ScienceInSight
News and Updates on Nutrition, Food Safety, Health and Sustainability

Food Fortification
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The COVID-19 Global Pandemic
ILSI addresses the pandemic’s impact on Nutrition, Immunity and Food Security
At the start of 2020, few would have thought that this would be marked in history as the year of the Sars-Cov2 (COVID-19) coronavirus pandemic. The novel virus has affected more than 200 countries globally, and brought immense tragedy. The World Health Organisation has reported 25 million cases of infection and more than 800,000 deaths due to COVID-19 as of August 2020. The pandemic has also led to unprecedented disruptions and burden to healthcare systems and economies around the world. The unabated and relentless spread of the virus has a disproportionate impact on vulnerable and poorer populations. Food insecurity and malnutrition are of critical concern, as the pandemic is likely to continue into 2021 in many countries.

In this period of great uncertainty, the need for sound and evidence-based scientific guidance is ever more urgent. ILSI SEA Region has adapted to the new normal of digital and web-based platforms for communicating and information-sharing. We have also embarked on projects that would help generate data, provide guidance and build capacity for our stakeholders. We also believe in promoting evidence-based science to counter misinformation that may confuse and mislead. To address the importance of accurate and credible science communication, we will be organizing a series of webinars on the topic From Nutrients to Food Systems – Science and Communication, starting in October 2020.

With health, safety and nutrition being of major current concern, ILSI hosted 2 global webinars in April and May to explore the relationship between nutrients and immunity, and how nutrition may play a significant role in reducing the severity and progression of the affected patients. An ILSI global project is currently being proposed that will dwell deeper into this important but complex science topic. The impact on the food supply chain and food system resilience as a result of the pandemic were the focus of 2 COVID-19 webinars organized jointly by the ILSI Asia Entities and hosted by ILSI SEA Region in May and July. We will continue to monitor and facilitate discussion in related topics and collate data that have been identified as priorities by our stakeholders to guide informed decision-making.

In this issue of Science InSight, we also share reports of key events and activities accomplished in the second half of 2019 and early 2020, as well as activities being put forth by our Country Committees in the Philippines and in Australia. On that note, I would like to thank Ms. Christine Dowdall who retired from ILSI SEAR Australasia at the end of June after spending the past 20 years serving our Australasia Country group. We extend our welcome to Dr. Janet Gorst who now serves as the Scientific Coordinator for ILSI SEAR Australasia.

With all challenges, there will be opportunities. We are hopeful that the learnings from this pandemic will generate new science through biomedical research, knowledge and treatment. Last but not least, we want to thank all our members and scientific advisors who have lent their time and support to assist us in planning and guiding our scientific activities in this challenging time.

Keep well, stay healthy and stay safe!

Boon Yee Yeong  
Executive Director, ILSI SEA Region
Impact of COVID-19 Pandemic on Nutrition, Immunity and Food Security

The unrelenting spread of COVID-19 over the past months has affected millions around the world. Although many governments have implemented unprecedented measures through their social and public health systems to contain the pandemic and resulting fatalities, extensive damage has been inflicted on vast sectors of the industry, trade and economy of most countries. COVID-19 has had a global impact unmatched in modern times, and there remain many questions on the virus itself and how to tackle it.

To discuss some of the key public health challenges arising from the pandemic, ILSI has brought together its global scientific network to present a series of COVID-19 webinars. Through these webinars, experts on the frontlines of fighting the pandemic have been able to share the latest information, knowledge and insights on important issues including food security and resilience, health research and practices, as well as technological advancements and developments that may be harnessed to address the global pandemic.

ILSI Global COVID-19 Webinar Series

On April 28, 2020, ILSI Global organized a webinar on the Importance of Nutrition in Supporting Immune System to share recent science and the role of vitamins and minerals in relation to immune system and viral infections. Two scientific experts, Dr. Christian Marin-Muller, CEO of Speratum and National Center of Technology of Costa Rica and Dr. Simin Nikbin Meydani, Senior Scientist and Director of the Nutrition Immunology Team, Jean Mayer USDA Human Nutrition Research Center on Aging (NRCA), USA were invited to present on How Immune System Works and the Nutritional Modulation of Immune Function respectively.

A second webinar on Nutrition in Immune Response Against Viral Infection was held on May 5, 2020 where distinguished speakers, Dr. Philip Calder, Professor of Nutrition Immunology within Medicine, University of Southampton, UK discussed Nutrition and Antiviral Immunity and Dr. Adrian R. Martineau, Professor of Respiratory Infection and Immunity, Queen Mary University of London, UK shared on Vitamin D and Acute Respiratory Infections.

The webinar recordings are accessible here: https://ils.org/covid-19-webinar-recordings/
ILSI Asia COVID-19 Webinar Series

In Asia, ILSI Southeast Asia Region in collaboration with ILSI Focal Point in China, ILSI India, ILSI Japan, ILSI Korea, and ILSI Taiwan organized a COVID-19 webinar series with the inclusion of perspectives from Asia. This series is organized under 2 thematic areas: Science Frontier and Public Health, and Food System Resilience.

On May 26, 2020, the first edition of this webinar series titled Food System Resilience - Global and Asian Perspectives was attended by over 600 participants from different parts of the world. Three eminent regional speakers with global experience - Prof. Shenggen Fan, Chair Professor of China Agricultural University, China; Prof. Paul Teng, Dean and Managing Director of National Institute of Education International, Singapore; and Mr. Ping Chew, Head of Food & Agribusiness Research and Advisory, Rabobank Asia Pacific, Singapore discussed the impact of COVID-19 on the food supply chain, and longer-term consequences on the fundamentals of our food systems. During the panel discussion moderated by Mr. Geoffrey Smith, President of ILSI SEA Region, Singapore they identified the strengths and weaknesses in our food security preparedness, shared their medium and long-term perspectives, as well as future investments needed to enhance food and nutrition security.

The webinar recording is accessible here: https://ilisisea-region.org/event/covid-w1/

Following the success of the first ILSI Asia COVID-19 webinar, a second webinar on Harnessing the Potential of AI in Biomedical Science and Nutrition Research was held on June 16, 2020. Experts presenting in the webinar were Dr. Wu Fan, Deputy Dean of Shanghai Medical College, Fudan University, China, Dr. Anh Wartel, Head of Clinical Development and Regulatory Affairs, International Vaccine Institute (IVI), South Korea and Prof. Jun Kunisawa, Director of National Institutes of Biomedical Innovation, Health and Nutrition (NIBIOHN), Japan. They reviewed the response and management of the COVID-19 pandemic situation in China and South Korea, explored the vaccine development landscapes and identified knowledge gaps. The webinar further delved into the immunological functions of diets, in particular, vitamin and fatty acid, and their interaction with commensal bacteria in the establishment of immunosurveillance and homeostasis and the system of big data analysis of animal and cohort studies for the identification of complex network in the gut and health.

An interactive panel discussion moderated by Dr. Jeremy Lim, Associate Professor of Saw Swee Hock School of Public Health, National University of Singapore was followed where speakers explored how the utilization of medical and digital technology (AI) could play a role in vaccine development and shared perspectives on the variations of mortality rates and success across countries and considered determining factors for the success of pandemic management.

The webinar recording is accessible here: https://ilisisea-region.org/event/covid-w2/

Papers on the outcomes of the two above webinars will be developed and submitted for publication.
ILSI Annual Meeting 2020: A Report from Costa Rica

The International Life Sciences Institute (ILSI) held its 2020 Annual Meeting from January 17-21 in San Jose, Costa Rica. This yearly gathering provides a platform for Members, Trustees, Board of Directors, Scientific Advisors and Staff from all ILSI entities to exchange timely updates, knowledge and forge partnerships. The team from ILSI SEA Region participating in this annual meeting included President, Mr. Geoffrey Smith; Scientific Director on ILSI SEA Region Board of Directors, Prof. Christiani Jeyakumar Henry; Executive Director, Mrs. Boon Yee Yeong; Director of Scientific Programs, Ms. Pauline Chan; and Executive of Scientific Programs, Ms. Janice Lee.

ILSI MANAGEMENT TEAM AND STAFF MEETING

At the 2020 Annual Meeting, Dr. Hannia León, Executive Director of ILSI Mesoamerica officially took over the role of Chair of the ILSI Management Team, previously spearheaded by Mrs. Boon Yee Yeong, Executive Director of ILSI SEA Region. The ILSI Management Team comprises the Executive Directors of all ILSI entities, and serves to coordinate the development and implementation of policies and practices relating to fundamental global operational matters. The ILSI Management Team and staff from the ILSI entities had fruitful discussions on communication management strategies, organizational goals and governance changes.
ILSI ASIAN ENTITIES MEETING

The ILSI Asian Entities Meeting provides a wonderful opportunity for representatives from the 6 Asian entities, namely, ILSI Focal Point in China, ILSI India, ILSI Japan, ILSI Korea, ILSI SEA Region and ILSI Taiwan to gather and share their programs and accomplishments over the past year. One of the key objectives of the ILSI Asian Entities Meeting is to explore and discuss areas of common interest and collaboration on activities and research projects in Asia.

Some of the collaborative programs and research projects that are being jointly undertaken by the entities include the 2020 International Workshop for Non-Animal Approaches in Food Sector; a research project on Global Comparison of How Short-Term Blood Glucose Response to Food is Measured and Translated; and the 12th BeSeTo Meeting. ILSI SEA Region was very pleased to announce the completion of A Review of Nutrition Labelling and Nutrition and Health Claims in Asia, a joint collaboration and publication with ILSI Focal Point in China, ILSI India, ILSI Japan, ILSI Korea and ILSI Taiwan.

The productive discussions and vivid interactions among the ILSI Asian Entities resulted in an exceedingly fruitful and productive meeting.

ILSI STAKEHOLDER GATHERING

The ILSI Stakeholder Gathering commenced with opening remarks from the Co-Chairs of the ILSI Board of Trustees, Dr. Michael Doyle, University of Georgia, USA and Dr. Kerr Dow, Cargill. This was followed by presentations from Malaspina International Scholars Travel Awards (MIST) 2020 recipients who were given the unique opportunity to present their research work to the meeting attendees.

A science session on **Who is an Expert, Who Gets to Decide?** chaired by Ms. Sylvia Rowe, President of SR Strategy, USA, saw discussions on issues and questions relating to what science is acceptable or sufficient as good evidence for policy, how scientific experts should be selected, the expertise of policy panels, and the role of public-private partnership. Invited experts included Dr. Ann Yaktine, Director of the Food and Nutrition Board of the National Academies of Sciences, Engineering, and Medicine, USA, Dr. Connie Weaver, Distinguished Professor Emerita of Purdue University, USA; and Prof. Alan Boobis, Professor of Imperial College London, UK.
POSTER SESSION AT ILSI ANNUAL MEETING 2020

Each year, a Poster Session is held during the ILSI Annual Meeting to allow each ILSI Entity to showcase their work and achievements over the past year, together with research work from young scientists. It also provides a good opportunity for ILSI colleagues and attendees to network and learn about each Entity’s programs and activities, and to foster closer working relationships and collaboration among the Entities.

Colleagues from ILSI SEA Region, MIST Award recipient Dr. Dian Handayani and Ms. Kristi Saitama

MIST Award recipient Dr. Dian Handayani and her research poster

Colleagues and members from ILSI SEA Region, ILSI Focal Point in China, ILSI Taiwan

SCIENCE SYMPOSIUM

The Science Symposium at ILSI Annual Meetings is a premier gathering where renowned experts from around the world are invited to share the latest research, innovations and knowledge in emerging scientific issues that impact public health.

This year’s Science Symposium was organized by ILSI North America and sponsored by ILSI Europe, ILSI Japan, ILSI Latin America Entities, ILSI Mesoamerica, ILSI North America, ILSI SEA Region, and American Society for Nutrition (ASN). A diverse range of topics surrounding the overarching theme of Smart Eating for Health, Sustainability and Safety was covered.

Presentations by prominent experts from leading academic and research institutions, government agencies, associations and industrial organizations were based on the four thematic areas of Food Safety, Consumer Behavior, Smart Packaging, and Food Allergens.

The Science Symposium saw active exchanges of knowledge, as well as open and balanced discussions on various critical issues.

To view the presentations shared at the Science Symposium, please visit https://ilsi.org/event/2020-ilsi-annual-meeting/
Malaspina International Scholars Travel Awards 2020

The Malaspina International Scholars Travel (MIST) Award is granted to exceptional early career scientists to help foster their professional growth and development. The award is named after Dr. Alex Malaspina, ILSI’s first President.

Each year, candidates for the award are nominated by the ILSI entities, from which successful candidates are selected and invited to attend the ILSI Annual Meeting. Besides receiving their MIST Awards at the ILSI Annual Meeting, these early career scientists will have the opportunity to meet and interact with other scientists, experts from industry, academia and government, as well as ILSI staff from all over the world.

Among the 5 scientists who received MIST Award in 2020 is a promising scientist from Southeast Asia nominated by ILSI SEA Region. Dr. Dian Handayani, Ph.D. is Head of Nutrition Department, Faculty of Medicine, at Universitas Brawijaya – East Java, Indonesia. Dr. Handayani has shared some of her thoughts and perspectives on receiving the 2020 MIST Award.

ILSI SEA Region (I): Please tell us more about your research project which you had presented at the ILSI Annual Meeting.

Dian Handayani (DH): One of the research projects I presented was on combating obesity. As a nutritionist, I try to explore the possibility of functional foods, such as oyster mushroom which is high in beta-glucan content, in combating obesity. This study is on-going, and my aim is to find the underlying mechanism of beta-glucan in oyster mushroom in preventing obesity by examining microbiota analysis, satiety response, anthropometric reversal, and inflammatory marker prevention caused by obesity.

I: What spurred you to carry out this research?

DH: Indonesia is currently facing a triple burden of
nutritional problems, one of which is obesity. Obesity rates have increased significantly from 2007 to 2013, as much as 150% in men and 200% in women. This upsurge in obesity rates is also followed by a growing prevalence of diabetes among the population prevalence. Therefore, the problem of obesity needs serious attention.

I: What do you think are the critical issues regarding Type-2 Diabetes, Obesity and Metabolic Syndrome that need to be addressed in Southeast Asia?

DH: The prevalence of Type-2 diabetes in South Asia is predicted to reach 12.6% in 2045, which is higher than the global prevalence that is predicted to reach 9.5% in 2045 and will be the third-highest after North America and Caribbean, Middle East-North Africa and Western Pacific (IDF, diabetic atlas). The same can be said for obesity where the prevalence continues to increase in Southeast Asia. Public knowledge on healthy food consumption, and the causes of obesity, Type-2 diabetes and metabolic syndrome still need further nurturing. Multisectoral collaboration among researchers, government and the food industry are needed to tackle these complex issues.

I: How do you feel about achieving the Malaspina International Scholar Travel Award, and what did you gain from your experience attending the ILSI Annual Meeting?

DH: It is a wonderful experience and receiving the Malaspina award and grant is very beneficial. Attending the ILSI Annual Meeting increased my nutrition knowledge and, of course, I have made new friends. There have also been some plans being formed, such as a joined research.

I: What do you think are the roles that ILSI SEA Region can play in scientific research, and specifically in your area of research?

DH: ILSI SEA Region contributes greatly to developing greater knowledge and understanding of nutritional science in the region. It also helps to develop and expand the network of scientists, health practitioners and experts from academia and the food industry who can collaborate and work together. This can help to bring about positive progress in addressing public health concerns and improve society’s well-being in general.

I: How can ILSI SEA Region further connect with younger scientists and future leaders in the region?

DH: Different stakeholders, such as scientists and researchers, the public sector and food industry may have different perspectives on public health issues. ILSI plays an important role in bringing stakeholders together, to exchange knowledge and insights, and find to common ground in tackling the problems. ILSI offers a platform for policymakers, industry leaders, government, academia, and other sectors of society to work together and collaborate in solving health problems in the society.

I: Would you like to share some of your thoughts on other topics or areas that you are interested in?

DH: Other than the potential health benefits of functional foods, and nutrition education as one of the strategies for obesity prevention, I am interested examining how other factors such as genotype, metabolism, and microbiota, may play a role in the efficiency of food regulation in the body.

I: What would be your hopes or vision for the future of nutrition and health in your country?

DH: I hope that in Indonesia, the public can increasingly understand the important role of nutrition in preventing chronic diseases such as obesity and diabetes. I will continue to pursue Interprofessional education and conduct research that is applicable, so that the public can receive the benefit of more information and knowledge regarding obesity prevention.
Science and Regulatory Developments in Recycled Food Packaging

The increasing production and use of plastic in our daily lives cause severe environmental problems. In the context of food packaging, the approaches to reducing the demand for virgin plastic have been developed and are already applied to different extents. These strategies include reducton of packaging weight and volume, reusing of packaging, and recycling of certain polymers.

On September 26, 2019, ILSI SEA Region and its Thailand Country Committee organized a 'Seminar on Recycled Food Packaging: Scientific Advances and Regulatory Development' that was held in Bangkok, Thailand. The meeting was co-organized with the Thailand Food and Drug Administration, and in collaboration with the Food Science and Technology Association of Thailand and the Department of Science Service, Thailand.

During the two-day seminar, experts and scientists from academia, the government and industry discussed the status and challenges relating to food contact materials (FCMs); shared information on safety concerns and regulatory approach to the recycling of Polyethylene Terephthalate (PET), including migration testing for recycled PET (rPET); shared updates on FCMs regulations in the Southeast Asia region; and provided insights and experience in the use of rPET.

The meeting opened with a welcome speech by Mr. Wanchai Sitrongkhiam, Thailand Food and Drug Administration (Thai FDA) on behalf of Dr. Tares Krasanairawiwong, Secretary-General of Thai FDA.


**FCM Regulations in Thailand**

Mr. Wanchai Sritongkhiam, Thai FDA, Thailand, presented on the *Status and Challenges in Food Contact Material Regulation in Thailand*. He reported that the Thai FDA is responsible for the safety of food packaging, while the Thai Industrial Standard Institute is responsible for developing various industrial standards including FCMs standard. The Office of the Consumer Protection Board (OCPB) under the Prime Minister’s Office regulates the labeling of plastic containers, while the Department of Foreign Trade is accountable for controlling measures for the import of ceramic containers and enamelware. The Thai FDA has developed the quality standards for food packaging and three notifications are available, including Notification No. 295/2548 (2005) for Plastic Container. Under this notification, it is prohibited to use colored plastic containers to contain food, with certain exceptions. The use of plastic containers from recycled plastic is also strictly prohibited. However, the Thai FDA is in the process of revising the regulation of plastic food packaging in order to reduce the plastic waste problem.

Safety concerns of allowing the use of rPET include contaminants from post-consumer materials, the incorporation of non-regulated recycled post-consumer material into the food packaging supply chain, and the unsuitability of some adjuvants in the recycled plastics for use as FCMs. In order to address the safety concerns around rPET, Thai FDA will consider each proposed use of recycled plastic on case-by-case basis and strongly based on scientific evidence. The Thai FDA is currently developing a Guidance on Safety Assessment and Efficiency Evaluation of Plastic Recycling Process and Recycled Plastics, as well as revising regulation on Qualities or Standards of Plastic Packaging.

**FCM Regulations in SEA**

Mrs. Sumalee Tangpitayakul, Thai Packaging Association, Thailand, provided *Updates on FCM Regulations in Southeast Asia Countries*. She shared that Thailand has been assigned to be the ASEAN Food Reference Laboratory for Food Contact Materials by the ASEAN Consultative Committee on Standard and Quality (ACCSEQ) since 2014. In regard to this, Thailand has conducted a survey on food contact legislation in the ASEAN countries. The survey (2015) concluded that all ASEAN countries have their own FCM regulations, except for Cambodia, Lao PDR and Myanmar. Mrs. Tangpitayakul then shared the updates on FCM legislations in Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore and Vietnam.

**Use of Recycled PET**

Mr. Leopoldo Becerra, The Coca-Cola Company, Thailand, gave a presentation on *Experience of the Use of Recycled Polyethylene Terephthalate (rPET)*. He shared that the Europe Union (EU) has a very good framework for the regulation of recycled packaging. The EU Food Contact Framework regulation (EC) No 1935/2004 and two provisions: (EC) No 282/2008 Recycled Plastics and (EC) No 10/2011 Virgin Plastics, have provided clear guidance on the general safety requirement for
rPET with the aim of producing rPET that is free from contaminants that could endanger human health. The EU recycled plastics regulation (EC) No 282/2008 focuses on decontamination process, while the recycled plastics remain subject to (EU) No 10/2011. He added that the EFSA authority has created a flow chart on how to carry out the challenge test and how to calculate the efficiency of the decontamination process with the summation of reference contamination level. A list of surrogates is also suggested. In EU, the regulations of rPET focuses on the chemical decontamination of the PET, unlike the approach of the US FDA which has established the tertiary recycling technology (chemical processing) which involves depolymerization of post-consumer plastic to starting materials, purification and repolymerization of the starting materials to form regenerated polymer. He noted that this technology has yet to be approved by EFSA.

**Migration Testing for rPET**

**Dr. Amporn Sane**, Kasetsart University, Thailand, shared a presentation on *Migration Testing for Recycling Polyethylene Terephthalate (rPET)*. Dr. Sane said that contaminants could come from the raw materials used in the production of FCM, manufacturing process and/or during filling in the packing process. When conducting migration testing, it is ultimately important to understand the chemical structure, molecular weight, the manufacturing process and the factor of degradation of the material. The molecular weight, polarity and volatility of the migrants also greatly affect the rate of migration. The standard protocol of migration testing is well documented by the US FDA and EU. Another important factor is the diffusion coefficient of the materials. There are 4 options of surrogates: (1) polar, volatile surrogate; (2) polar, non-volatile surrogate; (3) non-polar, volatile surrogate and (4) non-polar, non-volatile surrogate. Using the US FDA as the reference, Dr. Sane explained the protocol to conduct migration testing. Other than choosing the surrogates for migration testing, the ‘cocktail effect’ (the effect occurs when there is an exposition to different chemical substances simultaneously) is also an important factor to be considered.

**Panel Discussion**

During the panel discussion, the following points were raised and discussed:

- The experts underlined that while the US FDA and the EU have different approaches, both regulatory agencies have the ultimate goal of ensuring the safe use of recycled packaging. This is important when considering to use either the US FDA approach or the EU approach as a reference.

- When conducting a migration test, there are options of surrogates that can comply with both US FDA and EU guidelines, with considerations of limitations in each step and chemicals chosen. Regarding the assessment of virgin plastics, under EU regulations virgin plastics are required to undergo non-intentionally added substances (NIAS) assessment. It was highlighted that EU recycled plastic regulation (EC) No 282/2008 requires the recycled plastic feedstock to be compliant with (EU) No 10/2011, which is the regulation for virgin plastics. In other words, the recycled plastics must be free from contaminants that could endanger human health.

- It was highlighted that Thailand is making good progress in revising the food contact materials regulations.

- The experts concluded the Panel Discussion by reiterating the importance of multiple stakeholder collaborations in revising FCM regulations, and in the development of guidance on safety assessment of the recycling plastics. They added that research institutes would welcome such collaborations.
Innovation and Sustainability in Food Packaging

Food Packaging plays an integral role in providing safe, nutritious and sustainable food supply. Advances in innovative technologies, changing consumption trends and consumer preferences have led to the development of an array of food packaging materials. However, there are growing concerns about the widespread use of non-degradable food packaging materials and their negative environmental impact. Concerted efforts are now ongoing by government, industry, and researchers to help address these concerns, and reduce the utilization and impact of such non-degradable food contact materials.

From September 24 – 25, 2019, ILSI SEA Region and its Malaysia Country Committee organized the Symposium on Scientific Development of Food Packaging: Innovation, Safety and Sustainability held in Penang, Malaysia. The meeting was co-organized with the Food Safety and Quality Division (FSQD), Ministry of Health, Malaysia; and collaborators included The School of Industrial Technologies, Universiti Sains Malaysia (USM), Nutrition Society of Malaysia (NSM) and the Malaysian Institute of Food Technology (MIFT).

The opening of the symposium was graced by the attendance of Mr. Mohd. Salim bin Haji Dulatfi, Senior Director of FSQD, as the Guest-of-Honor. At this two-day meeting, presenters, scientists and experts gathered to discuss topics related to the safety evaluation of food contact materials, provide insights on microbial control for safe food packaging and innovations, share updates on food contact materials regulations in the Asia Pacific region, and present new initiatives on sustainable food packaging.

The opening presentation was given by Prof. Cristina Nerin, University of Zaragoza, Spain, on the State of the Science on Food Packaging Technologies - Challenges and Opportunities in the Era of Technology Transformation. Prof. Nerin shared that the global food market demands the extended shelf life of packaged food, but food safety is still the priority and packaging materials have to comply with established migration limits. Risk assessment must be applied to any material, which requires the identification of any migrant, including non-intentionally added substances (NIAS). But the analytical technology for this purpose is still sophisticated and difficult to apply. Food processing also adds NIAS to the food. From the environmental point of view, conventional and non-biodegradable plastics should be removed and substituted by biodegradable, compostable or recycled materials. Prof. Nerin concluded that all these issues represent challenges, but also open up new opportunities in the era of technology transformation.
Safety Evaluation of Food Contact Materials

Dr. Vanee Komolprasert, US Food and Drug Administration (FDA), United States, presented on the Safety Evaluation of Recycled Plastics for Use in Food Packaging Applications. Dr. Komolprasert reported that FDA supports recycling of food packaging materials, but recycled food contact materials must be safe for such use. FDA has developed a Guidance for Industry to highlight the issues that manufacturers should consider during evaluation of the recycling process when producing recycled material suitable for food-contact applications. She explained the regulatory review process used to evaluate the efficacy of a recycling process in cleaning and producing recycled plastic of a purity suitable for use in food packaging applications. The possibility that chemical contaminants in plastic materials intended for recycling may remain in the recycled material, and could migrate into the food is one of the major considerations. Dr. Komolprasert also recognized that sorting of co-mingled materials from the curb-side collection system, and maintaining the consistency of physical properties and volume of recycled plastics to meet market demand and sustainability, are equally challenging. All in all, the market depends on the industry to develop new technologies to address these challenges.

Dr. Barry Fields, Food Standards Australia and New Zealand (FSANZ), Australia, presented on the Threshold of Toxicological Concern in Safety Assessment of FCMs. Dr. Fields shared that advancements in chemical analysis of food contact materials have continued to alert scientists on the increasing presence of unsuspected substances. The evaluation of these materials requires substantial toxicological data, and therefore poses challenges. The threshold of toxicological concern (TTC) approach is normally used for chemical safety assessment, when the chemical structures are known. Dr. Fields explained that when the structural alerts for genotoxicity or chemical-specific genotoxicity data indicating that the chemical has the potential to be a DNA-reactive carcinogen, TTC approach should not be used. When FSANZ had published the 24th Australian total diet study in 2016, 30 food packaging chemicals in the Australian food supply were screened using the TTC approach. The TTC concept has a long history of use by JECFA, EFSA, US FDA and FSANZ. Dr. Fields concluded that this approach is well-suited for risk assessment of FCMs because of their typically minimal exposure.

Prof. Haixia Sui, China Centre of Food Safety Risk Assessment, China focused her presentation on Risk Assessment of Phthalates in Food in Chinese Population. She shared that the purpose of PAEs (Phthalates Acid Esters) risk assessment is to assess the content of PAEs naturally occurring in food and the exposure to PAEs among the population, so as to provide scientific evidence for decision-making on relevant food safety standards. Prof. Sui added that, to address consumer concerns about the migration of PAEs from disposable plastics bags in contact with hot food, the analysis of the migration of PAEs in plastic bags is also under study. Her team had analysed a total of 19 types of PAEs in 24 types of food groups. Prof. Sui informed that, according to results of the risk assessment, there is no need to set limits for PAEs in food. However, the study on disposable plastic bags in contact with hot food is still ongoing.

Dr. Sylvain Rannou, Nestlé Quality Assurance Center, Singapore, presented on Non-Intentionally Added Substances (NIAS) in Food Packaging: Risk Assessment and Management. Dr. Rannou emphasized that the transfer of information on chemical composition along the supply chain remains difficult, as thousands of chemicals are involved, and intellectual property may be jeopardized. Non-Intentionally Added Substances (NIAS), present in the final packaging as bi-products, degradation products, impurities, etc. from any stage of the manufacturing process could be known and detectable, or unknown and potentially undetected. Their toxicity may be unknown and they may also migrate into the food. A safety-based limit (SBL) can be defined from toxicological evaluations and used as a reference for packaging testing. Testing for NIAS will also enable identification of typical NIAS present in specific packaging types and their normal levels. Higher levels of occurrence (below SBL) could highlight a failure in GMP during manufacturing. Dr. Rannou concluded that testing for NIAS provides Industry with a tool to more tightly control the safety and GMP of food packaging.
Microbial Control for Safety Food Packaging and Innovation

In her presentation on Impact of Food Packaging on the Growth of Spoilage Microorganisms and Foodborne Pathogens, Dr. Lay Ching Chai, University of Malaya, Malaysia, noted that different packaging will yield different shelf-life and final retained sensory qualities of the final product. One of her study results showed that when compared to vacuum packaging, storage of mincemeat at refrigerated temperature with modified atmosphere demonstrated significant suppression growth of Salmonella spp. However, there was the drawback that low concentration of oxygen causes the meat to change color. The study also showed that although reduced-oxygen packaging of tofu slows down the growth of Enterobacteriaceae and spoilage aerobic bacteria, reduced-oxygen packaging increases the count of lactic acid bacteria and causes a sour taste in tofu. In conclusion, understanding the interaction between processing and the microbial community in food, as well as the impact of various packaging technologies to preservation of the safety, wholesomeness and quality of food, are essential to ensure food sustainability.

Dr. Nattinee Bumbudsanpharoke, Yonsei University, Korea, presented on Nano-Food Packaging: An Overview of Market, Safety Regulations, and Migration Case Study, reported that there is insufficient data on environmental and human safety assessments of migration and exposure of nanomaterial. The debate is still ongoing among researchers about the extent of migration and whether it is negligible and safe. The conclusive legislation from government agencies is an important solution to overcome these barriers. Although the national authorities from countries such as European Food Safety Authority (EFSA) and U.S. Food and Drug Administration (US-FDA) have released safety assessment guidelines and regulations, the current protocols or framework do not fully cover all products and applications. Dr. Bumbudsanpharoke emphasized that the producer or distributor is encouraged by the government agency to show and submit adequate safety evaluation in order to obtain approval on a case-by-case basis. Therefore, more research on the physical and chemical properties, as well as migration behavior of nano-food packaging, are still required.

In his presentation titled Active and Smart Packaging: An Overview and Opportunities, Mr. Henkie Hendra Wibawa, Indonesian Packaging Association, Indonesia, described the major growth trends in food packaging materials that are closely related with active and smart packaging. He further explained the differences between active and smart packaging concepts, many of which are commercially available around the world. The advancement of electronic devices that can be made cheaply will also help to drive innovation of active and smart packaging. The use of active and smart packaging will likely increase as more technologies make their way to market, and innovative packaging using active and smart
systems will become more common place. In concluding, Mr. Wibowa shared his view that active and smart packaging will likely replace traditional packaging in the near future.

**Updates on FCM Regulations in Asia Pacific**

**Dr. Barry Fields**, FSANZ, Australia, shared a presentation on *Translating Risk Assessment Data into FCM Regulations*, noting that if there is a risk to manage, risk managers would need to gather information, consult with stakeholders, determine, analyse and evaluate the options to manage and reduce the assessed risk, as well as select and implement the options of greatest net benefit to the community and monitoring the outcome. From the regulator point of view, regulating food contaminants via established maximum levels (MLs) in food is the most effective method and forms part of the risk management process. Dr. Fields said that Industry Codes of Practice can also serve an effective risk management function. Although FSANZ has minimal regulations for FCMs, it has conducted an extensive chemical assessment on a small percentage of food contact materials. He then discussed several surveys published by FSANZ on FCMs, and a food packaging information guide that FSANZ is currently developing for the industry which will provide general information on safety issues for consumers and describe the obligations of food businesses (particularly small and medium enterprises) to use safe packaging materials.

Providing an overview of *Updates on FCM Legislation in Thailand and ASEAN*, **Ms. Sumalee Tangpitayakul**, Thai Packaging Association, Thailand, explained that the Thai Food and Drug Administration, Ministry of Public Health is responsible for the safety of food packaging whereas the Thai Industrial Standard Institute, Ministry of Industry is responsible for developing various industrial standards including food contact materials standard in Thailand. The FCMs standard covers both technical quality and safety of the product. She mentioned that Thailand has been appointed by the ASEAN Consultative Committee on Standard and Quality (ACCSQ)-PFPWG Committee to develop the ASEAN General Guidelines on Food Contact Materials, which was adopted in the 27th Session of ACCSQ-PFPWG in 2018. In addition, she also shared the current situation and future trends in food contact material requirements in Thailand, as well as FCMs legislative updates in the region. She concluded by noting that the next step for ASEAN is to work on the ASEAN Guideline on Good Manufacturing Practice (GMP) for FCMs.

**Ms. Ruhana Binti Abdul Latif**, FSQD, Ministry of Health, Malaysia, reported on *Food Contact Material Regulation in Malaysia*, saying that the Malaysia Food Regulations 1985 and Food Hygiene Regulations 2009 provide some legal requirements pertaining to the safety and labeling of FCMs including food appliance in the country. She pointed out that the absence of international standards for FCMs poses a great challenge to the government in setting national standards. Furthermore, rapid technology advancements and the complex food supply chain have made the setting of regulations even more challenging. However, she believes that the harmonization of the ASEAN Guidelines on FCMs and GMP for FCMs would be helpful. Ms. Ruhana concluded that the Malaysian Government is aware that engagement with the different stakeholders is essential, not only to the food industries and consumers, but also among the ministries of which the Ministry of Health is responsible for food safety, while the Ministry of Energy, Science, Technology, Environment and Climate Change is responsible for sustainable food packaging.

In his presentation on *Food Contact Material Regulations in China: Update, Practice and Challenges*, **Dr. Marco Zhong Huaif Ning**, National Reference Laboratory for Food Contact Material, China, said that the China government has just reconstructed the risk management system for FCMs, where the National Health Commission, State Administration for Market Regulation, and the General Administration of Customs of China are playing important roles in the enforcement of FCMs regulation, market surveillance and border control, respectively. To achieve the goal of establishing comprehensive legislation for FCM, some new regulations are being considered, developed or
reviewed, such as the Introducing the regulation of recycled food packaging. Dr. Zhong then further shared the challenges faced by the regulatory agencies, including the lack of guidelines and transparency to perform risk assessment, limitation of analytical methods, lack of specific GMP for specific materials, lack of clear guidelines for the industry to prepare documentation etc. He concluded that while remarkable progress on the FCMs legislation has already been made, the China government would still need to work on the harmonization of the regulation system.

Ms. Hiroko Niwa, Ministry of Health, Labour and Welfare (MHLW), Japan, gave a presentation on The Amendment of the Japanese Food Sanitation Act: Introduction of Positive List System for Food Packaging. Ms. Niwa shared that the MHLW has introduced a positive list (PL) system for food utensils, containers and packaging (UCP) targeting synthetic resins (SRs). The 3 main reasons for this are: firstly, SRs are extensively used in various UCP, causing solid waste problems, secondly, UCPs are included in the PL systems in many countries, and thirdly, UCPs are independently managed by a trade association in Japan. She mentioned that the amendment fosters information sharing among the UCP manufacturers, business operators and their buyers in compliance with the amendment. This amendment will take effect in June 2020. She further discussed on substances controlled by the PL systems and substances regulated by the Negative List system, as well as the risk assessment framework of existing materials.

**Sustainable Food Packaging**

Mr. Leopoldo Becerra, The Coca-Cola Company, Thailand, shared a presentation on Experience of the Use of Recycled Polyethylene Terephthalate (rPET), discussing the EU Food Contact Framework regulation (EC) No 1935/2004 and two provisions: (EC) No 282/2008 Recycled plastics and (EC) No 10/2011 Virgin plastics. Mr. Becerra said that these regulations have provided clear guidance on the general safety requirement for recycled PET, with the aim of producing recycled PET that is free from contaminants that could endanger human health. The (EC) No 282/2008 focuses on decontamination process, where the recycling process must be capable of removing any contamination from the input that could endanger human health, 95% of the plastic feedstock should have been used for contact with food as a control of contaminant levels in input material, while the recycled plastics remain subject to (EU) No 10/2011. Mr. Becerra added that the EFSA authority has created a flow chart on how to carry out the challenge test and how to calculate the efficiency of the decontamination process, a list of surrogates is also suggested. In NIAS risk assessment, data on toxicity, migration and exposure are needed. Mr. Becerra emphasized that the EU focuses on the chemical decontamination of the PET, while the US FDA has established the tertiary recycling technology, which has yet to be approved by EFSA.

In his presentation on Biodegradable Food Packaging: Trend and Technology, Dr. Hayati Samsudin, Universiti Sains Malaysia, Malaysia, shared that there have been questions on the ability of biodegradable material in surviving thermal processes, cold storage, and distribution chain environment, mainly due to its brittleness, hydrophilic nature, and low heat distortion temperature. With the growth in commercial biodegradable food packaging, and consumers who are more socially and environmentally responsible has led to the rising trend for biodegradable food packaging. Examples include biodegradable stand-up pouch for snacks and frozen food applications, biodegradable bottled water, and biodegradable plastic straws, to name a few. Dr. Samsudin concluded that the packaging industry is shifting away from the traditional linear economy model of ‘make, use, dispose’ to the circular economy model of ‘make, use, recover, repurpose/remake’ for environment sustainability.

Presenting on Sustainable Food Packaging - Innovation and Experiences in Korea, Dr. Sangwoo Cho, Pulmuone Co., Ltd., Korea, said that the Korean government has implemented the plastic recycle policy with the vision to reduce 50% of plastic waste and increase the recycling rate to 70% by 2030. He then mentioned that Pulmuone is implementing a packaging reduction in 4
directions: reduce (reduction of weight); remove (restriction of use); recycle (single substance for easy regeneration and easy separation for economic recycling); and replacement (replacing the EPS). Several examples of innovative sustainable food packaging that are available in the market were shared. Dr. Cho concluded that the company has made remarkable progress in developing and applying innovative packaging methods to enhance the freshness of foods and to ensure the safety of their consumers.

**Panel Discussions**

After the plenary sessions, panel discussions among the presenters and audience highlighted some interesting points:

- With rapid advancements in food packaging technology, the experts highlighted that the trend in food packaging is moving towards more personalisation. Digitalized packaging is also helping to make packaging that face stringent requirements safer, more convenient, and more affordable and safer. Thus, the food packing industry is moving forward to align with emerging technologies.

- In the area of analytical testing, there is a shortage of laboratories in the region with established protocols and standards on FCM. Ms. Ruhana mentioned that FSSQD Malaysia is currently working with the Standard and Industrial Research Institute of Malaysia (SIRIM) to develop a laboratory for migration analyses. Upon the gazettement of the new FCM regulations, FSSQD would then evaluate the capability of SIRIM in conducting migration testing.

- In many countries, oxo-biodegradable plastics have been banned as questions have been raised on the suitability of oxo-biodegradable plastic for use as food packaging. Thailand is in the planning stage of prohibiting the use of oxo-biodegradable plastics. In addition, concern on how many times PET can be recycled was also raised. Safety assessment has showed that the current recycling technology is capable of removing contaminants and making sure it is safe for use. However, the physical properties of the PET changes over a number of times of recycling and this may affect the performance of the PET bottles.

**Conclusion**

Food packaging is indeed an important component in the circular economy, and recycling of food packages is just one of the many complimentary tools to reduce solid waste. However, the supply chain for food and food contact materials are undeniably complex and involves multiple stakeholders. Therefore, the collaboration of multiple stakeholders is required in order to achieve the goal of developing food packaging that is safe and sustainable.
Science and Regulatory Updates on Food Agriculture Technologies

Advancements in current and emerging food agriculture technologies include new plant breeding techniques, such as stacked biotech products, genome editing, and their potential adoption. These scientific advancements have an impact on food production and food supply chains, as well as the development of regulatory frameworks. To increase scientific knowledge and promote better understanding of these scientific advancements among key stakeholders and regulatory authorities, a series of seminars was organized in Malaysia and Singapore on August 21, 2019 and August 23, 2019, respectively. These meetings were co-organized by the US Department of Agriculture Foreign Agricultural Service and ILSI SEA Region, in collaboration with CropLife Asia, the Department of Biosafety in Malaysia, and the Genetic Modification Advisory Committee (GMAC) in Singapore.

Seminar in Malaysia

Scientific Approaches and Regulatory Development: Environmental Risk Assessment and Genome Editing

Prof. Dr. Wayne Allen Parrott, University of Georgia, USA, was invited to speak on the topic of Environmental Risk Assessment (ERA) for Genetically Modified (GM) Crops. He began his presentation by explaining the risk analysis framework and defined the concepts of “risk” and “hazard”. Prof. Parrott noted that robust protocols exist for risk assessment framework which can be used for ERA of GM crops. Risk (if any) may arise from the trait engineered into a crop. At the same time, there is a legal framework that has identified items such as endangered species, iconic species, biodiversity, agriculture, etc., that are worthy of legal protection. Any such item is termed an object of protection. The premise is then that a trait added to the crop could pose a threat to the object of protection. This risk is what is measured in an ERA, and the results are then used to determine if the risk (if any), is acceptable, manageable or unacceptable.

Problem formulation is the first step in ERA. The problem defines biological and environmental characteristics that determine if the new threat could endanger the object of protection. Items evaluated include gene expression patterns, the reception of the receiving environment and the biology of the crops. This information is used to identify possible threats to the object of protection, such as increased weediness, impact on ecological
functions, and harming of beneficial insects. The presence of a potentially harmful trait is not automatically a risk. A series of events must happen in order to link the crop trait to an object of protection. For instance, they must be in the same location at the same time. This set of events is known as the path to harm, and each step should be amenable to hypothesis-based testing.

Once the level of exposure is factored in, the likelihood of harm occurring to the object of protection can be estimated as ranging from very low to very high. Likewise, the consequences to the object of protection can range from marginal to major. Together, likelihood and consequence can be used to estimate risk, ranging from negligible to high. Once the risk is identified, it is possible to determine if the risk is acceptable, can be mitigated, or is simply unacceptable. This is the risk management stage. While risk assessment is a scientific process, other considerations, such as socioeconomic factors, can be factored into risk management. The result is a decision to approve the new trait, approve it with conditions, or deny the approval. Regardless, a risk communication component is essential to inform risk perception.

Dr. Rajumati Bhula, Office of Gene Technology Regulator (OGTR), presented on the Regulatory Perspectives on the Development of Crops Derived from Genome Editing. She began her presentation by providing legal definitions of Genetically Modified Organisms (GMO) and GM. Gene technology is defined as any technology for the modification of genes or genetic materials. However, there could be a potential issue with regards to genome editing as it could involve no introduction of new foreign material, or the introduction of foreign material but not necessarily from another species. These crops are considered as non-GM crops. Mutagenesis is not regulated under the Gene Technology Act 2000.

Several genome editing technologies have been used since 2014, such as targeted mutagenesis, oligo-directed mutagenesis, cisgenesis, intragenesis, etc. Dr. Bhula noted that there is currently no clarity in methodology from the researchers to the regulators. The gene-editing complexes, termed site-directed nucleases (SDN), cut plants’ DNA at targeted site to produce double-stranded breaks. There are three options that may be used for changing the host’s DNA: 1) SDN-1 (allow the cell to repair itself so that a small point mutation is made in the native gene), 2) SDN-2 (add in an engineered DNA template along with SDNs to the cells can use this template to copy insertions or deletions into the target site), and 3) SDN-3 (provide a brand new gene template for copying into the targeted site). However, there is a possibility of removing the gene-editing machinery through conventional genetic “backcrossing” to non-edited. With this approach, SDN-1 gene-edited crops tend to look similar to crops mutated by older methods. Therefore, no trace of foreign DNA can be detected.

Next, Dr. Bhula gave an overview of the Australian Gene Technology Scheme which includes the regulatory interfaces and their stakeholder complexes. The OGTR has just completed the 3rd review of the Gene
Technology Scheme, and priorities have been agreed by the Ministers. During this review, two public consultations were conducted and up to 1190 total submissions were received. Technical review of regulations suggested to exclude organisms developed using SDN-1 techniques only; RNAi is not gene technology, provided the RNA cannot give rise to changes to genomic sequence and cannot be translated into proteins; and require a license for all contained dealings with gene drive GMOs. She added that the OGTR had conducted a public perception survey on gene technology regulations, and results showed that respondents with less knowledge of gene technology were less likely to support such technology. Furthermore, it was found that this group of respondents either supported or rejected GM foods based on a “vague awareness” of what they have heard or read about gene technology.

Dr. Mahelechumy Anujanan, the Executive Director of Malaysian Biotechnology Information Centre (MABIC) chaired the panel discussion in Malaysia. A question on “when” the researchers/scientists should consult with the regulator was raised. Prof. Parrott suggested that researchers/scientists should consult with the regulator when they start developing new products, enabling the regulator to inform on the type of data required. Once the data required is collated, approval from the respective regulatory agencies may be sought. A question was raised on whether RNAi technology is regulated in Australia, and Dr. Bhula explained that it is not regulated in Australia. This is because RNAi is mostly applied in pesticides and does not involve direct incorporation of foreign genetic materials to crops. Thus, it is not regulated under gene technology, but regulated as pesticides. Apart from that, the National Gene Technology Scheme review suggests that priorities include looking into the definition of gene technology and GMO, human gene therapy, as well as GMOs released into the broader environment and gene drive organisms.

**Seminar in Singapore**

**Scientific Approaches and Regulatory Development: Stacked Traits and Genome Editing**

Prof. Dr. Wayne Allen Parrott presented on *Safety Assessment for Stacked Traits: Review Process and Data Requirements for Regulatory Approval*. He pointed out that “stacked traits” usually refer to two or more transgenes brought together in the same crop by crossing individual transgenes. The concern is that the transgenes will interact with each other to result in a new hazard. The argument that multiple transgenes can destabilize a genome was also common at one time, but some jurisdictions no longer consider that it poses a measurable risk. Regardless, conventional plant breeding sets the baseline from which to evaluate potential transgene interactions. Plant breeders have spent the past decades replacing unfavorable alleles with favorable ones. Information coming in from genome-sequencing projects is revealing that breeders are also bringing in new genes as well. These gene introgressions, as they are called, set up interactions among each other, but without a knowledge of the genes themselves, it is not possible to study them. Yet, plant breeding is remarkably safe. In contrast, transgenes are well-characterized, making it possible to study their interactions if they occur. A set of guiding questions can determine if interactions are possible and if they merit a safety assessment. Prof. Parrott highlighted that the mere presence of an interaction is not a hazard, but if a potential adverse effect can be identified, a targeted, hypothesis-driven food and feed safety assessment of the stack should be performed. Otherwise, the safety assessments performed on the original transgenes suffices. He concluded that the biology of the genes
and experiences to date indicate that stacking of most transgenes is as safe as stacking traits in conventional breeding. Only rare combinations of transgenes will require an additional safety assessment.

Prof. Dr. Hiroaki Kodama, Chiba University, Japan presented on the topic of **Japanese Registration for Breeding Stacks**. He said that in Japan, the potential adverse effects of stacked GM traits for food safety are evaluated based on 1) direct interaction between the transgenic proteins and 2) indirect interaction between transgenic proteins. The potential adverse risk of indirect interactions is that plant metabolites are converted into unintended substances by sequential reactions with transgenic proteins. For systematic assessment of GM stack varieties, single GM events are classified into three categories. Category I (Cat. I) comprises events that do not interact with plant metabolism. Insect resistance, herbicide tolerance, etc. are included in Cat. I. Category II (Cat. II) comprises events that modify plant metabolism. High oleic acid soybean is included in this category. Category III (Cat. III) comprises events that produce totally new substances from plant metabolites. At present, there are no Cat. III events. The current regulations for breeding GM stacks are as follows: (1) stack varieties for Cat. I x Cat. I can be commercialized after notifying the government; (2) stack varieties for Cat. I x Cat. II are assessed for their safety by a simplified process, and (3) the food safety of other combinations of categories will be evaluated by full assessment.

**Dr. Rajumati Bhula’s** presentation in Singapore was similar to her presentation in Malaysia. An interesting discussion was held during the **panel discussion**, where several questions with regards to Japanese regulations on stacks and gene editing were raised. The current regulation on product-based gene editing in Japan is still under the process of receiving public comments. All comments were categorized and replied based on scientific data. There were also questions raised concerning public or risk perception. Dr. Bhula shared that the public perception survey results show that only 10% of the respondents completely opposed GMOs, while 10% of the respondents completely supported GMOs. She further mentioned that the public is moving towards acceptance of technology advancements. Apart from that, there is no surveillance for stacks in the US and Australia as the detection method is a pre-requisite for exporting to these two countries. In Japan, there is a specific department handling sampling and detection of stacks in imported products.

A survey on potential topics of discussion for the coming years was carried out. In Malaysia, topics of concern included new technologies, risk assessment and management, public awareness of GM crops, GM labeling, as well as case studies. In Singapore, stakeholders responded that they are keen on topics such as risk analysis, and ERA for GMOs.
Current Challenges and Future Strategies for Food Fortification in Southeast Asia

While there has been increased commitment towards fortification interventions in Southeast Asia over the last few decades, effective implementation and long-term sustainability were often hampered by technical, regulatory and economic challenges. As Southeast Asia continues to tackle the double burden of malnutrition, it is imperative to review the role, effectiveness and strategies of food fortification to ensure effective progress towards reducing or eliminating micronutrient deficiencies.


The seminar provided key updates on micronutrient intake deficiency, regulatory status, and the effectiveness of food fortification programs in eliminating micronutrient deficiencies in Southeast Asia. Country experiences and industry perspectives on effective delivery of fortified food were shared. At the end of the seminar, a roundtable discussion identified key issues and explored practical strategies to overcome barriers to food fortification.

**Issues and Strategies**

The seminar commenced with Dr. Regina Moench-Pfanner, ibn360, with her presentation on *Revisiting Food Fortification Agenda in an Evolving Micronutrient Landscape of ASEAN*. She noted that despite significant economic growth and reduction in poverty, ASEAN countries continue to face the issue of double burden of malnutrition. She presented various evidence illustrating the effectiveness of food fortification in addressing micronutrient deficiency and highlighted the importance of regulatory monitoring and surveillance of food fortification programs to ensure effective implementation. On the other hand, she also recognized the challenges in implementation and enforcement where critical areas need to be addressed, including poor compliance with mandatory food fortification legislation and regulatory monitoring, inequity in access to fortified foods, and evidence gaps on the nutrient intake and status.
Dr. Moench-Pfanner emphasized the need to justify the cost-effectiveness of food fortification as a health investment. She concluded that increased political commitment and multi-stakeholder partnerships will be critical to the future success of food fortification. She also shared her hopes that food fortification could be accepted as a complementary public health strategy to reduce micronutrient deficiency and improve the overall nutritional status in the region.

Assoc. Prof. Pattanee Winichagoon, Institute of Nutrition, Mahidol University, Thailand shared the findings of the Multi-Criteria Mapping of Stakeholders’ Views on Strategies to Reduce Micronutrient Deficiencies among Women and Children in SEA: The Smiling Project. She pointed out that increased price, regulatory control, compliance challenges and product acceptability were the key concerns in implementing food fortification. Assoc. Prof. Winichagoon concluded that the stakeholders preferred interventions that were already implemented or familiar, as opposed to interventions that are new, or yield high uncertainty or low performance. She underlined the importance of understanding stakeholders’ perspectives to identify potential bottlenecks, gaps or concerns that need to be addressed in the implementation of the specific interventions.

Ms. Dora Panagides, Landell Mills, Myanmar spoke on the Key Considerations in Micronutrient Fortification Process: From Design to Implementation. She noted that although food fortification programs have been proven effective in reducing diseases relating to micronutrient deficiencies in low and middle-income countries, there has been a lack of understanding on the importance of food fortification, political commitment, resources for assessment and data for decision-making. The implementation of food fortification has also been met with challenges in setting appropriate standards with multiple micronutrient interventions, access to fortified food among certain population groups, cost and demand. In face of these challenges, she elaborated on several key issues for consideration for a successful design and implementation of food fortification program such as the likelihood to contribute to reduction in micronutrient deficiencies, demonstrating cost effectiveness to key stakeholders, consumer acceptability and multi-stakeholder willingness. A regular assessment of the micronutrient deficiency situation and review of fortification regulations based on the latest current evidence and data as well as taking into account the context and implementation factors are essential when assessing program sustainability and impact.

Navigating the Global Fortification Data Exchange (GFDx) website, Ms. Becky Tsang, GFDx, USA in her presentation GFDx: An Analysis and Visualization Tool for Industrial Fortification, demonstrated how an open-access database that provides readily available information can be used for decision-making at country, regional and global levels. Information concerning indicators including legislation status, fortification standards, coverage, availability of food and protocols for regulatory monitoring could be found on five fortified foods, namely, wheat flour, maize flour, rice, salt and oil. She shared that there is potential to incorporate other types of food in the future, and hopes that GFDx can be a helpful source for policymakers when making informed decisions on improving the quality of national fortification programs.

In his presentation on Unlocking the Potential and Synergy of Biofortification with Micronutrient Interventions, Mr. Steve Orr, HarvestPlus, Vietnam explained the importance and role of biofortification in reducing micronutrient deficiencies. Differing from genetic engineering and conventional fortification, it is able to improve micronutrient levels in crops through conventional plant breeding to ensure high consumer acceptability. While biofortification offers a sustainable and cost-effective solution for the hardiest to reach and low-income populations, it should not be considered as a panacea but a complement to other nutrition strategies to combat micronutrient deficiencies.

SEA Country Experiences: Current Challenges and Future Priorities for Fortification was presented by Dr. Siti Muslimatun, ILSI SEA Region Indonesia
Country Committee, Indonesia. Based on the country survey gathered from Lao PDR, Philippines, Thailand and Indonesia, she noted that inconsistent and limited national data on micronutrient intake and status remain a key gap among the four Southeast Asian countries. Key issues and challenges in fortification implementation varied in each country, with weak regulatory monitoring, limited funding and capacity, and lack of communication on the importance of fortified food being identified as the common barriers to successful implementation. Moving forward, Lao PDR aims to review fortification standards and look into opportunities to fortify other foods to improve other micronutrient deficiencies, considering the successful implementation of mandatory salt iodization. The Philippines, Thailand and Indonesia hope to strengthen regulatory monitoring and laboratory testing of fortified foods, improve multisectoral coordination and communication across multiple sectors to help improve and sustain national fortification programs to achieve public health objectives.

**Regulatory Updates**

Ms. Bui Hoang Anh, Vietnam Food Administration, Vietnam provided *Updates of Vietnam Regulatory Status of Micronutrient Fortification* where an overview of the legislation relating to the addition of essential nutrients to foods was shared. She elaborated on Decree No.09/2016/ND-CP which stipulated the compulsory provisions on food fortification with specific micronutrients, including iodine in salt, iron and zinc in flour, and Vitamin A in vegetable oil, and ensuring the use of iodized salt, flour fortified with iron and zinc in food processing. This decree aligns with the international recommendations for a highly effective and low-cost strategy to help in the prevention and control of micronutrient deficiencies and to demonstrate the Government’s commitment to improving public health. Permitted levels and form of micronutrients, as well as penalties for violation on food fortification, were also shared. At present, regulatory monitoring is ongoing to ensure organizations or individuals engaged in manufacture, trade and import of micronutrients comply with Decree No.09/2016/ND-CP.

The next presentation was delivered by Ms. Pauline Chan, ILSI SEA Region, Singapore who gave an overview of *Updates of SEA Regulatory Status of Micronutrient Fortification*. She shared that most Southeast Asian countries have both voluntary and mandatory fortification regulations, focusing mainly on staple foods and condiments which allow a greater proportion of the population to benefit from food fortification. While Singapore and Brunei only have voluntary fortification regulations, they provide regulatory limits for permitted fortificants. Food manufacturers are also permitted to use nutrient content claims if the amount of a micronutrient meets the stipulated criteria. Ms. Chan concluded by identifying variations in the maximum and minimum limits set for each fortificant in different food categories as an opportunity for potential harmonization in the region. Recognizing its substantial challenge due to differences in food consumption patterns and status of micronutrient deficiencies in Southeast Asia, she suggested to discuss and explore common requirements and criteria of selected micronutrients as a starting base for future harmonization.

**Experiences and Perspectives**

Dr. Tran Thuy Nga, National Institute of Nutrition, Vietnam shared *Vietnam’s Experience: Current Challenges and Future Priorities for Fortification*. She noted that although Vietnam has achieved a remarkable reduction in the prevalence of anemia, iodine and vitamin A deficiencies, micronutrient deficiencies remain a public health problem in the country. This could be due to unsustainable micronutrient interventions, inadequate knowledge and practice on micronutrient deficiency prevention, government budget constraints and lack of financial support from international organizations. Although Decree No.09/2016/ND-CP for food fortification was implemented to address iodine, iron, zinc and vitamin A deficiencies, strong and continuous commitment from both the government and the community is required to achieve effective implementation.

Dr. Nga said that, moving forward, Vietnam aims to develop and strengthen platforms for
collaboration between the government and food processing enterprises as well as organizations responsible for intervention programs. Communications on micronutrient deficiencies need to be increased, and awareness on the importance of micronutrients need to be raised in order to increase consumers’ demand for fortified foods. Prevention activities for other micronutrient deficiencies such as vitamin D, calcium, and folate also need to be prioritized if the National Nutrition Survey shows any relevant evidence.

**Mr. Geoffrey Smith**, Essential Micronutrient Foundation, Singapore highlighted in his presentation on *Beyond the ‘Big Five’: Micronutrients of Emerging Interest for Public Health and Strategic Considerations* that recent studies have shown strong evidence of vitamin D deficiency in most Southeast Asian countries, despite exposure to regular sunlight. Given the importance of vitamin D for bone health and formation, he recommended taking appropriate actions to address the deficiencies such as fortifying edible oil with vitamin D as a viable consideration due to the challenge of seeking good dietary sources of vitamin D that are widely available and affordable in the Southeast Asia region. He concluded that greater research efforts need to be undertaken in potential areas such as non-skeletal functions of vitamin D, vitamin K, especially vitamin K2-menagquinone, interactions among fat-soluble vitamins A, D and K and the efficiency of calcium incorporation into bone formation in the context of Southeast Asia region.

**Ms. Nguyen Thi Phuong Trang**, Unilever Vietnam and Ms. Wei Tang, Unilever China shared on *Industry Perspective: Opportunities and Challenges in Fortification*. As part of Unilever’s sustainable living plan to improve the health and nutrition of consumers, food fortification is adopted as one of the key approaches to sustainable nutrition and to address malnutrition. Using the systematic review outcomes on the consumption patterns of bouillon cubes, seasonings and condiments in Asia, a scenario analysis of fortifying these food vehicles with iodine and iron on micronutrient intake showed that using iodized salt and adding iron to bouillon cubes, seasonings and condiments can help to increase the intake of iron and iodine, providing approximately 33% of the RDA in Asian countries. While the study outcome was promising, current barriers faced by the industry regarding technological challenges, additional or unnecessary costs of fortificants, and disharmonized regulations for fortified products among neighboring countries, as well as food consumption data gaps need to be addressed in order to achieve successful implementation of fortification programs. Ensuring appropriate consumer communication and education, such as providing consumer-friendly information on the fortified product, was also recommended to raise consumer awareness of the need for fortified products.

**Case Studies**

**Dr. Fabian Rohner**, Groundwork, Switzerland spoke on *Iodine Deficiency: Epidemiology, Consequences and Reduction Strategies*. He pointed out that while most severe forms of iodine deficiency occurred in mountainous areas, with goitres being highly prevalent prior to the implementation of salt iodization programs, milder forms of iodine deficiency had borne negative consequences on physical and cognitive development in less prone areas in large parts of the world. Using a few case studies from different countries such as Cambodia and Uzbekistan, Dr. Rohner demonstrated variations in the iodine status of different population groups and in different geographic regions within a country. Recognizing the success of salt iodization in reducing iodine deficiencies over the past decades, he emphasized the importance of channelling focus towards enhancing commitment to enforcement and monitoring, not only in table salt but also salt in processed foods and providing a more comprehensive and inclusive legal framework to address the changing dietary pattern in the region, thereby ensuring the sustainability of salt iodization programs.
Bringing the focus to **Iodine Fortification of Salt and Seasoning Sauces in Thailand.** Prof. Visith Chavasit, Institute of Nutrition, Mahidol University (INMU) discussed the technical challenges encountered in production, process and quality control prior to the adoption of Universal Salt Iodization (USI) strategy, which specified an iodine level of 20-40ppm iodine in iodized salt and use of iodized salt as the raw material for the manufacturing of fish sauce and soy sauce in the country. To overcome technical complications while ensuring the production process is economically feasible, Thailand FDA and INMU jointly developed operation-friendly and affordable machinery for small and medium scale salt producers. For the iodization of fish and soy sauces, the industry is permitted to fortify their finished products instead of using iodized salt for fermentation. In-line quality assurance is encouraged for salt and sauce producers considering the high cost and lack of technical support for quality control of finished products. He highlighted the importance of localizing and modifying fortification processes based on sound scientific knowledge to ensure practicality, whilst ensuring fortificant levels verified with standard analytical methods fall within the acceptable range.

**Dr. Kyly Whitfield,** Mount Saint Vincent University, Canada spoke on **Thiamine and Riboflavin as Key Candidates for Fortification in Southeast Asia: A Case from Cambodia.** She noted that unlike other micronutrients, thiamine is a suitable fortificant of choice in Cambodia because there are no technological, sensory or safety issues when added to a single food vehicle. From her research findings, she demonstrated the potential of thiamine-fortified fish sauce in preventing infantile beriberi in Cambodian women undergoing pregnancy and early lactation from a randomized clinical trial. Dr. Whitfield also presented an ongoing dose-response study which aims to formulate a thiamine-fortified salt for future use in Cambodia. The research will continue to look into the impact of various doses of maternal thiamine on markers of infant cognitive development and the dose of thiamine required by lactating women to achieve optimized thiamine concentrations in their milk. She concluded by calling for greater attention to the two micronutrients given the recent evidence showing the negative effect of sub-clinical thiamine deficiency in early life on cognitive development and function, and the low riboflavin status in Cambodia and Malaysia and its role in anemia.

**Dr. Yukiko Nakanishi,** ILSI Japan Center for Health Promotion, Japan presented her research study on the **Introduction of Fortified Rice into the Canteen for Cambodian Female Workers** with the objective of improving productivity and micronutrient status among Cambodian women. Multi-micronutrients-fortified rice (MMFR) containing appropriate levels of folic acid, zinc and vitamin B1 based on WHO-WFP-DSM recommendation, as well as nutrition education sessions, were provided to the reproductive-aged female workers. The 12-week double-blinded randomized trial found that the introduction of fortified rice resulted in an increase of serum folate concentration in proportion to the frequency of intake of fortified rice in the intervention, suggesting that rice fortification may contribute to a reduced risk of neural tube closure failure in neonates. An increase in absolute and relative presenteeism score in the fortified group may also contribute to better productivity. Dr. Nakanishi shared that a scale-up project of the fortified rice introduction into the workplace in Cambodia will be entering into the second phase, and the current research will be submitted to the international scientific journal for publication.

The last presentation on **Flour and Rice Fortification in Indonesia** was given by Dr. Siti Muslimatun, ILSI SEA Region Indonesia Country Committee, Indonesia who presented on behalf of Dr. Yuni Zahrani, Ministry of Health Indonesia. She highlighted that the country is currently experiencing a triple burden of malnutrition, with an alarming rate of almost 50% of the pregnant women being anemic due to iron deficiency. While salt, flour and palm oil fortification regulations have been introduced in the country, there remain challenges in technology and producer’s capacity, regulation implementation, monitoring and evaluation, and availability of domestic fortificant.

Dr. Muslimatun further elaborated on the progress of rice fortification development in the country. She
revealed that the acceptance study on fortified rice had been well received and the impact evaluation study led to a reduction of anemia by 50% in pre-schooler and about 30% in reproductive women. Given the positive outcomes, efforts to increase domestic premix production capacity have been made. She added that premium rice “FORTIVIT” was recently launched in September 2019 by the Indonesian Bureau of Logistics and is currently sold on e-commerce. Non-premium fortified rice which will also be developed to target the underprivileged people through non-cash food aid.

**Conclusion**

This seminar had helped to:

- Share experiences and perspectives on effectiveness, challenges, and potential strategies to chart effective and sustainable food fortification programs in Southeast Asia.

- Identify critical areas for improvement in relation to regulation, monitoring and enforcement of food fortification programs

- Highlight challenges in ensuring effective coverage and equity in access to fortified foods in some Southeast Asian countries, Challenges that have impeded the progress and effectiveness of food fortification programs included limited funding and capacity, and a lack of multi-sectoral coordination and communication.

- Synthesize broad-reaching recommendations to address identified challenges and barriers, such as increasing government commitment and multi-stakeholder collaboration with well-aligned objectives.
### Meetings

#### ILSI SEA Region Annual Meeting
**ILSI SEA Region Annual Meeting 2020**
- **Completed**
  - April 21, 2020
  - Singapore

#### Food and Nutrients in Health and Disease (FNHD) Science Cluster
**ILSI Asian Entities COVID-19 Webinar Series: Harnessing the Potential of AI in Biomedical Science and Nutrition Research**
- **In collaboration with ILSI Asian Entities**
- **Recording available on ILSI YouTube channel**
- **Completed**
  - June 16, 2020
  - 10.00am-11.45am (GMT+8)

**Webinar on The 3 S’s Subjects of Interest: Salt, Sugar & Sleep (A series of 4 webinars)**
- **Organized by ILSI SEA Region Philippine CC**
- **Completed**
  - June 23, 2020
  - August 18, 2020
  - 1.30pm-3.00pm (GMT+8)

**Upcoming**
- September 15, 2020
- TBC
- 1.30pm-3.00pm (GMT+8)

#### Science Symposium Webinar: From Nutrients to Food Systems – Science & Communication
- **October 2020**

#### Mini Symposium on Sweetness and Carbohydrates
- **4th Quarter 2020**
- **Singapore**

#### Regional Symposium on Physical Activity, Nutrition & Health Impact
- **2nd/3rd Quarter 2021**
- **Venue (TBC)**

#### Seminar on Nutrition and Aging
- **Co-organized by ILSI SEA Region Malaysia CC**
- **TBC**
- **Kuala Lumpur, Malaysia**

#### Technical Committee on Maternal, Infant and Young Child Nutrition (MIYCN)
**Expert Working Group & Workshop on Nutrition Assessment and Micronutrient Surveillance**
- **TBC**

#### Nutrition and Food Guidance for Public Health (NFGPH) Science Cluster
**Science Symposium Webinar: From Nutrients to Food Systems – Science & Communication**
- **October 2020**

**Webinar on Updates on Amendments to Malaysian Food Regulations on Nutrition Labelling and Claims**
- **Organized with ILSI SEA Region Malaysia CC**
- **October 2020**

**2nd Workshop on Front-of-Pack in Indonesia**
- **Organized by ILSI SEA Region Indonesia CC**
- **4th Quarter 2020**
- **Indonesia**

**Workshop on Nutrition Labeling in Vietnam**
- **Co-organized with Vietnam CC**
- **2nd Quarter 2021**
- **Vietnam**

**11th Seminar and Workshop on Nutrition Labeling, Claims and Communication Strategies**
- **Proposed 2021**
- **Kuala Lumpur, Malaysia**

**Symposium on the Science of Sweetness**
- **Proposed 2021**
- **Venue (TBC)**
### Food Safety and Risk Assessment (FSRA) Science Cluster

<table>
<thead>
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<tr>
<td>- Recording available on ILSI YouTube channel</td>
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<tr>
<td>ILSI Asian Entities COVID-19 Webinar Series: Food System Resilience &amp; Sustainability - Impact, Learnings &amp; the Future Post-COVID-19 Pandemic Part 2 (In collaboration with SFS Cluster) - In collaboration with ILSI Asian Entities</td>
<td>July 30, 2020 2.00pm-3.45pm (GMT+8)</td>
</tr>
<tr>
<td>Seminar and Workshop on Capacity Building for ASEAN National and Appointed Analytical Laboratories - Discussion with ASEAN Food Testing Laboratories Committee (AFTLC)</td>
<td>June 10, 2020</td>
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<tr>
<td>Seminar on Low and Non-Caloric Sweeteners - Organized by ILSI SEA Region Indonesia CC</td>
<td>TBC</td>
</tr>
<tr>
<td>Virtual Conference on Whole Genome Sequencing - Organized by ILSI SEA Region Australasia CO, New Zealand Food Safety Science &amp; Research Centre and Australian Institute of Food Science &amp; Technology</td>
<td>October 28-29, 2020 12.30pm-2.45pm (GMT+10)</td>
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<tr>
<td>Seminar on Food Additives (A Closer Look at Flavors)</td>
<td>November/December 2020 Hanoi, Vietnam</td>
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<tr>
<td>Genotoxicity and Nanotoxicity Conference in Food - Organized by SFA and in collaboration with A*STAR</td>
<td>March 1-2, 2021 Singapore</td>
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### Sustainable Food Systems (SFS) Science Cluster

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<td>July 30, 2020 2.00pm-3.45pm (GMT+8)</td>
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### Other Meetings with Presentations by ILSI SEA Region or Supported Speakers by ILSI SEA Region, and Other Related Meetings

<table>
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<tr>
<td>Presentation on The Application of the Mycotoxin Mitigation Guidance at an ASEAN Level In Coffee Production - A Case Study for Plenary Session: Europe Meets Asia - The SEA Region Perspective on The Practical Guidance to Mitigation of Mycotoxins during Food Processing @ World Mycotoxin Forum: Mycotoxin meets Asia - Plenary session supported by ILSI Europe’s Task Force Process-Related Compounds and Natural Toxins and ILSI SEA Region</td>
<td>January 13-15, 2020 Bangkok, Thailand</td>
</tr>
<tr>
<td>2020 ILSI Annual Meeting &amp; Science Symposium</td>
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<tr>
<td>ILSI COVID-19 Webinar Series: Importance of Nutrition in Supporting Immune System - In collaboration with ILSI Global and ILSI Entities - Recording available on ILSI YouTube channel</td>
<td>April 28, 2020 8am-9.30am ET, USA</td>
</tr>
<tr>
<td>ILSI COVID-19 Webinar Series: Nutrition in Immune Response Against Viral Infection - In collaboration with ILSI Global and ILSI Entities - Recording available on ILSI YouTube channel</td>
<td>May 5, 2020 8.00am-9.30am ET, USA</td>
</tr>
</tbody>
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## Research, Meeting Reports, and Collaborative Projects

### Food and Nutrients in Health and Disease Science Cluster

- **Global Comparison of How Short-term Blood Glucose Response to Food is Measured and Translated**  
  Co-lead with ILSI North America  
  Manuscript submitted to Advances in Nutrition

- **Review on Physical Activity in Southeast Asia - Methodologies and Intervention Studies**  
  In collaboration with National Institute of Education (NIE), National Technological University, Singapore  
  To be initiated

- **Survey on Physical Activity Assessment, Status, Data and Programs**  
  To be initiated

- **Patterns of Sodium Intake and Sources of Sodium Among Filipinos Aged 19 to 50 Years: Findings from the 2008 National Nutrition Survey**  
  In collaboration with the Food and Nutrition Research Institute (FNRI), Philippines  
  Journal review completed; paper under revision

- **Data Analysis: Levels and Sources of Sugar Intake in the Philippines**  
  In collaboration with the Food and Nutrition Research Institute (FNRI), Philippines  
  Paper prepared and under revision

### Technical Committee on Maternal, Infant and Young Child Nutrition

- **Levels and Sources of Protein, Omega-3 Fatty Acid, and Related Micronutrient Intake Among Malaysian Children Aged 6 to 23 Months in an Urban Area**  
  In collaboration with International Medical University, Malaysia  
  On-going analysis

- **Prevalence, Risk Factors, and Actions to Address Gestational Diabetes in Selected Southeast Asian Countries**  
  Revised manuscript submitted to European Journal of Clinical Nutrition

- **A Scoping Review on Maternal Nutrition Status on Maternal Health and Birth Outcome in Malaysia**  
  In collaboration with Universiti Sains Malaysia  
  Finalizing paper

- **Vitamin D Status and its Correlates among Pregnant Thai Adolescents**  
  In collaboration with Mahidol University, Thailand (original study)  
  Completed; to be submitted for publication

- **A Review of the Situation and Factors Affecting the Nutritional Status of Filipino Pregnant Women**  
  In collaboration with the Institute of Human Nutrition and Food, College of Human Ecology, University of the Philippines Los Baños  
  Completed; to be submitted for publication

### Nutrition and Food Guidance for Public Health Science Cluster

- **Measurement of Total Sugar Content of Commonly Consumed Foods in Malaysia**  
  In collaboration with Malaysia Country Committee, Ministry of Health, Malaysia and Institute of Medical Research, Malaysia  
  On-going

- **Technical Paper on Regulatory Status of “Other Food Components” in SEA**  
  On-going

- **Review and Analysis of Micronutrient Fortification Regulations in Southeast Asia**  
  On-going

- **Additional Case Studies for Monograph on Functional Foods**  
  On-going

### Food Safety and Risk Assessment Science Cluster

- **Study on Dietary Exposure of Sweeteners in Thai Consumers**  
  In collaboration with Institute of Nutrition, Mahidol University, Thailand  
  Completed; publication submitted

### Sustainable Food Systems (SFS) Science Cluster

- **Food System Resilience and COVID-19 – Lessons from the Asian Experience**  
  Submitted to Global Food Security Journal
Peer Reviewed Scientific Journals


Online Monographs/Reports

Report on Regulatory Status of Micronutrient Fortification in Southeast Asia
Published in March 2020 on ILSI SEA Region’s website

Report on Food Consumption Survey: Review of Status in Southeast Asia Region
Published in April 2019 on ILSI SEA Region’s website

ILSI SEA Region Functional Foods Monograph
Published revised version (December 2019) on ILSI SEA Region’s website

Report on Food Composition Tables: Review of Status in Southeast Asia Region
Published in January 2017 on ILSI SEA Region’s website

Monograph 2 Volume 1: Safety Assessment of Low- & Non-Calorie Sweeteners (LNCS)
Ongoing editing

Review of Nutrition Labeling, Nutrition & Health Claims Regulation in Asia
Published in March 2020 on ILSI Asian Entities’ websites
Thank You and Happy Retirement

At the end of June 2020, Ms. Christine Dowdall retired after 22 years of contributions as Executive Director of ILSI SEAR Australasia. In all these years, she had led ILSI SEAR Australia with great professionalism and dedication. As a key member of the ILSI SEA Region family, Chris will be much missed. ILSI SEA Region wishes her a very happy retirement, and all the best in her future endeavours!
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Indonesia • Malaysia • Philippines • Thailand • Vietnam

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