN FINE TO MAXIMIZE THE POSITIVE IMPACT OF THE UNIVERSITY ON SOCIETY AND THE ENVIRONMENT. IN FEBRUARY 2020, CHRISTIAN WAS APPOINTED PRESIDENT OF THE EXECUTIVE COMMITTEE OF THE SWISS FOOD & NUTRITION VALLEY.

THE CASE FOR STEWARDSHIP

FACTS:

- 70 million tons of plastic waste annually
- 70% of freshwater withdrawals
- 70% reduction in biodiversity
- 37% of emerged land
- 3.5 billion under-nourished people and 2 billion over-nourished people
- 821 million starving people and 500 million obese people

Christian Schwab began his presentation saying that radical change was necessary and, although the figures are stark, various solutions have already been identified from plant-based proteins and precision farming, through alternatives to plastic and recycling/upcycling and soils, water pollution and regeneration agriculture to healthy, more respectful diets, genetics and microbiome. However, he argues that the world has not yet recognized the complexity of the challenge due to a lack of adequate measurement, asking, “Do we have the right level of ambition? Is it enough to reduce the harm we are doing to the soil? Do we go for zero impact? Or should we be looking at regenerative agriculture? Where do we set the bar? We are heading for the world’s worst food crisis in food history due to Covid-19 and I don’t think we’ve fully measured it yet.”

Change in attitude

Resistance to radical transformation from cultural perspectives and interest groups will work to support the status quo, although the Integrative Food and Nutrition Center (IFN) believes that previous lack of political will to tackle the problems is undergoing change, with politicians likely to introduce more stringent regulations – bans on plastic packaging, for example – as a means of securing election success. If this happens, how do nations manage what is required? And then there is the nature of competitive advantage; as new standards and regulations are introduced the competitive advantage, particularly of the private players, will need to evolve.

The IFN believes that although there is a consensus that radical innovation is required, a less aggressive regulatory environment is needed with incentives and education programs, investment and the involvement of financiers and donors. As Christian Schwab said, “When was the last time you saw such systemic innovation in the food industry? There is a lot of stars to align to address big, systemic problems such as curbing obesity, reducing food waste and loss.”

The idea of developing industry governance would mean installing someone in the food system to mobilize and motivate the diverse players. The desire is for public and private sectors and academia to unite in their support and finance a governance program enabling change to be implemented.

Q&A

The session started with a question by moderator, Gustavo Porpino, regarding the fostering of pan-global collaboration and innovation. Florian Viton responded that it was important to meet the needs of the institutions and organizations in terms of the particular challenges, but it was critical to have government support in terms of the removal of barriers and the provision of strategic incentives that will create and sustain a rich, innovation ecosystem. Singapore was offered as an example as it has managed to attract and engage with food companies, suppliers, start-ups, academics and investors to create a vibrant ecosystem, linking Singapore with the rest of the world. This has resulted in proliferating collaborations across the globe due to the fact that many of the participating companies have a global presence.

Gustavo Guadagnini of GFI focused firstly on the need to involve academia as there has to be a strong scientific network, followed by engaging with the private sector as there are multiple ideas being developed. Finally, a global food trade has to be regulation compliant in countries that have different public policies and these need to be coordinated for the successful development of new food production solutions.

Christian Schwab said that bi-lateral cooperation in academia already exists, but the bigger challenge is systemic innovation. He suggested that there were two components required to make this successful, firstly, a clear definition of the problem and secondly, political will combined with funding and incentives.

Pedro Martins, Innovation Manager and Head of Sourcing and Sustainability of the start-up Liv Up, said that from a young company’s perspective, investment in food solutions and start-ups is important and a prerequisite for investment will mean start-ups evaluating their impact and clearly communicating the information. Once this happens, more investment is likely to be available.

Raising consumer awareness

The next question concerned raising awareness. Pedro Martins said that his company has a consumer-centered approach and, when talking about collaboration, focuses on the food eater as the most important stakeholder as they decide what is going to be eaten and, by implication, what will be produced. The company has a collaborative approach, sharing data with suppliers to ensure there is a balance between supply and demand.

Ladina Schröter, Public Affairs and Co-Lead, Sustainability at Planted said that many of Planted's consumers were generally aware of the need for and cared about sustainability and were familiar with plant-based solutions and the need to move towards plant-based proteins but the company wanted to reach a broader public. Although it was not going to suggest that everyone had to change their diet and become vegetarians, consuming more plant-based protein was certainly part of the solution. The company communicates using its product footprint to show how it relates to an animal product and has, literally, a transparent approach with its production facility enclosed in a glass unit, so that people can visit and see how their food is produced. As Ladina Schröter said, "It's an opportunity to get closer to the food we're eating." Covid-19 has obviously had a negative impact on the company's ability to welcome visitors, but hopefully tours will resume in the near future.

Market developments over the next decade

The next question involved the perceived development of the market over the next 10 years, with the fostering of entrepreneurs and healthy food businesses, bearing in mind the majority of consumers in the developing world will not have the purchasing power to buy healthy food products and that the sector may still be considered a niche market segment.

Florian Viton was emphatic that there was a "paradigm shift" in consumer demand for sustainable nutrition and this was creating what he referred to as "a burst" of innovation. His perception is that despite there being fluctuations in demand around the world due to socio-economic factors, the food industry has a solid reputation for creating products originally meant for a niche market and, with subsequent upscaling and down-pricing, making them appealing to the mass market. His belief is that consumers all over the world have the same desire for healthier foods, although people in developing countries are the most affected by the consequences of unhealthy, unsustainable consumption practices.



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Gustavo Guadagnini was asked how he predicts market trends for alternative protein over the next decade. His response was that the alternative protein market is going to be one of the most important things happening in the food system over the next 10 years. There is positive consumer feedback for plant-based products as technology has made them more appealing in terms of taste and texture, and the trend for *flexitarianism* is expected to contribute to the alternative proteins market. There are suggestions that the market will be worth between US \$100 billion and US \$300 billion and predictions that the value of the cultivated meat market could be even greater.

There is likely to be some resistance to cultivated meat from certain consumers, but research suggests that when consumers consider the production process, the fact that cultivated meat will not contain antibiotics or hormones and is free of contamination is a positive aspect. Forecasts suggest that cultivated meat will account for at least 10% to possibly more than 50% of the total meat market within the next two decades, this being an illustration of how consumers drive demand in the food industry.

Changing consumer consumption habits

There was a question involving the need to implement strategies to change consumer consumption habits. Gustavo Guadagnini's argument centered on an active decrease in education, saying that completely changing consumer habits, ideas and ways of eating food is virtually impossible, particularly on a large scale. Gustavo Guadagnini's belief is that the more technology creates solutions that look similar to products consumers already use is an easier, more efficient approach.

The role of academia

Christian Schwab took the question of the role of academia in the triple helix model of innovation involving collaboration between public and private universities, government agencies and the industry. His response incorporated the belief that firstly, academia has an important role in terms of technology transfer and legal capabilities that are necessary to accommodate joint research programs. Secondly, that there must be a focus on educating students on key issues and finally, that the sector should adopt a more conspicuous role in public debates, saying, "Scientists have to come to the fore and bring back discussions on a fact-based level so that policies are science-based."

He added that attractive food alternatives were required in order for people to change their eating habits and the current cultivated meat and plant-based proteins were extremely promising, providing an ever-growing choice for consumers.



His final comment was regarding the importance of marketing, saying, “We should not underestimate the element of marketing. Food is a cultural thing yet see how many brands became global because marketing could overcome the cultural dimension.” However, there was a warning regarding the need to distinguish between the needs of developed and developing nations. Industrialized countries are beginning to embrace plant-based alternatives, yet people in emerging markets are eating more meat. As previously highlighted, global meat consumption is increasing, partly because it is an aspirational element of food, suggesting that there may be global marketing difficulties ahead.

Where once marketing was used to sell copious quantities of products, there is now a shift to marketing connected with social needs and understanding different consumer requirements – this is going to be pivotal in the development and availability of more healthy food products.

Connecting smallholders and consumers

A further question concerned how smallholder farmers can be more effectively connected with consumers. Gustavo Porpino said that this was particularly relevant to Brazil, where most of the agricultural production comes from smallholder farmers. The pandemic has resulted in the emergence of various IT solutions and Pedro Martins explained that LivUp has implemented a system whereby 70% of its vegetables come from smallholder farmers. Forecasting information is shared with the farmers, who are given free technical support to balance income and output, with a pledge to purchase a pre-agreed amount of produce at a pre-set price. Pedro Alexandre Martins' argument is that the supply chain must be short, with only one or two companies between the farmer and the consumer. He went on to say that the LivUp system has produced some excellent results; in May 2021 more than 100 tons of organic vegetables were received as a direct result of partnerships with smallholder farmers.

The 'worst-case scenario'

The penultimate question concerned the 'worst-case scenario' should technology fail. Pedro Martins of LivUp advised that food has to be delicious and affordable, and his worst-case scenario would be the industry failing on these two counts. He said, "If people see more value buying unhealthy food or fast food or meat instead of healthy, plant-based alternatives, then the market won't change."

Christian Schwab's worst-case scenario would be a massive explosion of inequality. He advised that choosing the status quo with its accelerating global warming and negative impact on food production due to soil impoverishment, means the world has a maximum of 60 harvests before catastrophe strikes. Food shortages and price increases will mean only rich countries will be able to afford food, even then, it will only mean a delay in the inevitable. The Brazilian paradox will engulf the world's southern hemisphere first, before moving north, with food shortages causing global political and social unrest.

Price parity

The final question concerned price parity between animal and plant-based production. Gustavo Guadagnini advised that price parity has not yet been reached when considering the entire food production chain, particularly when considering a country like Brazil, a producer of cheap animal products. However, the industry is moving rapidly in the right direction and there is the potential to not only reach price parity but also to exceed it, especially when considering that vegetables are grown to feed animals, which humans then eat. According to Gustavo Guadagnini, "We could just eat the vegetables; it would be cheaper and more efficient."



*Alessandra Apicella,
Head, Science
& Technology
Office, Seoul*



*Leonardo Machado,
CEO ad interim
Swissnex in Brazil*

CLOSING REMARKS

Alessandra Apicella noted that many of the initiatives discussed in the session could be exported to meet the needs of other countries, along with the inspirational transformation of the Republic of Korea from being a WFP-funded recipient to a funding provider.

Start-ups demonstrated the sector's strengths in all three countries, particularly the focus Switzerland has placed on sustainability and the transition to alternative foods; alternative foods and relationships with consumers in Brazil; and AI being implemented in Korea to avoid food waste.

Presenters, speakers and start-ups provided information, ideas and opinions on innovations, including alternative proteins and the coordination and governance of the industry. One of the key observations was that a global approach is needed, along with the acknowledgment that this is not going to be easy to achieve. It will mean developing bigger, broader initiatives but this event has demonstrated that representatives of the food industry in Brazil, the Republic of Korea, and Switzerland all have the knowledge, the talent, the will and the passion to translate ideas into actions and results.

Organization

Swissnex in Brazil and the Science & Technology Office Seoul.

Shift to healthy and sustainable consumption patterns,
United Nations Food Systems Summit 2021

Partners

CJ Food South Korea, CPDA-UFRRJ, Embrapa, EPFL Integrative Food and Nutrition Center, ETH Zürich Competence Center World Food System, Livup, Nuvilabs, Planted, Swiss Food & Nutrition Valley, The Good Food Institute Brazil, and WFP Korea Office.



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