22nd Meeting of COMSATS Coordinating Council

Ministry of Science Technology & Research

Industrial Technology Institute
Ceylon Institute of Scientific and Industrial Research (CISIR)
Colombo
Sri Lanka

Dr Radhika Samarasekeera
Director General

CISIR

Introduction

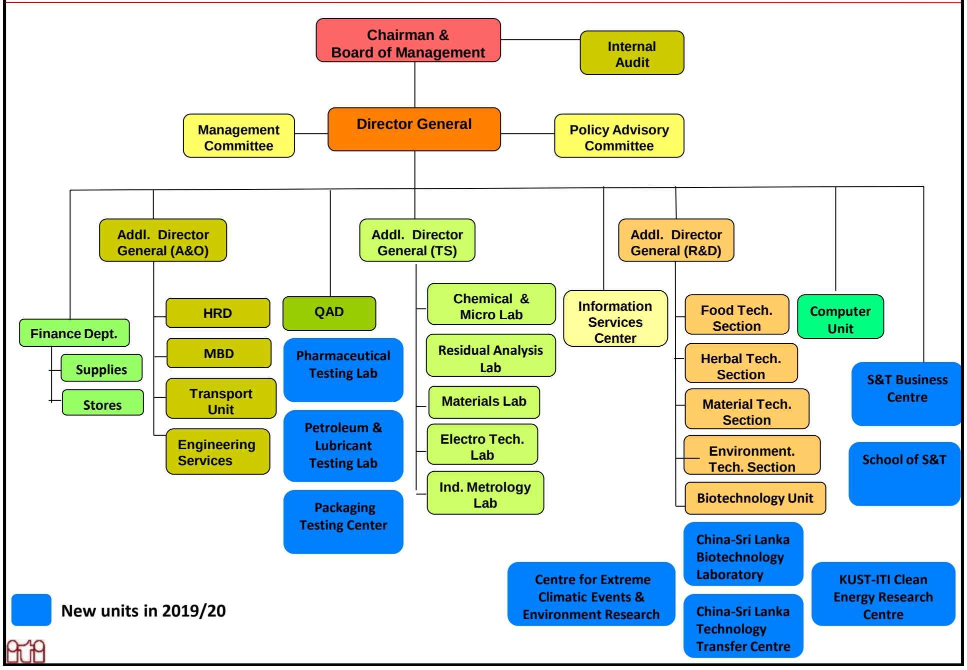
Industrial Technology Institute - Colombo

ITI Modern Research and Development Complex - Malabe

Industrial Technology Institute – Successor to CISIR

- Government owned country's leading and the largest scientific R&D and service organization with a complement of multi-scientific staff collaborating in multi-disciplinary teams.
- Established in 1955 under the Parliament Act no 15 of 1955 (CISIR Act) in order to support the Industrial Development in the country.
- Since 1998 the Institute is functioning under the Science & Technology Development Act No 11 of 1994.
- Center of Excellence of COMSATS in Sri Lanka.
- Core business is the promotion of industrial development through R&D, consultancy, technology transfer and the provision of testing and calibration services.
- Total staff of 393; 106 are Research Scientists/Engineers; 90 technical & 22 PhD holders.
- Laboratories are equipped with state-of-the art instruments.

Organizational Structure



Vision

- To be a regional Centre of excellence in Scientific Industrial Research for national development.

Mission

- To provide demand driven scientific industrial R&D and internationally competitive Technical services to catalyze rapid industrialization for the benefit of the people of Sri Lanka.

Objectives and Functions

- The Technology Institute shall be demand-driven.
- The object of the Technology Institute shall be to elevate the level of Technology in Sri Lanka to the level required for rapid industrialization.
- Functions shall be: - to support industry by-

1. Undertaking on contract, testing, investigation and research, for improving product quality, technical processes and methods used in industry, and for discovering new processes and methods to be used in industry;
2. Providing technical services and consultancies; and engaging in activities connected with technology transfers, the adaptation of technologies and the development of new technologies;
3. To conduct research with a view to accelerating industrial technology development;
4. To collect, process and disseminate useful technical information, in particular on "shelf technology" with a view to accelerating industrial development;
5. To undertake training of persons in areas related to the experience of the Technology Institute;
6. To undertake or to collaborate in the survey and monitoring of environmental pollution and to recommend remedial measures to mitigate such pollution;
7. To co-operate with government departments and institutions, universities, technical colleges and other bodies in demand driven research to promote industrial technology development.

Quality Infrastructure

- **ISO 9001:2015 Quality Management System Certification**

- **ISO17025:2005 Laboratory Quality Management System - ISO 17025:2017**

Accredited by the Sri Lanka Accreditation Board (SLAB) for Chemical, Food, Water, Material, Microbiological, Residue Chemical testing and Industrial Noise and Vibration Measurements. More than 500 accredited parameters

- **ISO 17043 : 2010 accreditation as Proficiency Testing (PT) provider**

- **ISO 17065, product certification – lubricant oil –** on going

- **Measurement Traceability**

• Mass, dimensions, volume, electrical, and temperature measurements are accredited and traceable to SI units through KRISS – South Korea and PTB – Germany.
• Performance tests on selected lab apparatus, force and pressure measurements are traceable to SI units through KRISS – South Korea and PTB – Germany.

Highlights of the Progress 2018

Research & Development

- Enhancing preservation of fruits using Nano Technology

Development of fruit coatings to enhance preservation of fruits to minimize postharvest losses-

- Bio Waxes - Natural anti-senescence and anti–microbial agents incorporated edible wax formulation for postharvest preservation of perishable fruits.

- Tree Fresh Formulation (TFF) –Hexanal based enhanced freshness formulation to be used as a pre-harvest spray treatment to extend life of fruit on trees up to 3-4 weeks

Launching Product Technologies

- Hot Wax formulation and Manioc Wax

- Banana fiber based fruit wrap paper from waste banana fiber – to protect fruits during storage and transportation. Banana paper making technology is disseminated to centres of banana farmer association.
- Hexanal incorporated banana fiber composite board for slow releasing applications of trapped active compounds.
- Low added sucrose Nutritious scorn / Flat bread from minor cereals.
- Studies in surface sterilization of spices using non thermal processes - Optimize the Cold Plasma and UV process parameters for effective killing of the microbial population on the surface of the selected spices.
- Development of shelf stable high energy instant food products from locally available raw materials using gamma irradiation.
- Omega 3 rich chicken eggs - Extension of Technology transfer agreement with Arogya Farms Pvt. Ltd. to assist the commercialization process of technology developed by ITI.
- Isolation and characterization of six probiotic lactic acid bacteria from Non-diary sources (finger millet and banana)

- Conversion of readily available Sri Lankan natural quartz to solar grade silicon by electrochemical de-oxidation process for application in electronic industry

Natural quartz

Locally fabricated Electrochemical cell for silicon extraction

Novel graphite based anode for high-temperature applications

- Development of red-clay based water filter/apparatus for removal of hardness in drinking water. The same filter is capable of removing fluorides and heavy metals (As, Cd, Pb).

- Further research on production of high quality graphene based materials from local graphite as a value addition for high-tech applications.

Development of reduced graphene oxide (rGO), graphite oxide (GO) from local graphite. Pilot scale synthesis of GO and rGO completed.

- Fabrication of photo-catalytic continuous flow reactor for decontamination of organic waste.
- Effective removal of heavy metals and organics from the wastewater using TiO_2 loaded graphene oxide prepared using local raw materials.

- Environmentally - friendly, controlled-release fruit and melon flies attractive product based on Ocimum extracts and natural-nanocomposite substrate – BASCA
- Second clinical trial on Pure Cinnamon (*Cinnamomum zeylanicum*) capsule – as a potential pharmaceutical agent for diabetes mellitus (anti-diabetic, anti-cholesterol product)
- Investigation on natural fragrances and other volatiles from Sri Lankan flora and their industrial applications
- Rapid extraction of medicinal and aromatic plants and selective isolation of compounds by microwaves - Extraction of bio-active ingredients using Microwave hydro-diffusion and Gravity method and essential oil using Microwave Extraction.
- Operational model to control dengue in Sri Lanka using multiple vector control intervention, new product development and community participation –

  Developed monoclonal antibodies on Nano-particles for the detection of Dengue.
- Protocol for detection and identification of Genetically modified food products were developed for the benefit of food controlling authorities as well as consumers.
- Developed Protocols for identification for food borne pathogens using Real Time PCR
- Biodegradation of petroleum in contaminated soil and water bodies.

- National projects on Environmental Science and Technology on Air pollution control and mitigation, Wastewater Treatment, Solid Waste Management, Water quality studies, Hazardous waste management, Environmental Impact assessment.

- Minamata Initial Assessment (MIA) project on National inventory of Mercury release in Sri Lanka

Ministry of Mahaweli Development and Environment, UNIDO, United Nations Environment Program (UNEP). To provide national information as a basis for prioritizing measures to reduce mercury releases in order to meet the obligations under the Minamata Convention.

- Hazardous Waste Inventory of Sri Lankan Industry Sector

Central Environmental Authority, Sri Lanka & Forum Finland and Endeavour Energy Corporation. Adapted from the 'Methodological Guide for the Development of Inventories of Hazardous Wastes and Other Wastes under the Basel Convention' (UNEP, 2016).

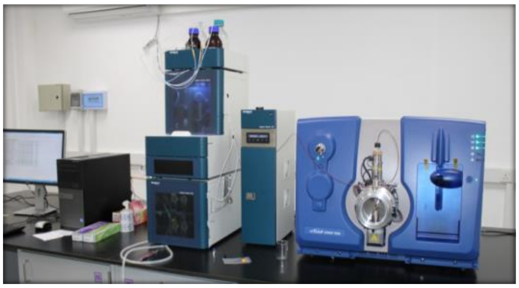
- Evaluation of impacts of Agrochemicals on Grape trees and Grape cultivating soil and water; study of heavy metals, nitrate and phosphate content in Northern province.

- Impact of water quality parameters on Chronic Kidney Disease of unknown etiology (CKDu) in Northern province.

Upgrading the entrepreneurship of 'Vidatha' by providing training on product technologies and quality evaluation of their product samples in order to meet high market opportunities.

LC-MS/MS

Technical Services



- Food analysis for contaminants and adultrant– Aflatoxin, Sudan, Melamine, DCD, Histamine, MSG
- Pesticide residues - Glyposate, 30 common organic pesticides imported to the country, 80 other organic pesticides that are used in the country including, Ethaphone, pesticide residues in tea, fruits and vegetables and water in schools.
- Weedicide residues (MCPA, glyphosate).
- Antibiotics residues in dairy products.
- ICP MS-MS - Heavy Metal analysis – Cosmetics, water, herbal products, food products.

State of the art Ambient Air Quality Monitoring facility

- Monitoring of air quality and stack emissions - In cooperating USEPA approved methods & as per National Environmental (Ambient Air Quality) regulations

Power Plants, Port Access Elevated Highway Project, industrial zones, Bandaranaike International Airport Development Project, Colombo Port City Project, Sanitory landfill projects.

- Noise barrier design for central expressway.
- Noise modeling for Light Rail Transit project under Colombo Urban Transport Survey Project.
- Development of Noise guideline for Expressway and Light Rail Transit.

Awards -2018

1. National Awards for Science and Technology Achievements (NASTA) - Excellence in International Collaboration for Advancement of S & T - IDRC Project-FTS & MTS

2. DASIS Award - 2018

Environmentally - friendly, controlled-release fruit and melon flies attractive product based on Ocimum extracts and natural-nanocomposite substrate - BASCA – HTS & MTS

3. Sahasak Nimawum - Gold Medal

Environmentally - friendly, controlled-release fruit and melon flies attractive product based on Ocimum extracts and natural-nanocomposite substrate - BASCA - HTS & MTS

4. Sahasak Nimavum - Gold Medal

Bio wax in the commercialized category under technical field of Food Technology- IDRC team- FTS team

5. Sahasak Nimavum - Silver Medal

Low added sucrose nutritious scorn-Flat bread in the open category under technical field of Food Technology – FTS team

6. Presidential awards for scientific publication

7. Presidential Awards - Third Place

Development of clay filter body with high fluoride binding ability for the remediation of fluoride contaminated water (Group Invention) – MTS team

8. Presidential Awards

Calibrated Measuring Tape - Mr Sooriyarachchi and Dr Liyanawaduge

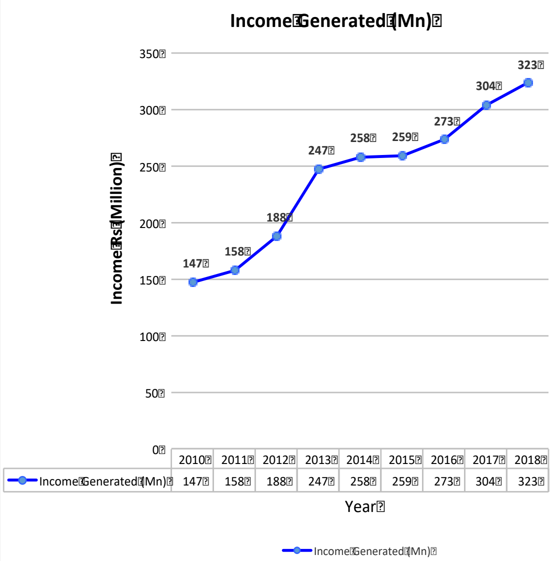
9. SUSRED Award - Support Scheme for Supervision of Research Degrees

10. Three Minute Thesis (3MT) presentation competition of SLAYS - Gold medal

Income Progress

Income Source	Codes	2017 Rs Mn	%	2018 Rs Mn	%
Standard Services	SS	178.795	68	196.619	68
Consultancy Services	CS	20.712	8	22.849	8
Technology Transfer	TT	2.766	1	3.245	1
Contract projects	CP	26.083	10	29.252	10
Customized Services	CTS	18.827	7	17.230	6
Training Services	TS	13.803	5	19.949	7
Royalty	RTY	0.330	0	0.110	0
Other income		42.911		34.595	
Sub Total		**304.229**	100	**323.912**	100
Government Grants		240.00		240.00	
Total		544.23		563.91	

Income Generated- 2010-2018



Year	Income Generated (Rs Mn)
2010	147.1
2011	158.3
2012	188.5
2013	246.8
2014	258.2
2015	258.6
2016	273.0
2017	304.2
2018	323

Year	Income from Research Grants (Foreign)- (Rs Mn)
2013	26.9
2014	19.2
2015	21.8
2016	16.3
2017	11.3
2018	10.2

Publications and Patents - 2018

- Publications – 44 scientific publications in referred journals
- Communications - 113 International and Local Communications
- Patents – 06
- Book Chapters- 07
- PhD obtained – 04
- New PhD Registrations – 07

Collaborations with COMSATS Centres of Excellence

- Proposed COMSATS High tech S&T university at ITI, Sri Lanka under the partnership of COMSATS

- COMSAT University of Islamabad
  Intent of Cooperation - To collaborate in pursuing joint academic and research activities

- Member of COMSATS Centre for Climate and Sustainability (CCCS) and setting up a COMSATS Centre for CCCS at ITI in Sri Lanka with the aim of promoting the linkages of climate change and sustainable development as environmental factors in ensuring the success of Sustainable Development Goals (SDGs).

- Technical Cooperation between International Center for Climate and Environmental Sciences (ICCES), Chinese Academy of Sciences China
  MOU was signed for Establishment of joint Climate Research Centre at ITI with ICCES.
  One ITI officer is undertaking PhD degree at ICCES in Climate and Environmental Sciences.

- International Centre for Chemical & Biological Sciences (ICCBS), University of Karachi - Pakistan

ICCES, China

ICCBS, Pakistan

China and ITI science and technology cooperation programs - BRI

Signing of MOU between MOST China and the Ministry of Science, Technology & Research Sri Lanka on **Co-establishing China-Sri Lanka joint laboratory on Biotechnology**

- ITI is the collaborator/implementing partner for the establishment of three entities below under protocol signed between Ministry of Science and Technology, China and Ministry of Technology and Research, Sri Lanka on specific programs for Scientific and Technology Co-operation.

1. China (Yunnan)-Sri Lanka Joint Biotechnology Laboratory with Yunnan Rural Science and Technology Service Center, Yunnan Agricultural University and Kunming University of Science and Technology.

Framework agreement was signed between ITI and Yunnan Rural Science and Technology Service Center.

China and ITI science and technology cooperation programs - BRI

An agreement was signed on Co-establishing a CSLTTC between CSTTC and ITI

2. China-Sri Lanka Technology Transfer Center (CSLTTC) which is a sub center of China-South Asia Technology Transfer Center (CSTTC) of Department of Science and Technology of Yunnan Province.

3. International Research Center on Clean Energy Industry Technology between Kunming University of Science and Technology and ITI. – Signing of agreement pending

4. Technical Cooperation between Central China Normal University (CCNU) and ITI.
MOU was signed. One ITI officer is undertaking PhD degree at CCNU in molecular biology

Future Programs

- S & T cooperation with COMSATS and other Centres of Excellence of member countries to undertake joint research.

- Upgrade ITI to an advanced institute

To undertake high-tech research in the area of Industrial Biotechnology under Belt and Road Initiative (BRI).

- Partnership for commercialization of technologies and establishment of incubation facility.

ITI Programs to COMSATS Centres of Excellence

- Collaborative research in relation to Medicinal & aromatic plants, spices and essential oils, Food Technology, minerals.

- Accredted Technical services

- Post-graduate training – PhD

Thank You