

Sponsors

I would like to thank the sponsors who contribute to my Presidential year 2021/2022, A special thank you to Prof Eugen De Silva who contributed very generously. To all my dear Colleagues, Students and Well Wishes around the globe for their contribution. Each contribution is

most welcome. To the few Industries and banks that gave sponsorship once again and thank you. All the names will be displayed on the screen during the Presidential Address on the 22nd of June at Sri Lanka Foundation Institute and also live stream *via* Zoom.

Prof. Srianthie Deraniyagala graduated from the University of Colombo with a BSc (Honours) in Chemistry, and obtained her PhD from Dalhousie University, Canada in the area of Bio-Organic Chemistry. She has over 42 years of service at the University of Colombo where she served as a Senior Professor in the Department of Chemistry. She currently serves as a visiting lecturer at the College of Chemical Sciences, Institute of Chemistry Ceylon.

Chief Guest at the 51st Annual Sessions

Mr. Asoka Hettigoda

Chief Guest's Address

Mr. Asoka Hettigoda

Chairman & Managing Director, Hettigoda Group of Companies



It is a great honor and a privilege to address the annual Sessions of the Institute of Chemistry of Ceylon 2022, especially at a time when your esteemed institute have just celebrated 50 years in 2021. It is also comforting to see many known faces in the audience who have made a tremendous contribution to the field of Chemistry in Sri Lanka.

Let me first congratulate all those who are presenting research papers today and especially who have won various awards. You are embarking on a life long journey using all the skills, learning and experiences to create a better life for yourself and a better environment for all of us. You have shown the ability to withstand strong competition, societal pressures, to successfully complete your course of education. This should be the first of many milestones that you will achieve in life and remember to make alma mater proud in all your future endeavors.

Historically, many countries have faced numerous

economic, political and other uncertainties of varying consequence. Country planners deal with these challenges by relying on past experiences and established structures. Currently, Sri Lanka is in a serious crisis where uncertainty has reached extreme levels. Solutions that we are aware of are inadequate and we are running out of options.

Today, I will discuss how members of your esteemed institution can help our country to overcome the serious crises we are in. Your solutions must be sustainable and should provide immediate results as we are facing huge challenges in food security, shortage of medicines and energy. We all have seen and been part of long queues to obtain these basic essentials and many of us have wasted lots of valuable hours and most importantly dampen the hopes of the future generations.

To resolve these critical issues, I believe new technologies coupled with out-of-the-box thinking can spur sustainable development and give a push to achieving equitable growth in Sri Lanka. Technology has become part and parcel of our lives today, making us demanding for newer technologies. Developed countries are blessed to experience new technologies while due to globalization, poorer countries are not far behind, sometimes leapfrogging the natural introduction cycles. However, not all new technologies are accepted as they now have to be sustainable. Hence, the primary criterion is technologies that promote sustainable development.

What is sustainable development? The Official Agenda for Sustainable Development of the United Nations adopted on 25 September 2015 outlining the 17 Sustainable Development Goals. They are, No Poverty, Zero Hunger, Good Health and Well-being, Quality Education, Gender Equality, Clean Water and Sanitation, Affordable and Clean Energy, Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Reduced Inequalities, Sustainable Cities and Communities, Responsible Consumption and Production, Climate Action, Life Below Water, Life on Land, Peace, Justice and Strong Institutions and Partnerships for the Goals.

I would like to concentrate on three important aspects from the above list as they are critical for the survival of Sri Lanka and its people.

1. Zero Hunger - End hunger, achieve food security and improved nutrition and promote sustainable agriculture. However, according to media reports and expert analysis, Sri Lanka will face a severe food shortage in the coming months due to ill-advised decision on banning chemical fertilizer and thereby jeopardizing our traditional agriculture industry.
2. Good Health and Well-being – Due to lack of foreign exchange, many essential medicines for critical ailments are in short supply. Hence, ensuring good health for Sri Lanka's population will be challenging.
3. Affordable and Clean Energy – We all have experienced exponential increases in fuel and gas prices and to many it has become unaffordable. Ensuring access to affordable, reliable, sustainable and clean energy for all is going to be extremely difficult.

Zero Hunger

Let me first discuss the need to eradicate hunger, provide nutrition to the malnourished, create food security while promoting sustainable agriculture and livestock.

According to UN, by 2050, the world's population will exceed 9.7 billion people – a projected growth of more than 30 percent and amounting to an estimated 2.3 billion more people to feed. To put this in perspective, consider that we will need to produce the same amount of food over the next four decades that we produced over

the past 8,000 years.

Access to adequate food quantities vary widely among countries where people from developed countries have a problem of overeating that leads to major health risks while people in poor countries have malnutrition from food deprivation. Increasing food production has created many negative impacts such as soil erosion, deforestation, destruction of wild life, etc. Overuse of pesticides, chemical fertilizers and commercial agricultural practices have had a significant impact on sustainability as well.

Marian Wright Edelman, Founder/President of the Children's Defense Fund (CDF), USA, says "Hunger and malnutrition have devastating consequences for children and have been linked to low birth weight and birth defects, obesity, mental and physical health problems, and poorer educational outcomes". The impairment of children's ability to develop physically and mentally can severely inhibit school attendance and performance, thus undermining the effectiveness of investments in education and subsequently reducing productive potential as they enter the labor force. These children are caught in a trap of hunger, low productivity and chronic poverty.

According to Central Bank report of 2015, Sri Lanka faces a substantial burden of child malnutrition, with 13 per cent of all children less than 5 years reported as stunted and 24 per cent as underweight in 2012. In addition, rates of anemia, low birth weight (LBW), stunting, underweight and wasting are staggering as Sri Lanka's performance is more comparable to countries with worse health outcomes than those with developed countries. Despite the steady pace of economic growth and rising standards of living, improvements in this area in the past decade have been slow and marginal.

Price and affordability are key barriers to accessing sufficient, safe, nutritious food to meet dietary needs and food preferences for an active and healthy life.

According to Food and Agriculture Organization of the United Nations (FAO), there are three types of diets:

- "Energy sufficient" diets provide adequate calories for energy balance at a given level of physical activity and body size, using only the least-cost starchy staple in each country. For example, such a diet could consist of only the lowest cost type of rice in that

country, or only maize porridge.

- “Nutrient adequate” diets provide not only adequate calories but also adequate levels of all essential nutrients – namely, carbohydrates, protein, fat, vitamins and minerals, within the upper and lower bounds needed to prevent deficiencies and avoid toxicity.
- “Healthy” diets meet a set of dietary recommendations intended to provide nutrient adequacy and long-term health.

According to FAO, the cost of healthy diets is nearly five times as expensive as the cost of energy sufficient diets. In all, it is estimated that 3 billion people globally cannot afford the least-cost form of healthy diets. Moreover, 1.5 billion people cannot afford a nutrient adequate diet of which the majority live in Southern Asia and sub-Saharan Africa.

Returning to Sri Lanka’s current crisis, scientists must identify seeds that use fewer resources and that are better for the environment. Further, must develop tools and agronomic practices that enable us to produce more with fewer resources. In the short term, we must decide which type of diet is most suited during the crisis and for what age group. Let us look at how smart technologies are used in this endeavor:

- Identify crops that require the least amount of fertilizer and other resources
- Develop crops that give high nutrition with less cost
- Create technologies to prevent nutrient losses and promote Good Agricultural Practices (GAP)
- Identify fresh fish varieties with high nutrition value that propagate quickly
- Collars with GPS and RFID can automatically relay important information in real time and help them to create virtual field boundaries. Further, this technology can also monitor the health conditions of the animals and inform the health officers of any emergencies. In addition, it can keep the livestock away from dangers, for example poisonous weeds. Farms can spend lots of money each year installing, repairing and replacing wires, walls and hedges, yet virtual fencing technology could pay for itself.
- Crop Sensors and smart farms – Monitor and analyze

the field conditions and accordingly and apply exact amounts of fertilizer and pesticides. Optical sensors, satellite imagery are used to analyze the health of the crop across the field. These methods improve returns on inputs while preserving resources for future use. Further information is gathered to improve productivity by having advance knowledge of weather patterns, and crop diversification and planting techniques while improving efficiency.

- Use of Biotechnology expands the genes available for crop improvement. These newly developed crops are able to tolerate insects, viral diseases, produce grain with improved nutritional quality, and resist stresses caused by extreme weather.
- Let’s look at how satellite technology can be used to create abundance of opportunities to develop Aquaculture in Sri Lanka with hundreds of kilometers of territorial waters known to have plenty of fisheries resources. The Scottish salmon industry uses satellites to monitor harmful algal blooms and receive early warnings of potential problems, while the UK shellfish industry is monitoring water quality with the help of a Plymouth Marine Laboratory project. These new sustainable technologies improve the harvest without disrupting the ecosystem.

These are some thoughts and recommendations that would provide some solutions to the current crisis and promote sustainable development.

Good Health and Wellbeing

Having the highest life expectancy in the region, Sri Lankans have enjoyed better access to health care at state offerings as well as private care. Blessed with a traditional medicinal system, Ayurveda, which dates back to King Ravana’s time, Sri Lankans have the option of using allopathic and traditional medicines. However, with the growth of non-communicable diseases, chronic kidney disease (CKD), dengue and other new age ailments, the need for new medicines has arisen.

- Create new natural medicines to address critical illnesses using our traditional knowledge of Hela Wedakama
- Promote mental and spiritual wellbeing through

- yoga and meditation as a solution to many ailments
- Biometric sensors are used in telecommunications for remote applications to monitor blood levels infections, etc.
 - Various handheld devices to be used by consumers to self-diagnose medical conditions within seconds and inform your medical care partners accordingly. Through this application, a network of physicians will get to know condition and direct the nearest medical institution of the patient's condition. Mobile health devices with wireless technology have enabled physicians and patients alike to check on healthcare processes on-the-go and have taken healthcare monitoring out of the lab and has made it part of your life.
 - Pre Natal gene manipulation using biotechnology to remove any birth defects and other disorders.
 - South America is rolling out basic internet connectivity for health professionals in remote rural villages. Doctors can now talk to leading medical professionals who can help with patient diagnosis and treatment. They can even navigate and guide clinical scans over the internet in real time to help identify the cause of problems.
 - Healthcare mobile apps help professionals make confident and efficient decisions in the moments of care. With drug and disease information readily available at your fingertips, caregivers not only save time—they can also improve patient safety.
 - The electronic health record used by many hospitals around the world, combines patient records, prescriptions and other documentation and has led to improve the efficiency of healthcare offered.
 - Studies consistently show the benefit of tele-health, especially in rural settings that do not have access to the same resources metropolitan areas may have. Many studies have shown the cost savings of telemedicine while saving many lives.

Affordable and Clean Energy

With the high cost of fossil fuels, coupled with environmental degradation, Renewable energy offers multi-faceted benefits from its very nature that include sustainability, climate safe future, augmenting economic

growth, creating new jobs and enhancing human welfare. These green energies play a vital role in balancing energy mix and allow small countries to wither the shocks of the world market. Especially, with no foreign currency, Sri Lanka's only hope is to develop cost efficient renewable energy solutions and to reduce its dependence on fossil fuels.

- Create affordable solar ovens
- Create Low cost wind mills – According to National Innovation Foundation of India, a low cost wind mill which can generate 1kvA was developed by C. M. Subramanian for Indian Rs 80,000.
- Creation of Low cost Bio-Gas plants
- Start producing Solar panels in Sri Lanka. Microcrystalline quartz is the major ore of silicon. Among the vast sources of vein quartz (silica) found in Sri Lanka, it can be used for manufacturing of solar cells, computer chips, and silicon carbide. Using our Silica, create low cost solar panels and require that every house must be equipped with a solar power unit.
- Lithium air Batteries which rivals gasoline in its energy density, offers fivefold increase compared to traditional Li-Ion batteries. By using atmospheric oxygen, these batteries could extend the electric vehicle range dramatically.
- Fuel cells require constant source of fuel and oxygen to run, while producing electricity continually. These technologies can be ideally used for stationary power generation or large passenger vehicles.
- Tidal Turbines convert tidal energy into electricity which can be used in large scale power generation.
- Space based solar power stations collect solar power in space. They have a much higher collection rate than what is possible on earth and is also unaffected by the filtering effects of the atmospheric gases
- Third generation biofuels involve genetic modification of organisms to produce new fuels. Production of Hydrogen from highly efficient algae is such an example.

During my whole speech, I have emphasized the role of technologies in sustainable development and some of the key aspects that affect Sri Lanka's growth strategy.

In addition, how these sustainable technologies can be pivotal in reducing poverty, hunger and income disparity. If correct measures are implemented at the outset, the future, which you will be part of, will be greener, a better place to live economically and socially.

With these thoughts, I am confident that you can play a key role in shaping Sri Lanka for the next millennia. Having being exposed to many challenges at the Institute

and the commitment you have shown to complete your research, is a clear indication that you are ready to face any challenge, locally or internationally. Now it's time for you to take the bull by the horns.

I wish all the presenters good luck in your future endeavors and remember to make your alma mater and your country proud.

Kandiah Memorial Awards - 2022

Three Kandiah Memorial Awards are made annually to commemorate Professor A Kandiah, the first President of the Chemical Society of Ceylon. Professor Kandiah served in the University of Ceylon from 1933 and was the Professor of Chemistry at the University of Ceylon from 1934 until his death in 1951.

The Kandiah Memorial Awards for Basic Chemistry and Applied Chemistry are awarded for the best research contribution in Chemistry carried out by a postgraduate student registered at a Higher Education Institute and for work carried out in Sri Lanka with the exception of special analysis (less than 20% of findings) that cannot be done in the country.

- The Kandiah Award for Basic Chemistry is made for research predominantly in Basic Chemistry (Organic, Inorganic, Physical & Analytical).
- The Kandiah Award for Applied Chemistry is made annually for research in related areas such as polymer, food, biochemistry, biotechnology etc. where interdisciplinary research is involved, provided that chemistry has a central role & comprises at least 50% of the content.
- The Kandiah Memorial Graduateship Award is awarded to the best piece of research in the chemical sciences carried out by a Graduate Chemist of the Institute of Chemistry Ceylon registered with a Higher Educational Institute for a postgraduate degree.

Kandiah Memorial Award for Applied Chemistry - 2022



Ms. Yasuri Amarasekara is expecting to start her Ph.D. degree at Macquarie University, Australia. Her research interests span the field of Peptide Chemistry, Cancer Cell Biology, Computational Chemistry, and

Nanomedicine. She has obtained her B.Sc. Special degree in Immunology and Integrative Molecular Biology from the Faculty of Science, University of Colombo. She received her postgraduate degree (Master's in Philosophy) from the Sri Lanka Institute of Nano Technology.

In terms of her experiences, she has worked as a Lecturer attached to the Department of Biomedical Sciences under the Faculty of Science at the NSBM Green University. She has also worked as a Research Assistant at the Centre for Scientific Computing and Advanced Drug Discovery at the University of Sri Jayewardenepura, Sri Lanka, where she focused on Computer-Aided Drug Discovery projects.