

COSTI
CONNECTING INNOVATION...

**Coordinating Secretariat for Science
Technology and Innovation**

Looking Back to 2013-2016

(01-02-2013) – (31-12-2016)



**COORDINATE WITH THINKING
MONITORING WITH EMPATHY**

Foreword

The purpose of this report is to summarize and collate as much as possible, the achievements of COSTI over the period 2013-2016. Although COSTI activities are well documented and publicized via the COSTI website www.costi.gov.lk, they may not be evident because of their diversity and multiplicity.

COSTI was established by Cabinet approval in September 2011, to fulfill the aspirations of the scientific community of Sri Lanka, who saw the need for an Apex body to coordinate scientific activities being undertaken by National Universities and R&D institutions coming under many Ministries. The former President Mahinda Rajapaksa having assigned the Senior Minister for Scientific Affairs the responsibility of coordination of all scientific activities in the country by Gazette Extraordinary No. 1681/3 of 22 November 2010, placed COSTI under the purview of this Ministry.

The implementation of the *Science Technology and Innovation Strategy for Sri Lanka* based on the National Science & Technology Policy adopted by the Cabinet of Ministers in 2009, is the mandated activity of COSTI. With a Project Office set up on the 3rd Floor of the Standard Chartered Building, Janadhipathi Mawatha, Colombo 01, COSTI started its operations on 01 February 2013. As approved by the Department of Management Services, the initial team comprised of a Project Director, a CEO and 3 Programme Directors appointed by the Cabinet of Ministers. Subsequent appointments to the DMS approved Cadre by advertisement and interviews lead to the establishment of TEAM COSTI: consisting of 3 teams – Admin and Finance Team (8 members), IT Team (8 members) and Science Team (22 members) – totaling 38.

Over the period 2013-2016, Team COSTI undertook various types of assignments and engagements, ranging from simple coordination of meetings among scientists and relevant stake holders, to high-end Conferences and Workshops (such as The STS Forum and Conference on Future Earth), and Round Table Discussions (such as Round Table for Establishment of CERA). Some of these efforts have yielded excellent results – e.g. Establishment of a Centre of Excellence for Robotic Applications (CERA) and the green light given by the Government for setting up a National Science Centre as well as a Biotechnology Park in Sri Lanka. There would have been many more noteworthy outcomes from COSTI's efforts; many projects were on the verge of approval or even implementation, but due to various unforeseen circumstances such as administrative changes due to change of Ministries, search for new locations due to the likelihood of eviction from Chatham Street Office etc., that disrupted the working atmosphere, they could not be achieved.

I have attempted to report all important activities carried out by COSTI during the past 4 years (01 February 2013 to 31 December 2016). Some minor events such as one to one meetings with scientists/stake holders or outside meetings attended by COSTI staff have not been included in this report. All publications referred to in this document are available at COSTI website www/costi.gov.lk, if the reader wishes to have further information on a particular event.

Annexes are meant to highlight in some detail, a few ground-breaking and land mark events that have become operational (Annex 1) and some activities that were in the verge of being approved or implemented but have not seen the light of the day to date (Annex 2) due to various circumstances beyond COSTI's control. There were many obstacles that hindered COSTI's continuous engagement in coordination activities and these resulted in many proposals becoming non-starters.

I wish to express my sincere thanks to Prof. Sirimali Fernando, Prof. Ajith de Alwis, and all members of Team COSTI for their unstinted support given by providing relevant information and documentation as well as photographs for compiling this document.

Dr. M.C.N. Jayasuriya,
Programme Director, COSTI

June 2017

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The Nation which does not Create New Things will not Rise

කුමාරතුංග මුනිදාස
குமாரதுங்க முனிதாச
Cumaratunga Munidasa
(1887-1944)



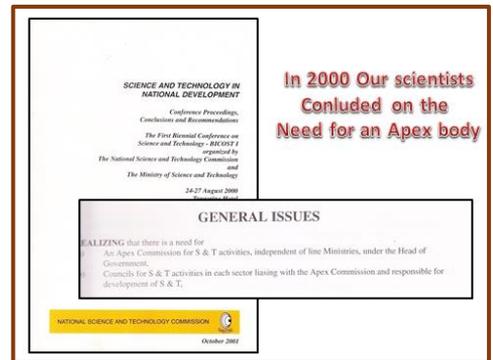
COSTI – 2013-2016

WHAT COSTI HAS ACHIEVED OVER THE PAST 4 YEARS

PREAMBLE

In August 2000 NASTEC – The National Science and Technology Commission, which was created by the Science and Technology Act No. 11 of 1994 and came into operation in August 1998, held the first ever large scale gathering of Sri Lankan scientists – The BICOST – The Biennial Conference on Science and Technology, as mandated by the Act.

The Conference which was attended by over 250 scientists and professionals of all hues developed an action plan called 'The Science and Technology Agenda for National Development', having considered S&T under sub-themes of agriculture, health, education, industry, environment and information technology. The first recommendation originating from this Conference¹ was the need for an APEX body for Science and Technology directly under the executive and outside the line ministries to enable coordination of S&T among ministries in order to ensure stronger decision making, coordination and facilitation.



BICOST I - Recommendations

In November 2010, His Excellency the President by Gazette Extraordinary no. 1681/3 of 22 Nov. 2010 assigned the Senior Minister for Scientific Affairs the responsibility of coordination of activities among Ministries related to subject areas such as science, research, technology, education, information technology, industry, skills development and engineering services, with the objective of scientific development in Sri Lanka. In September 2011, the Cabinet of Ministers approved the establishment of COSTI – The Coordinating Secretariat for Science Technology and Innovation - under the purview of the Senior Minister for Scientific Affairs, also observing that the treasury had agreed to provide necessary facilities and support to strengthen the unit responsible for coordination and monitoring.

Thus, COSTI came into being on 01 February, 2013 under the purview of Prof. Tissa Vitarana, the Senior Minister for Scientific Affairs. Although a Project funded by the consolidated fund of the government and not directly under the executive, COSTI had an oversee option, being outside the line ministries that are involved in Science and Technology activities, and was in fact much in line with the NASTEC recommendation of 2000.

COSTI was to focus primarily on coordination and monitoring of the implementation of the National Science Technology and Innovation Strategy 2011-2015, by different Ministries, Institutions and the private sector and report through the Senior Minister for Scientific Affairs, to an Inter-Ministerial

Committee for Science Technology and Innovation, which was to be established as a part of the coordinating frame work. The main out comes envisaged through COSTI were:

- i) High-tech industrialization leading to rapid economic development,
- ii) Science and innovation based balanced societal development,
- iii) An inclusive development of a knowledge based society, and
- iv) An internationally positioned and enhanced knowledge creation and innovation capacity within Sri Lanka.

These goals were to be achieved by operationalizing a National Coordinating and Monitoring Framework of the Science Technology and Innovation Strategy for Sri Lanka.

COSTI Project Office is set up at Janadhipathi Mawatha, Colombo 01



COSTI Project Office opening at Chatham Street, Colombo 01



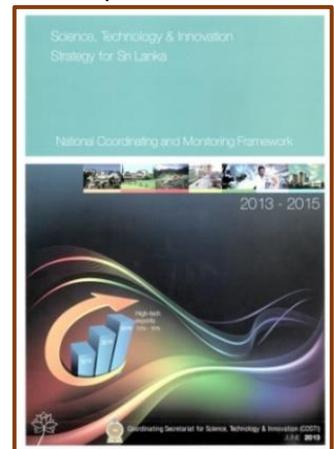
COSTI Project Office (2013-2015)

On 01 February 2013, COSTI opened its Project Office on the 3rd Floor, of the Standard Chartered Building, Janadhipathi Mawatha, Colombo 01. As approved by the Department of Management Services, the initial team comprised of a Project Director, a Chief Executive Officer and 3 Programme Directors appointed by the Cabinet of Ministers. Subsequent appointments to the DMS approved Cadre by advertisement and interviews lead to the establishment of TEAM COSTI, consisting of 3 teams – Admin and Finance Team (8 members), IT Team (8 members) and Science Team (22 members) – totaling 38.

There were many congratulatory messages from national and international organizations on the establishment of COSTI for coordinating S&T activities in the country. The Secretary to HE the President addressed a letter to all Secretaries of Ministries, Heads of Departments, State Corporations and Statutory Boards requesting their cooperation towards operationalizing the coordinating and monitoring framework by appointing suitable persons as liaising officers to work with COSTI.

Coordinating framework for National STI Strategy - COSTI Booklet

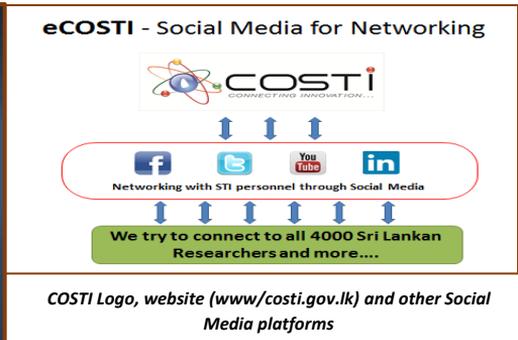
One of the first initiatives of COSTI was to prepare the ‘National Coordinating and Monitoring Framework 2013-2015’, for Science, Technology and Innovation Strategy for Sri Lanka². The booklet outlines the coordinating and monitoring arrangements for Science Technology and Innovation at the national level for implementation of the National STI Strategy across different line Ministries.



National Coordinating and Monitoring Framework

Launching of COSTI Logo, website and Social Media

The COSTI Logo, website (<http://costi.gov.lk/>) and other Social media developed by the IT team of COSTI was launched on 10 July 2013 by Hon.Minister (Senior) for Scientific Affairs Prof. Tissa Vitarana.



Our First Procurement

Our first Procurement was for printing the Cumaratunga Munidasa sticker with the inscription “The Nation which does not Create New Things will not Rise”. It became COSTI’s motif, appreciated by many, for spearheading and revitalizing the science and technology innovation drive. Although the procurement raised the first audit query the motif itself became the foundation for COSTI’s uniqueness and the outlook towards innovation.



Our First Workshop



COSTI, organized its first Workshop on the theme ‘Open access to Research Information’ in April 2013. The workshop organized by the National Science Foundation in collaboration with COSTI, and with the participation of senior academics and scientists of the country, identified the urgent need for an ‘Open Access Policy’ that could be adopted by research funding bodies across the country. A committee appointed by the National Science and Technology Commission (NASTEC) resulted in the formulation of a policy template encompassing guidelines for free and unrestricted online access to peer-reviewed publications and data arising from research carried out based on public funds in universities and research institutions. The Policy document was adopted and launched in 2014.

COSTI Basecamp

Basecamp is a web-based project management tool that could be used to collaborate with multiple users from anywhere in the world by accessing the system through a web browser/App. Ideas and project information are shared through to-do lists, milestones (important deadlines), messages (notes with comments), write boards (shared text files), online chats, and file sharing.

COSTI set up the Basecamp as the virtual platform for connecting relevant resource personnel both nationally and internationally. Currently, COSTI runs more than 80 projects via Basecamp. This is a very useful tool for engagement, communication and networking and much can be achieved as COSTI has shown with some of the projects carried out in this way (eg. CKDu and Sri Lanka, CERN, Food safety monitoring system).

PROJECTS AND PROGRAMMES

1. Asian Development Bank Technical Assistance programme

The Asian Development Bank (ADB) approved a Capacity Development Technical Assistance (CDTA) programme for Human Capital Development and Capacity and Implementation Support Project on 3 December, 2012 with a view to enhancing human capital in Sri Lanka for a productive knowledge-based economy. The CDTA covers (i) secondary education, (ii) skills development and (iii) science, technology and innovation (STI). Considering the cross-sectoral coverage and the strong focus on capacity development for sectoral planning, implementation, and monitoring loop, the National Planning Department (NPD) under the Ministry of Finance Planning (MOFP) took the role of the executing agency of the CDTA.

In January 2013, the External Resources Department (ERD) sent a request to ADB to support the development of a road map to facilitate the coordination and monitoring of the implementation of the National STI Strategy 2013 – 2015. The request letter referred to a project proposal from the Coordinating Secretariat for Science Technology and Innovation (COSTI) to establish a road map, documents and an ICT platform for coordination, monitoring and implementation of the road map.

In response to this request, ADB fielded Prof. Heesung Yang as a Consultant from 16 to 21 May 2013 aiming to (i) provide feedback to the proposed COSTI functions, organization and work plan, (ii) identify the areas and methods of ADB technical assistance and (iii) develop and

agree on a work plan for the next 12 months, with clear deliverables. The discussion centered around COSTI, its functions, organization and work plans, priority areas for ADB support and advisory inputs required for the project.



Launching of Sigma and VIDU Programmes with ADB Consultant Prof. Yang

The above consultation with ADB resulted in the formulation of two projects, Survey Sigma and VIDU Programme, that would set up the baseline for a national R&D directed funding mechanism, and identify potentially significant R&D programmes to be implemented through the treasury and the NPD.

a) Survey SIGMA

As a core task of the ADB project, COSTI initiated ‘Survey Sigma’, an activity meant for Stocktaking and Analysis of STI initiatives/programs being undertaken in the country. Thus, in March 2013 COSTI launched its first major activity, a national R&D survey to understand the current status of S&T in the country.

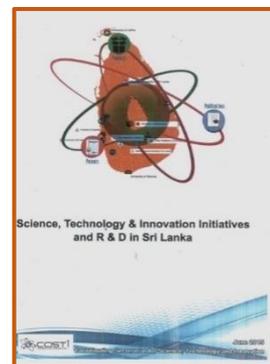
The survey was conducted with a view to gathering baseline information on Science, Technology and Innovation initiatives, especially related to information on R&D projects, human resource and capacity levels, impediments to R&D etc., carried out by state sector Research Organizations and National Universities, coming under the purview of 20 line ministries. The need for such a survey arose because surveys that have been conducted so far by various S&T institutions in the



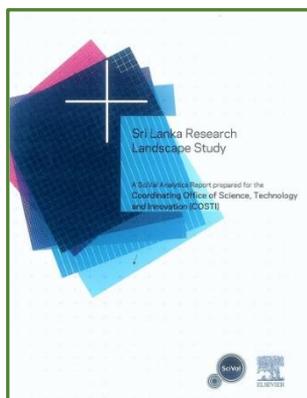
Pilot testing and assessment of the questionnaire

country were not adequately comprehensive and showed many lapses, discrepancies and deficiencies. The time lag (18-24 month period in most cases) between the appraisal and the publication of the results was a major consideration since information was often obsolete by the time they were made available to the public.

The questionnaire used in the survey was structured so as not to duplicate efforts of S&T surveys conducted regularly by NSF, CARP, UGC and NASTEC. The emphasis of the COSTI survey was on gathering qualitative information on R&D activities, rather than quantitative statistical data. The survey attempted to record national development efforts in R&D conducted during the period 2008 to 2012. A special section was devoted in the questionnaire to identify major constraints and impediments that have stifled the progress and effectiveness of R&D activities in the country. Views were sought from five senior researchers and Head of the Institution/University Faculty on issues/constraints encountered by researchers in relation to funds, infrastructure, human resources, administrative and procurement procedures, and other R&D related issues. The questionnaire, developed/refined in consultation with major stake holders at a workshop held in Colombo, was distributed to 42 R&D institutions and 52 University faculties coming under the purview of 20 line Ministries, along with guidelines for completing the questionnaire.



COSTI Report on STI initiatives and R&D in Sri Lanka



SciVal Analytics report by Elsevier

The surveys' attempt to capture a baseline assessment of national development efforts in R&D during the period 2008 to 2012, was somewhat disappointing because of the low response rate to the questionnaire from both R&D Institutions (62%) as well as from Universities (43%). This perhaps was a reflection of perception of indifference of the scientists, a poorly developed information management system that is in existence and/or inadequate institutional capacity to undertake such an activity. However, commissioning Elsevier to track and assess the research performance of Sri Lanka using bibliometric and other indicators provided supplementary information³ to benchmark successfully the R&D activities in the country. The final outcome of survey has been published⁴ (www/costi.gov.lk//images/phocadownload/Sigma).

This exercise was a clear eye opener to the fact that surveys based on questionnaires would not be the way forward but Sri Lanka would require a more sustainable and proactive system of gathering information in the future.

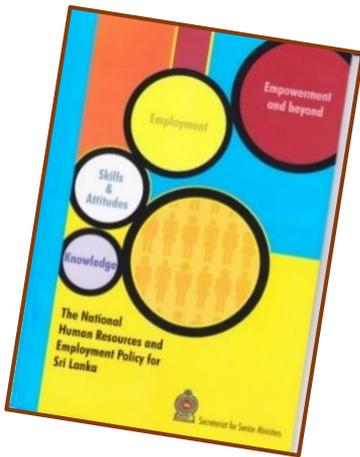
This paved the way to further strengthen the concept of developing the Sri Lanka Innovation Dashboard, an online web based activity that could easily be accessible via the internet, by all R&D institutions and University faculties as well as by individual scientists. COSTI believes that this is the way forward for keeping track of science and technology initiatives of the country and that hereafter surveys based on structured questionnaires would be a redundant entity.

b) VIDU Sri Lanka – STI Flagship Project Development

The VIDU Programme was meant to identify potentially significant research and development projects to change the current economic landscape of the country. These flagship projects are expected to cut across the entire institutional structure and bridge research with the business sector ensuring public private partnerships.

An instrument frequently used in both developed and developing countries (eg. Malaysia and Korea) towards achieving targeted national development is the concept of investing in a few largescale multi-disciplinary STI projects that will catalyze and accelerate the STI input, in collaboration with industries. Although Sri Lanka has not yet engaged on such accelerated, well focused and government committed programmes to use S&T innovations to impact the economy and growth, the ADB during their mission in May 2013 was strongly supportive of this approach and indicated their backing for this programme. However, since ADB would not provide financial support for implementation of such projects, COSTI having had initial discussions developed programmes/projects and submitted them to NPD for funding.

COSTI used the expertise available within the National Councils for Hi-Tech Development and the support of co-opted scientists and other relevant stake holders in the development of flagship projects. The project on ‘Establishing a Center of Excellence in Robotics Applications’ (CERA), developed by the National Council on Electronics and Robotics as a Public Private Partnership, was supported by NPD and the National Budget for year 2014 allocated a sum of Rs. 80 Million to initiate activities related to the project. In addition, as a response to the paper advertisement by the Ministry of Finance COSTI submitted more proposals (both as flagship and National Innovative Projects) to NPD in 2015. All these project proposals covering the sectors/themes of Biotechnology, Advance Materials, Advanced Design and Manufacturing, Nanotechnology, ICT and Space Technology and Electronics and Robotics were developed after having had many consultative meetings with relevant stakeholders.



National Human Resources and Employment Policy for Sri Lanka

The proposal for ‘Development of Marine Craft for Exploiting Ocean Resources’ was also accepted by the NPD as a feasible project but subject to finalizing the funding source.

c) STI and skills development – supporting Ministry (Senior) for Human Resources

The National Human Resources and Employment Policy for Sri Lanka (NHREP)⁵ formulated by the Ministry (Senior) for Human Resources of the Secretariat for Senior Ministers has identified the need for strategic introduction/development and strengthening of relevant human resource skills and competencies for rapid industrialization and sustained growth of Sri Lanka. Thus, the successful implementation of the National S&T policy will depend as a prerequisite, on fulfilling the requirements of science technology and innovation workforce.

A Consultative Meeting on Implementation of the National Human Resource Planning related to STI held in March 2013, recognized the need for champions to move forward the specific requirements identified in the NHREP viz a viz, 20,000 Challenge, STI Job Classification, National Cadre of Researchers, Obtaining services of experienced S&T personnel beyond their mandatory retirement age, A National STI skills audit and An STI Roadmap for Sri Lanka.

(i) 20,000 Challenge – HR development in S&T sector

Rapid industrialization and sustained economic growth of a country depends mainly on the availability of relevant human resource skills and competencies. Evidence from developed countries clearly show that

the human resource development in S&T sector is particularly important for sustained economic development and that a strong positive correlation exists between per capita GDP and the number of science and technology personnel in the country.

According to UNESCO standards Sri Lanka requires 20,000 R&D scientists by the year 2020. However, according to the National R&D Survey 2013 of the National Science Foundation⁶, the number of R&D scientists in Sri Lanka in 2010 has only been 5162. Thus, a well-prepared road map and a clear strategy is required if Sri Lanka is to achieve the above target that would ensure rapid economic development.

Having conducted a number of consultations from amongst senior scientists a Concept Note⁷ has been prepared along with a roadmap and well defined strategies for implementation.



Reports/Concept Notes pertaining to specific COSTI initiatives for NHREP

(ii) Sri Lanka STI Job Classification

It is well recognized world over that highly skilled workers are essential for the development and diffusion of knowledge. They constitute a crucial link between technological progress and economic growth, social development and environmental well-being. In order to keep up with new technologies that are being developed, highly skilled science and technology workers are essential. However, given that training of skilled science and technology workers are time consuming and costly, what is first required is to plan for the supply of adequate number of skilled workers with required skill levels and skill types. Secondly there is a need to ensure that trained science and technology workers are fruitfully employed so that the investments made are not wasted. Such planning is possible only when comprehensive information on the stock and flow of science and technology workers in a country are available.

Based on a number of consultations and having reviewed internationally comparable measures from Australia and United Kingdom a Concept Note⁸ has been prepared for identifying the human resources in science and technology required for Sri Lanka with recommendations for classifying levels of education and S&T fields and occupations suitable for the country. The Concept note includes a road map with recommendations for identifying S&T workers for Sri Lanka.

(iii) National Cadre of Researchers

Inadequate remuneration for scientists has been a major obstacle in recruitment and retention of quality scientific personnel in Sri Lanka. This coupled with insufficient state support for R&D has witnessed a situation where the rate at which the senior scientists retire or resign from service has become much higher than the replenishment of cadre positions with younger talent from the bottom of the ladder.



Champion of the project discussing the proposals amongst scientists

The scientists in Sri Lanka (approximately 5200) are scattered across several Ministries. This makes it difficult to make a rationale to the Salaries and Cadres Commission on an exclusive remuneration package for scientists. For R&D to make a meaningful impact on the economy, it has been estimated that the number of scientists should expand to about 20,000 by 2020 from the present number. In addition, much of available state research funding lacks an overarching focus, firstly in terms of priority areas of research and

secondly on policy leading to sustained and adequate scientific output, both very critical for national development through research commercialization and enhanced exports of value added high-tech goods.

Therefore, a new system has been proposed that would satisfy the objectives of increasing research activity leading to human resource development and incentivize scientists to engage in research relevant to commercialization involving private sector partners, thereby leading to an increase in high-tech value added exports from the country. The proposed tier system will provide research support for scientists and will be linked to an input-output basis with clearly identified KPIs.

This performance based financial reward policy was prepared after a series of consultative meetings with scientists from various disciplines. The new scheme⁹ is expected to produce a higher scientific output in key areas of research linked to national development coupled with increased output of scientific human resources.

(iv) Obtaining services of experienced S&T personnel beyond their mandatory retirement age

Sri Lanka is following an economic development model that places a heavy reliance on the S&T sector. The sector is primarily deficient in qualified and experienced R&D personnel in sufficient numbers. Available information shows that only 55% of the Researchers have research degrees (ie. PhD or MPhil) and that nearly 50% of the R&D personnel are over 50 years old. This poses a major question. It appears that nearly 50% of qualified people will be retiring within the next 10 years, based on the present criteria for retirement. Although retiring people will be replaced with equally qualified personnel from among the junior cadres, the present number of around 5000 qualified personnel is not adequate to fulfil the requirements. Furthermore, there is a need to increase the number of R&D personnel to around 20,000 by the year 2020. Unfortunately, the number of research degrees offered by Sri Lankan universities is well below the target to meet either of these requirements, as the average number of output of PhD and MPhil degree holders by the 15 universities at present stands around 100 per year.

In addition to attempting to producing 20,000 trained R&D personnel by year 2020, by way of a) Launching an incentive scheme to recognize the researchers who contribute considerably for Sri Lankan research and development system through the 'National Cadre of Researchers' and b) Promoting postgraduate research and training leading to production of 20,000 postgraduate research degrees (PhD, MPhil and MSc), it is proposed to obtain the services of experienced S&T personnel beyond their mandatory retirement age¹⁰. This is to be achieved by granting provision for universities and research institutes to extend the services of experienced and trained S&T scientists (ie. academics, research officers, professionals and technical staff), up to 10 years beyond their retirement age on contract basis, but renewable annually. Accordingly, the retirement age of academics in university service could be extended up to 70 years while the retirement age of research officers in state research institutions and senior technical staff of both in universities and state research institutions could be extended up to 65 years. The extension of service should only be granted based on past 5 years of performance of the person concerned and that the person granted with an extension should work according to a work plan agreed upon by the employer and the contract holder. Furthermore, they should not take up administrative positions but continue with their R&D activities.

(v) National Scientific and Technical Skills Audit of the Sri Lankan S&T sector

The National Human Resources and Employment Policy recognizes that the human resources in Sri Lanka have considerable potential to steer the country's growth trajectory from its current low skilled, low productive and low income earning workforce to one that is highly skilled, dynamic and globally competitive.

The required transformation needs more human resources in the field of Science, Technology and Innovation (STI) in numbers with required quality, especially to address the present and future local and global challenges. A well-executed National Scientific and Technical Skills Audit can play an important role in reshaping human capital to address these challenges effectively and efficiently in the country. It is important to have this benchmark data and the audit will be a useful input for government, education and training providers, employers, employees and other individuals to make prudent choices in decision making looking at the current skills mismatch.

Therefore, a Concept Note¹¹ with a road map for the audit has been developed based on the goals and targets set to address the present, emerging and future challenges considering local and global perspectives. In this process COSTI consulted key proponents of the UK Strategy and templates for survey too have been shared. Multiple discussions were carried out bringing the Department of Census and Statistics and a clear way forward for a Sri Lankan National Audit has been identified.

(vi) STI Road map for HR Development

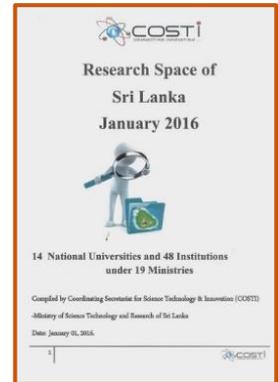
According to available information, there is a severe dearth in the number of qualified STI personnel in Sri Lanka. Two major causes for this has been identified as inadequate opportunities for higher education and post graduate studies and lack of a mechanism to attract potential STI personnel.

Considering the National Human Resources and Employment Policy as the overarching policy framework of the Government of Sri Lanka that would govern its human resource development work, a Master Plan for Implementation was developed by the Secretariat for Senior Ministers where COSTI provided inputs towards the development of an Implementation Matrix for the road map in the areas of STI.

2. Mapping of STI landscape – Our Research Space

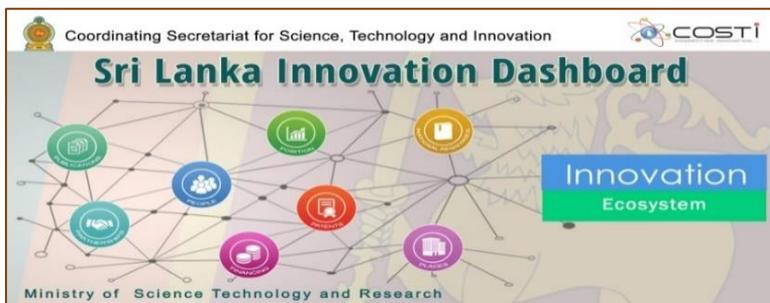
As a pre-requisite to the Technical Assistance programme on Capacity Development in STI to be supported by the ADB, COSTI undertook a study to map the Sri Lankan Research Space¹² (updated to 2016) in order to gather background information on the major players conducting R&D activities in the country.

The study recorded fourteen (14) National Universities under the Ministry of Higher Education, two (02) under the Ministry of Skills Development and Vocational Training and one (01) under the Ministry of Defense. In addition, there are forty eight (48) R&D institutions coming under the purview of eighteen (19) line Ministries.



Mapping our STI Landscape

3. National Science, Technology and Innovation Dashboard



Sri Lanka Innovation Dashboard

COSTI is mandated to Coordinate and Monitor Science Technology and Innovation activities in the country. It also works towards promoting value addition and commercialization in line with the National Science, Technology and Innovation Strategy for Sri Lanka.

In order to achieve the above, COSTI developed a National Science, Technology and Innovation (STI) Dashboard which is an Information Management System that provides information on the current status of Sri Lankan STI space (a snapshot view).



Dashboard of the future

Science and innovation to accelerate economic growth

Dr. GEETHA ABEYSINGHE
Program Director of COSTI talks about Sri Lanka's first-ever National Innovation Dashboard which reflects the Science, Technology and Innovation (ST&I) position of the country with BusinessUK's **CHANDANI JAYATILLEKE**

The introduction of the National Innovation Dashboard last month is an opportunity for Sri Lanka to develop and maintain a national research and scientists' database, with a complete list of people who are engaged in research and innovation activities and their outputs. The dashboard project was spearheaded by the Coordinating Secretariat for Science, Technology and Innovation (COSTI) which was established on February 1, 2013 with the specific aim of coordination and monitoring of Science, Technology and Innovation activities in the country.

The system was developed by Lanka Software Foundation, a non-profit organization formed with the objective of promoting open source development, by Sri Lankan developers, with the close collaboration of the IT team of COSTI.

There was an urgent need for Sri Lanka to establish its own innovation

ST&I information in the country earlier. "Sri Lanka's achievements never got reflected fully at the international level, although our innovators, scientists and researchers had made some significant contributions to the development of ST&I of the country," Dr. Geetha Abeysinghe, Program Director of COSTI who was in-

It also launched Sri Lanka's first-ever dashboard that aggregates accessible collections of Institutional and people data in electronic form for shared access by the scientific community, both national and international. The data collection started with the survey carried out by

COSTI (SIGMA Survey) where 42 R&D institutions and 52 university faculties were surveyed. However, the low response rate to the survey led to the thinking that surveys based on questionnaires would not be the way forward when gathering information on STI but Sri Lanka would require a more sustainable system, perhaps based on ICT.

The Innovation Dash Board that has been developed also incorporates Information gathered during various coordinating activities of COSTI. Furthermore, data have been mined through various websites and both hard and soft publications, and through contacting organizational heads. It also entertains entries by inventors and thus provides an innovation platform for 'would be entrepreneurs'. The Innovation Dashboard conceptualized by the IT team of COSTI and developed using open software was launched at the Trace Expert City in Colombo in July 2015 and has since been demonstrated to scientists and academia at numerous workshops, seminars and conferences. It can be accessed via internet at <http://dashboard.costi.gov.lk/home/>.

The Sri Lanka Innovation Dash Board (SL_IDB) won the National Best e-Content Award under the 'Government and Open data' Category, at the 2016 e-Swabhimani organized by the Information Communication Technology Agency of Sri Lanka (ICTA). The e-Swabhimani is an initiative of ICTA aimed at recognizing excellence in digital content creation.



COSTI IT Team with the 2016 e-Swabhimani Award, winner under the 'Government and Open Data' Category

4. Tax Incentive Scheme for Research and Development

On 20 September 2012, the Minister of Finance introduced in his budget speech for 2013, a package for new Research, Technology and Development measures aimed at encouraging more private sector engagement in research and innovation. He proposed ‘to grant a triple deduction for research expenditure and a lump sum depreciation for capital expenditure on required equipment and development of laboratory facilities to encourage private sector engagement in research and innovation’ (item 37.1 of page 47 of Budget Speech 2013). This is a modification to the previous announcement made in the Budget Speech of 2012 which states, quote ‘As announced in the 2012 Budget, I introduce a provision to the tax laws to provide triple deductions to the private sector to fund research in collaboration with Government research institutions’ unquote, which limited the tax incentives to private sector only if they funded research and development in collaboration with Government research institutions.

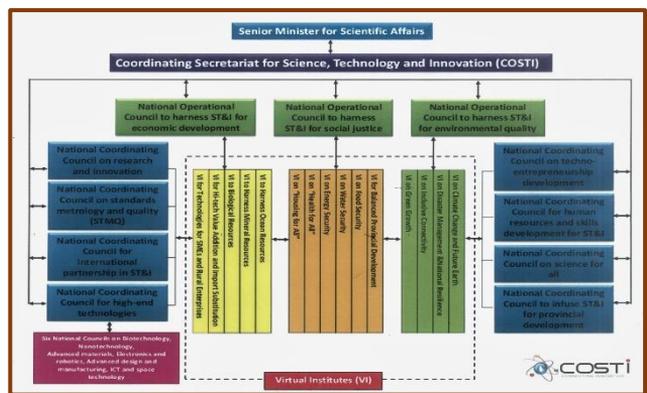
Accordingly, the triple deduction and lump sum depreciation allowed for expenditure on research and development carried out through Government institutions will be extended to such expenditure incurred on research and development carried out by themselves or through private R&D institutions. Thus, a claimant carrying on a business in Sri Lanka in a tax year may, in calculating income from the business for the year, be entitled to deduct expenditures incurred on R&D carried out in Sri Lanka that relates to the business of the claimant.

Thus, having reviewed various tax incentives being provided for R&D by a number of developed countries such as Canada, United Kingdom and Singapore, a R&D Tax Incentive Scheme¹³ was developed that would provide targeted Research and Development Tax offsets to Sri Lankan businesses of all types, in all sectors conducting Research and Development (R&D) in Sri Lanka. The industry perceptions on the scheme were also assessed at a number of meetings and thereafter the proposed scheme was submitted to the treasury for their views.

Designed to encourage more private sector companies to engage in R&D it is expected to provide cash refunds or tax deductions for expenditure on eligible R&D work done in Sri Lanka. The scheme is to be administered by the Department of Inland Revenue, based on an application form developed by COSTI in consultation with the Department of Inland Revenue.

5. Establishment of National Coordinating Councils

The establishment of National Coordinating Councils was a mandated activity of COSTI, within the Operational Framework for Coordination and Monitoring of STI activities as approved by the Cabinet of Ministers in August 2011. The National Coordinating Councils have been recognized as a mechanism for facilitating the coordination and monitoring of STI activities in the key thrust areas.



Operational Framework of COSTI

Although according to the National Coordinating and Monitoring framework of the STI Strategy 2013-2015 eight National Coordinating Councils were to be established; only the following three could be established by the end of 2014. The delay in establishing the Coordinating Councils until end of 2014 was primarily due to the delay in approval by the Treasury of the proposed honorarium payment of Rs. 4000/- to a Council member for attending Council meetings.

a) National Coordinating Council on Science for All

The National Coordinating Council on 'Science for All' held its first meeting in May 2014. The main functions of the Council are to:

- Develop a National Science Communication Policy and a master plan for co-implementation with effective mechanisms/programmes for popularizing science, technology and innovation among different segments of the society with all stakeholders from the state, private, non-governmental and civil society sectors.
- Facilitate and monitor processes to co-identify, co-plan and co-implement mechanisms to attract the younger generation into science disciplines and science careers in collaboration with all stakeholders from the state and private sectors, NGOs and civil society, in collaboration with the NCC on Human Resources and Skills Development.
- Coordinate and monitor public awareness activities to impart and enhance an understanding of the scientific basis of current happenings (at provincial, national, regional and global level) using print and electronic media (radio, TV, internet, Newspapers and Social Media Networks such as Facebook and Twitter), in English, Sinhala and Tamil languages.
- Coordinate, support and monitor rapid dissemination of key concepts and relevant information generated through the COSTI framework (through National Coordinating Councils, National Councils and the 15 Virtual Institutes), to the general public and key stakeholders.
- Coordinate and monitor programs to improve skills in science communication of scientists and journalists, pulling many resources together, in collaboration with the NCC on Human Resources and Skills Development and all relevant stake holders in the state and the private sector.
- Co-identify and co-develop and support co-implementation of programs to create awareness especially among micro and SMEs, small businesses and the service sector on the value of technology and innovation, along with product standards, quality systems and relevant environmental safety issues, in collaboration with the NCCs on Techno-entrepreneurship and standards and Quality and all relevant stake holders, in the state and the private sectors; and monitor progress.
- Coordinate, collaborate and cooperate with other institutions and agencies on international activities related to science popularization, and identify and facilitate international partnerships to achieve science for all for twining arrangements and identifying funding opportunities in collaboration with the NCC on International Partnerships in STI, and monitor progress.
- Coordinate and monitor the development of multimedia and web based resources for science popularization and education
- Coordinate and monitor the establishment of a dedicated TV channel for science education and popularization, as identified in the National STI strategy.
- Coordinate and monitor the setting up and operationalization of a National Science Centre in Sri Lanka as envisioned in the National STI Strategy.
- Advice on development of a web enabled Scientific Information Database to be used by providers and beneficiaries of science popularization.

The National Coordinating Council on Science for All met four times during 2014.

b) National Coordinating Council on International Cooperation in STI

The National Coordinating Council on International Cooperation in STI began functioning, with the first meeting of the Council in June 2014. The main functions of the Council are to:

- Prepare an action plan aiming to achieve set targets of the roadmap developed by the Coordinating Council to implement the activities of the STI strategy
- Identify areas for possible international partnerships to facilitate the activities related to STI

- Facilitate and coordinate the development of strategic international partnerships with international institutions/agencies/bodies for R&D in key areas of national and international dimension
- Facilitate aligning and developing partnerships with UNESCO programmes
- Develop/strengthen partnerships with other relevant international bodies such as UNDP, UNICEF, UNIDO, Commonwealth of Learning (COL), Asia Pacific Centre for Transfer of Technology (APCTT), Asia Pacific Association for Agricultural Research Institutes (APAARI), International Centre for Genetic Engineering and Biotechnology (ICGEB), International Foundation for Science (IFS), to foster international corporations/collaborations for STI activities
- Develop/strengthen relationships with international funding bodies such as SIDA, CIDA, EU, IDRC etc.
- Assist ICSU in its mission to strengthen international science for the benefit and well-being of all humanity, upholding ICSU's principle of the Universality of Science that embodies freedom of movement, association, expression and communication among scientists across borders

The National Coordinating Council on International Cooperation met three times during 2014.

c) National Coordinating Council on Human Resource and Skills Development

The following are the expected functions of the above Council. Although the draft Terms of Reference was prepared and arrangements were made to hold its first meeting, it could not be held due to unavoidable circumstances.

- Prepare a road map with well-focused and accelerated programmes and activities for training, succession planning/talent pool management, attracting and retaining skilled personnel in all sectors and subject areas relevant to Science and Technology
- Identify human resource development needs to facilitate implementation of demand driven research & innovation programs conducted in the country by the virtual clusters
- Provide assistance towards the establishment of a National Cadre of Research Scientists as outlined in the National S&T Strategy
- Assist in the development of other strategies/activities to meet the demand for STI personnel in the country
- Develop a National Technical Workforce Planning and Development Strategy for implementation by different line Ministries as outlined in the National Human Resources and Employment Policy for Sri Lanka

Although the Framework had the mandate to create 8 National Coordinating Councils, COSTI was able to establish only the above during the period of its operation.

6. COSTI Advisory Council

As outlined in the National Coordinating and Monitoring Framework of STI Strategy for Sri Lanka, an Advisory Council to the Senior Minister was established in July 2013 with the membership of 10 eminent public and private sector personnel. The Advisory Council chaired by the Senior Minister was intended to act as a think tank bringing the highest level of private sector leadership and a few leading personalities in the public sector.



Advisory Council meeting discussing VIDU programme

7. MOU with the Treasury



Discussing the MOU with Minister Amunugama and Dr. Batagoda of the Treasury

and understanding which COSTI felt was important and needs addressing. Therefore, COSTI proposed an MOU with the NPD to facilitate coordinated planning and input of resources towards STI activities in the country. The aim was to ensure that the outputs as far as possible directly address national developmental goals and the national priorities and have an impact on the innovative capabilities of the country, resulting in near-term enhanced STI activity contributing towards the economic, social and environmental development of the country. More specifically, close coordination and monitoring of STI activities were expected to enable the parties to strengthen the innovative capacities of the STI institutions and the community. Furthermore, it was expected to foster sustainable longer-term university-industry-research institution partnerships in the country, enable the development of end-user driven, solution-oriented directed research and development programmes and advance such research and innovation into profitable use. This would ensure optimum disbursement of government funding and resource inputs to STI activities in the country avoiding duplication as far as possible and promote private sector resource input into research, development and innovation.

Upon analysis of available information COSTI observed that projects submitted to the NPD from different Ministries were not given their due recognition and importance because of lack of awareness

Although a draft MOU was prepared and agreed upon by both parties, it never became operational due to changes in the administration of the two institutions.

8. Establishment of Virtual Institutes

According to the National Coordinating and Monitoring Framework 2013-2015, COSTI was mandated to establish fifteen (15) Virtual Institutes under the three sustainability pillars namely, Economic Development, Social Justice and Environmental Quality.

A Virtual Institute (VI) is a knowledge based results oriented collaborative STI network of multidisciplinary individuals, groups and organizations working through a virtual platform to identify, design and strategize the implementation of national innovative programmes for the sustainable socio-economic development of the country. A study for the mechanism of implementation of VI's was carried out by Post Graduate Institute of Management and the University of Sri Jayewardenepura and their views were taken into consideration in the implementation process.

The future of scientific research and innovations will increasingly depend on the interaction between globally distributed teams of researchers/academia and also focusing on cross cutting areas. The main advantage that VIs can bring to Research & Innovation is the increased interactivity between researchers and access to skills, knowledge, research data and computational resources situated in remote locations. Time will be saved since researchers will not need to travel to work with others or access resources. Data is collected increasingly by using instruments at remote sites in real time. The real-time capability will also allow researchers to quickly validate results. The effectiveness of research partnerships is therefore, likely to be flourished more and more, but yet using existing institutional and available infrastructures circumventing spatial and temporal barriers.

The First Virtual Institute on Climate Change and Future Earth was launched on 17 September 2014 at the Coordinating Workshop on 'Developing an STI Agenda on Future Earth for Sri Lanka'

The following Virtual Institutes were initiated during the period 2013-2015. Based on a draft Concept note, stake holder consultation or a national workshop, information was gathered on the current status, gaps, issues and challenges that need to be addressed. Subject to tasks to be performed to bring about remedial measures, in relation to the thematic area under consideration, clusters and sub-clusters were formulated. Furthermore, key players who could effectively contribute to implementation of best solutions were also identified.

VI's under Economic Development pillar

- Virtual Institute to Harness Ocean Resources
- Virtual Institute on Mineral Resources
- Virtual Institute on Biological Resources
- Virtual Institute on High-tech Value Addition and Import Substitution
- Virtual Institute for SMEs and Rural Enterprise Development in Sri Lanka

VI's under Social Justice pillar

- Virtual Institute for Balance Provincial Development
- Virtual Institute on Food Security
- Virtual Institute on Water Security
- Virtual Institute on Energy security
- Virtual Institute on Health for All
- Virtual Institute on Housing for All

VI's under Environmental Quality pillar

- Virtual Institute on Climate Change and Future Earth
- Virtual Institute on Green Growth
- Virtual Institute on Inclusive Connectivity
- Virtual Institute on Disaster Management and National Resilience

9. Development of National Innovation Projects (NIPs)

The 15 Concept notes developed for the Virtual Institutes were used to formulate National Innovation Projects (NIP). NIPs are considered to be next generation research and development projects that have specific objectives/problems to be addressed and thereby achieve targeted outputs that are of immediate benefit to the general public and the national economy. These were prepared based on extensive consultations with relevant stake holders of the specific thematic area. Round table discussions and mini workshops were held among stake holders from various clusters/sub-clusters under the thematic area of the Virtual Institute, who having considered the present state of the art formulated next generation research and development projects.

Of the National Innovation Projects (NIP) formulated during 2014-2015, the following twenty-five proposals (25) have been forwarded to the Treasury for consideration in the National Budget and the Public Investment Strategy for Sri Lanka.

The First five proposals (a-e) emerged as VIDU proposals as they were prepared under the guidance of the National Councils and relevant experts. Two of them (b and e) were supported by NPD and were included in the Public Investment Strategy 2014-2016.

a) Seaweed farming, harvesting and technological value addition as a lead project for profitable and sustainable exploitation of Sri Lanka's Marine resource

Objectives:

- i) Sustainable development of the seaweed industry through cultivation of red sea weed species *Kappaphycus* and extraction and biotechnological value addition to intermediate and consumer products

b) Development of Innovative, Sustainable Marine Craft for Exploiting Ocean Resources

Objectives:

- i) Develop the design and build an advanced model of a craft which is economically and ecologically feasible
- ii) Increase the number of advanced deep sea fishing vessels being deployed
- iii) Increase deep/high sea fish harvest sustainably and thereby contributing to the realization of national objectives; enhanced export earnings, import substitution, creating gainful employment to Sri Lanka and enhanced nutritional status

c) Development and manufacture of quality Biologicals (mainly vaccines) locally to reduce import dependency of local industries

Objectives:

- i) Invention of new vaccines using local microorganisms as antigens to control diseases of livestock
- i) Improvement of existing vaccines to match global standards for commercialization
- ii) Formulation of therapeutics locally for prevention and control of diseases
- iii) Production of diagnostic reagents locally to substitute expensive imported diagnostic kits
- iv) Development of starter cultures for value added dairy products

d) Science, Technology and Innovation (STI) intervention to transform the Sri Lankan tea industry

Objectives:

- i) Improving overall productivity and energy efficiency of the tea plantations and tea processing industry and thereby reducing the cost of production enabling the industry to be sustainable in the market it operates.
- ii) Reducing all types of wastages of tea leaves as well as processed tea, with direct economic benefits to the industry.
- iii) Improving the quality of end product and its compliance to emerging stringent food compliance requirements.
- iv) Further differentiating Pure Ceylon Tea as a versatile herbal product that can be positioned at the top-end of the value chain.
- v) Re-positioning the industry for the future.
- vi) Developing highly value-added differentiated product range meeting emergent market requirement.

e) Establishing a 'Centre of Excellence in Robotic Applications' (CERA) as a Public-Private partnership

Objectives:

- i) In general to increase awareness of robotic technology and promote robotics application in Sri Lanka
- ii) Develop cost-effective robotic platforms for industrial automation
- i) Create new industries related to robotics technology

f) Synthesis of graphene from locally available vein graphite for advanced applications in industry

Objectives:

- i) Develop a pilot scale manufacturing technology for the production of graphene
- ii) Design and develop graphene based advanced applications
- iii) Obtain IP rights for: modifications to graphite/graphene, mass scale manufacturing of graphene from vein graphite and manufacturing technology of advanced devices from graphene

g) Establishing a Center for Advance Venom Research & Applications

Objectives:

- v) To facilitate research and development towards the production of species specific anti-venom from Sri Lankan snakes, ensure the conservation of Sri Lankan snakes and support eco-tourism by establishing snake farms.

h) Establishment of Sri Lanka Biotechnology Park

Objectives:

- i) Establish a centralized biotechnology facility with the state of the art modern technologies for a high throughput genomics facility, tissue engineering for human development, pharmaceutical and enzyme industry, etc.
- ii) Provide incubator facilities for inventors.

i) Genomics and Digital Health Core

Objectives:

- i) To establish the most modern cytogenetic, molecular genetic, molecular cytogenetic, and other complementary laboratory infrastructure for genetic and genomic analysis and for conducting cutting edge research and facilitate commercializing of research findings.

j) Genetic improvement of tomato for yield, fruit quality and enhanced resistance to biotic and abiotic stresses through genomics assisted breeding

Objectives:

- i) To develop varieties of tomato with improved fruit quality, increased tolerance to major pests and diseases and changing climatic conditions
- ii) Introduce a real-time crop pathogen identification system to the national agriculture system of Sri Lanka

k) Establishment of an Advanced Fumigation System for Sri Lanka Customs

Objectives:

- i) Establish a proper Fumigation System for Quarantining Fresh Commodities at the ports of Sri Lanka
- ii) Control and avoid foreign pests and disease contaminations which are possible through imports and Temporary Import for Export Purpose

l) Manufacture of a National Electric Vehicle

Objectives:

- i) Use electric vehicles as urban taxis to make our transport systems greener, cleaner, and more people-centered which will reduce the carbon emissions in urban area and the noise generation from the vehicles
- ii) To promote solar smart grids for households adding power to the grid at day time, with electric vehicle to use the excess power at nights

m) Nanotechnology for Ceramics and Glass

Objectives:

- ii) Development of novel bio-ceramic nanocomposite materials, high-tech ceramic electronic materials, and future generation glass to use in variety of industries
- iii) Synthesis or fabrication of nanomaterials or nanostructures to be used in the above applications.

n) Establishing Electronic Product Commercialization Facilitation (EPCF) Centre as a 50-50 Guarantee Mode Public Private Partnership

Objectives:

- i) To set up a National Electronics Product Commercialization Facilitation Centre with Industry/State Sector participation to evolve programs in pursuit of the laid down policies and to create institutional mechanisms to advance the implementation of various programs aimed at promoting Sri Lanka as an Electronics Hardware Manufacturing Hub and suitably market BRAND SRI LANKA in Electronics for increasing the Electronic Products exports from present USD 400 million to USD 4 Billion by 2020.

o) KIPO IP Sharing Project – Appropriate Technology

Objectives:

- i) Improving the quality of life in low income families from poverty and disease through development and dissemination of appropriate technology
- ii) Facilitate sustainable economic growth of the country and strengthen the development of technical capacity in local communities

p) Establishing a Sustainable Food Safety Monitoring System for Sri Lanka

Objectives:

- i) Development of cost-effective simple tests to detect hazardous substances and properties in food
- ii) Development of simple and rapid methods to assess the hygienic quality of raw milk at milk collection centers

q) A Real Time Mobile based information system and a management Dashboard to achieve Food Security for the country and stable and sustainable prices for farmers and consumers – ‘Govi Nena’ (“ගොවි නූණ”)

Objectives:

- i) Develop a mobile based information management system to achieve an equilibrium between supply and demand of agricultural products including paddy at an optimum price point that will be beneficial to both producer and consumer
- ii) Developing a web based Dashboard for relevant Agriculture Authority to view crop dynamics such as extent and varieties that has been planted and other relevant information
- iii) Set incentives to influence selection of crops for planting that will be conveyed to farmers visually and in real time

r) Development of a Energy Storing System (ESS) for house-hold usage

Objectives:

- i) Provide an adequate, affordable and reliable energy supply system by 2020 by developing an indigenous energy storage device for house hold use that will enhance peak saving and energy storing capacity and reduce fossil fuel consumption

s) Development of Bio-refinery for the Production of Fuels and Chemicals from Biomass

Objectives:

- i) Promote second generation biofuel production and demonstrate the usage of biofuel as an energy source to reduce the dependency on imported conventional fossil fuel and enhance the sustainability of the nation.
- ii) Develop basic chemical production facilities within the country hence encourage local production of essential commodities and enhance the development of product manufacturing industry

t) A special diet based treatment that can be used as a preventive and curative measures for Chronic Kidney Disease of uncertain etiology (CKDu) – A pilot study

Objectives:

- i) Introducing a successful dietary intervention to help patients affected by CKDu
- ii) To study the efficacy of a special diet formula prepared using traditional varieties of crops grown without using agro-chemicals, on CKDu

u) Solar Roofing; Alternative for asbestos roofing

Objectives:

- i) Promote solar roofing as an alternative for Asbestos roofing
- ii) Eradicate the health effect due to usage of asbestos and reduce harmful waste material (asbestos)
- iii) Promote kind of a roofing having more benefits compare to asbestos roofing
- iv) Promote solar energy as a solution for power crisis

v) Establishment of a National Climate Observatory System for Sri Lanka

Objectives:

- i) Development of a national land+sea grid of online weather stations reporting live and real-time to a public online repository that can be used by mobile applications users, by private companies and by public institutions to provide high accuracy and rapid disaster predictions.

w) Nanotechnology for greener environment (Hi-tech composites for urban construction using local raw materials and advanced technology)

Objectives:

- i) Development of novel nanocomposite materials to use in the building construction and roadway construction industries
- ii) Synthesis or fabrication of nanomaterials or nanostructures to be used in the above nanocomposites

x) Online Learning Environment (for Mathematics and English)

Objectives:

- i) To provide an ICT-enabled, widely accessible, interactive learning environment, specifically to support Mathematics and English at secondary school level.

y) ICT Startup Acceleration

Objectives:

- i) To accelerate the ICT startup eco-system in Sri Lanka.
- ii) Facilitate local ICT innovation and foster related start-ups
- iii) Facilitate the establishment of foreign ICT start-ups in Sri Lanka

Of the various proposals submitted the following projects received financial support from the NPD.

- a) Establishing a National Science Centre for Sri Lanka
- b) Establishing a Centre of Excellence in Robotics Application (CERA)
- c) Establishing a Biotechnology Park for Sri Lanka

A sum of Rs. 419 million was allocated by the Treasury for 2015, to initiate activities related to the establishment of a National Science Centre. Although the National Science Foundation and COSTI were identified as the implementing agencies, the then Ministry of Technology and Research intervened and took over the responsibility. This delayed the implementation process and the Ministry was not able to effectively utilize the allocated funds. The activity has now been revitalized by the present Ministry of Science Technology and Research.

The Treasury allocated Rs. 80 million for CERA in its budget for 2015 to initiate activities and this activity is progressing well under the direction of Ministry of Industries. (See Annex 1)

With regard to Biotechnology Park, Treasury allocated Rs. 200 million to initiate activities. Land has been allocated and work is progressing well with COSTI coordinating the activity vigorously.

The other proposals are yet to be funded although a few of them have been considered as highly relevant and nationally important. Some of them were on the verge of approval or even implementation (Annex 2). However, lethargy or perhaps indifference on the part of the proposed executing agencies could be attributed to non-implementation of some of these proposals.

COORDINATING WORKSHOPS/CONFERENCES

2013

1. Future Earth – Developing a Science, Technology and Innovation Agenda for Sri Lanka



Hon. Minister of Scientific Affairs lighting the traditional oil lamp



Nobel Laureate Prof. Juan Tseh Lee delivering the keynote address

Future Earth is a 10-year international research initiative on Earth System research that will develop the knowledge for responding effectively to the risks and opportunities of global environmental change and for supporting transformation towards global sustainability in the coming decades.

Future Earth has been established by a broad science and technology Alliance for Global Sustainability which includes the International Council of Science (ICSU), the International Social Science Council (ISSC), the Belmont Forum of funding agencies (BF), the United Nations Environment Program (UNEP), the United Nations Educational Scientific and Cultural Organization (UNESCO), the United Nations University (UNU), and the World Meteorological Organization (WMO) as an observer.

While the scope of Future Earth is global, a number of issues require both region and country specific approaches to provide robust observations and forecasts of regional environmental change, assess potential impacts and vulnerabilities and explore mitigation and adaptation pathways. Regions as well as individual countries have a critical contribution to make to assess environmental change and to participate in building a global picture for transitioning towards sustainability. This could involve identifying the needs and priorities of researchers and practitioners at national and regional levels, stimulating cooperation and partnerships, and promoting institutional coherence.



Prof. Heinz Gutscher and Prof. Nordin Hasan sharing their knowledge on Future Earth

In order to assess the present status with a view to co-identify, co-plan and co-develop a STI Agenda for Future Earth for Sri Lanka COSTI organized a 2 day workshop from 17-18 September 2013 at Galadari Hotel in Colombo. The Chief Guest of the Workshop was Nobel Laureate in Chemistry (1986) and President of the International Council for Science (ICSU) Prof. Yuan Tseh Lee. Two other internationally renowned scientists Prof. Heinz Gutscher from Germany and Prof. Nordin Hasan from Malaysia also shared their knowledge and experience in Earth System Science and Global Sustainability Research.

In addition to developing a common understanding of the Future Earth initiative amongst over 200 Sri Lankan scientists, policy makers, high ranking government officials, funding agencies and other relevant stake holders, the workshop developed a Science Technology and Innovation Agenda for Sri Lanka on Future Earth¹⁴, identified



Discussing Future Earth

priority areas for research and institutionalized the First VI, the Virtual Institute for Future Earth for Sri Lanka.



Over 250 participants attended the workshop

The Workshop on Future Earth was the First high-end Coordination effort of COSTI.

2. Innovative Approaches in Biotechnology for Fueling the National Economy – Coordinating Workshop for Biotech Stakeholders

COSTI organized a workshop titled “Coordinating Workshop for Biotech Stakeholders: Innovative Approaches for Fueling the National Economy” in November 2013 at Hotel Cinnamon Grand, Colombo with a view to:

- promoting a dialogue among the R&D organizations and industries active in biotechnology and
- form a better understanding of current issues and cooperation.



Prof. Tissa Vitarana addressing the participants

A total of 92 participants representing both public and private sectors related to biotechnology attended the event. Key recommendations in the areas of Medical, Agriculture and Industry are expected to sensitize biotech stakeholders and policy makers and take follow up action towards developing a pragmatic technology roadmap to create an enabling environment to pursue directed R&D and innovations focusing on most pressing needs of the country.

2014

1. Coordinating Workshop for the Establishment of a National Science Centre in Sri Lanka



The Coordinating Secretariat for Science Technology and Innovation (COSTI) organized a workshop titled “Coordinating Workshop for the Establishment of a National Science Centre in Sri Lanka” from 22-24 January, 2014 at Waters Edge, Battaramulla, Sri Lanka. The main objective of this workshop was to provide a platform to discuss and develop modalities towards the establishment of a state of-the-art Science Centre in Sri Lanka with exhibit galleries, interactive exhibits/Exploratorium, to show case among others Sri Lanka’s traditional knowledge, our heritage, our rich biodiversity,

wonders of science, marvels of the human body etc. Funded by the US National Science Foundation, several well-known professionals from the Association of Science-Technology Centres (ASTC) participated as resource persons. While the Ministry of Education and Ministry of National Heritage played a major role in organizing the workshop, the Institution of Engineers Sri Lanka (IESL), Sri Lanka Institute of Architects (SLIA), National Institute of Education (NIE), the Sri Lanka Medical Association (SLMA) and the National Academy of Sciences of Sri Lanka (NASSL) joined hands with COSTI as co-organizers to accomplish this task.



Mr. Mohanlal Grero, and Prof. Tissa Vitarana lighting the traditional oil lamp

The workshop was inaugurated by Hon. Minister (Senior) for Scientific Affairs Prof. Tissa Vitarana and Hon Deputy Minister of Education Mr. Mohanlal Grero. While the programme concept was presented by Mr. Anthony (Bud) Rock, President and Chief Executive Officer of ASTC, the Key note address was delivered by Ms. Gillian Thomas, CEO of the Miami Science Museum, USA.

Two days of this three-day event were allocated for presentations and group discussion sessions where details involved in the establishment of a state-of-the art science centre were worked out. The third day was devoted to visiting the Colombo National Museum in order to familiarize with the cultural differences and behavioral tendencies among the public visiting science centres. The workshop was concluded by identifying the way forward towards establishing a science centre in Sri Lanka and a subsequent debriefing of the Hon. Senior Minister for International Monetary Co-operation and the Deputy Minister of Finance and Planning, Dr. Sarath Amunugama, Hon. Senior Minister for Scientific Affairs Prof. Tissa Vitarana and Hon. Deputy Minister of Education Mr. Mohanlal Grero, about the outcome of the workshop.



Workshop participants posing for a photograph

2. A Coordinated dialogue on ‘Science for all: Mainstreaming Science Technology and Innovation for Public Communication’

For Sri Lanka to improve its economy to bring prosperity to its people and become a knowledge hub, it is imperative that we recognize the importance of science, technology and innovation, and the scientific capability of the people.

In order to meet this challenge, the role played by science communication is of immense importance and accordingly COSTI in collaboration with SciDev Net (www.scidev.net) organized a coordinated dialogue on science communication titled, “Mainstreaming science technology and innovation for public communication”, at Galadari Hotel Colombo, on 29th May 2014.



Prof. Vitarana at the opening ceremony



Moderators at work

Newspapers and Social Media Networks such as Facebook and Twitter) and develop mechanisms to encourage and facilitate cross-boarder exchange in the field of science in society.

The objectives of the workshop were to: discuss the development of an action plan/road map with effective mechanisms/programmes etc. for popularizing science, technology and innovation among different segments of the society, facilitate linkages and networking of scientists and journalists working on science, enhance public awareness and understanding of the importance of STI using print and electronic media (radio, TV, internet,



Two journalists expressing their views

3. Coordinating Workshop on ‘Harnessing Biological Resources for Economic Development’

COSTI organized a Coordinating Workshop on ‘Harnessing Biological Resources for Economic Development’ on 22 August, 2014 at SLIDA, Colombo with the objective of:

- identifying the present status in terms of availability and utilization of Biological Resources of the country,
- forming the stakeholder clusters based on priority areas to develop next generation projects in harnessing Biological Resources toward economic development,



Discussing Biological Resources of Sri Lanka

- initiating a process towards the development of National Innovative Programmes (NIPs) to conserve Sri Lanka’s biological diversity and ensure that its components are utilized in a sustainable manner for the economic development of the country,
- networking among the R&D organizations and industry to implement the NIPs and encourage collaboration. A multitude of participants from the State Research Institutes, Ministries, Universities, Private sector, NGO and INGOs participated in this event.



Participants at the workshop

4. Workshop on Risk Assessment and Risk Management of Genetically Modified Organisms

COSTI joined hands with the Ministry of Environment and Renewable Energy and the Biodiversity Secretariat to organize the above workshop on 17 September 2014 in Colombo, as a back to back event of the Second Annual South Asia Biosafety Conference. The objectives of the workshop were to: acquire knowledge and practical training on risk assessment and management of genetically modified organisms, food, feed and processed products in order to build capacity in these areas. The South Asia Biosafety Programme, Centre for Environmental Risk Assessment and Biotech Consortium India Ltd, supported the workshop by providing resource persons.

The workshop provided a Forum for Sri Lankan scientists to interact with the resource persons, share their knowledge and experience and establish links for future collaboration and partnership.

5. National Conference on Biotechnology

The first National Conference on Biotechnology was organized by the Coordinating Secretariat for Science, Technology and Innovation (COSTI) along with the National Council on Biotechnology. It was held on 18 September 2014 at Hilton Residencies, Colombo. The conference was graced by the Hon. Minister (Senior) for Scientific Affairs, Prof. Tissa Vitarana and the Governor of the Central Bank of Sri Lanka, Mr Ajith Niward Cabraal.



Opening ceremony – address by Prof. Tissa Vitarana



Chief Guest – Mr. Ajith Niward Cabraal

Over 350 biotechnologists from academic and state and non-state sector institutions, policy makers and investors participated. Key note address was delivered by Dr. Mark Eiteman from the University of Georgia, USA who attended the conference after having seen the COSTI website and COSTI’s collaborative efforts in promoting biotechnology in the country. The concurrent exhibition sponsored by the USAID in Sri Lanka gave the opportunity to fifteen biotechnology industrialists, the majority representing non-state sector, to showcase their capability and contributions towards the national economy.



Dr. Mike Eiteman delivering he keynote address

Three parallel sessions were conducted in the areas of agriculture, medical and industry with presentations by eminent scientists/industrialists followed by a discussion which focused on developing National Innovation Programmes (NIPs) to fuel the national economy using biotechnology by expanding the industry sector. The concept of a National Biotechnology Industry Association (NBIA) was conceived which will function along with the Ceylon Chamber of Commerce. Eng. Mangala Yapa, CEO/Managing Director of Ceylon Chamber of Commerce was elected as the chair for the task of launching the industrial association.

6. National Conference on Disaster Management

In order to commemorate the tenth anniversary of the Indian Ocean Tsunami, Ministry of Disaster Management organized a three-day conference themed “The future we want; Safer Sri Lanka”, from 24 -26 September, 2014 at the BMICH, Colombo 07. The conference brought together over 500 participants representing Ministries, Government Departments, Agencies, Universities, INGO’s, NGO’s and Global & Regional level stakeholders to assess the progress and share the lessons learned, challenges encountered in implementation of disaster management activities since 2004 and to plan the way forward.



COSTI on New Innovations for Disaster Risk Management

Considering the importance of integrating Science, Technology and Innovation to improve the technical capacities of the agencies involved in the sector and to introduce new technologies for Disaster Risk Management and National Resilience, COSTI conducted a half-day session at the above conference scheduled on 25th September 2014 from 9.00am to 12.30pm. The session comprised of presentations on new innovations for Disaster Management, how STI interventions could be made readily available for Disaster management as well as Q & A sessions related to applications of ST and I into disaster management process.

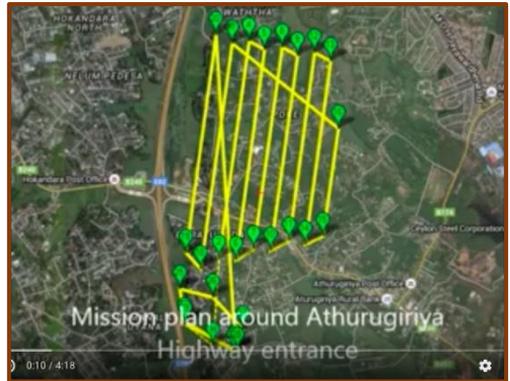


Participants at the Conference

Working on the National Disaster Management Action plan COSTI selected 20 areas for STI interventions. The Conference also resulted in connecting Ministry of Disaster management with the University of Moratuwa.

One of the projects that resulted from this exercise, the development and use of a UAV in disaster management saw its deployment during Kelaniya floods in 2016.

This occasion was also used for launching the Virtual Institute (VI) on Disaster Management and National Resilience.



Mission plan of CeyMapper, the Disaster Management drone

7. COSTI – UNESCAP - APCTT workshop on ‘Evidence Based STI Approaches to Achieve Sustainable Development Goals’

In conjunction with its annual Governing Council meeting in Colombo, APCTT organized a one-day meeting on 27 November 2014, on “Evidence Based STI Policy Making to Achieve Sustainable Development Goals” to brainstorm on the STI based approaches to achieve the post-2015 sustainable development goals. The Open Working Group has identified ‘Technology’ and ‘Capacity Building’ as a means of implementing the SDGs with emphasis on STI capacity building in developing and least developed countries (LDCs).



Mr. Michael Williamson, Head, APCTT addressing the participants

The main objectives of the workshop were to: appraise the SDGs and the means of implementation that are relevant to the work programme of the Centre, deliberate on the current STI based approaches of the Asia-Pacific countries to achieve national development agendas, identify the need and gaps in strengthening evidence (facts and figures) based STI policy development, governance and evaluation in the context of achieving the SDGs and brainstorm on the way forward, including opportunities for South-South cooperation to further an STI based development agenda.

The workshop was held successfully on 26th November with the participation of Bangladesh, Malaysia, Thailand, South Korea, Philippines, and Pakistan. Key officials from Central Bank, IPS, UGC, National

Planning, COSTI, NERDC, NASTEC, CARP, Ministry of Higher Education and Ministry of Health participated on behalf of the Government of Sri Lanka.



Formulating the 'Colombo Statement'



Participants of the workshop with Minister Vitarana

The 'Colombo Statement' was a key outcome of the workshop. As agreed at the National Coordinating Council, the statement will be circulated by the Ministry of External Affairs to all Sri Lankan missions abroad for further action as appropriate.



An exhibition of products from the Sri Lankan SME sector



Fine tuning the 'Colombo Statement'

2015

1. National consultative workshop on 'Strengthening and road mapping of emerging technology innovation systems of Sri Lanka'

The Ministry of Science Technology and Research funded the workshop titled "National consultative workshop on strengthening and road mapping of emerging technology innovation systems of Sri Lanka", which was held on 17-19 of November 2015 in Colombo. COSTI was a collaborative partner at this workshop.

2. Regional Workshop on SME's and R&D: Collaboration and Commercialization

COSTI collaborated with Ministry of Industry and Commerce, NEDA and the ADB Institute (Japan) to organize a Regional Workshop on 'Small and Medium Enterprises and Research and Development: Collaboration and Commercialization' from 22-23 December 2015 at Jaic Hilton, Colombo.



Hon. Minister of Industry was the Chief Guest at the workshop

The workshop was attended by a number of foreign delegates from Korea, Malaysia, Taiwan, Japan, New Zealand and China, in addition to scientists and relevant stake holders from Sri Lanka. The Hon. Minister of Industry and Commerce Mr. Rishad Bathiudeen was the Chief Guest at the workshop.

The foreign delegates described how R&D has facilitated the development of SME's in their countries and the usefulness of incubators and accelerators in this process. Local participants emphasized the need for government support by way of long term strategic investment and partnership. An Innovation Accelerator Fund set up as a revolving fund would be a welcome support mechanism for SME's. Private sector must be encouraged to invest in innovation.

2016

1. Workshop on Innovation System Assessment in the Context of Global Innovation Index (GII) and Sri Lanka Innovation Index (SLINDEX).



Sri Lanka has been ranked 85th out of 141 economies in the Global innovation Index (GII) 2015, which shows a remarkable improvement compared to the previous years. Since there are significant variations in economic, social and environmental parameters among provinces a Sri Lanka Innovation Index (SLINDEX) will play a major role in identifying these disparities in detail which certainly will help policy makers to minimize these variations in the development of each of the provinces. In addition, as SLINDEX requires the baseline data of each province, this

would definitely improve the level of quality of information gathered at national level, which subsequently will improve the reliability and quality of data provided for the Global Indices.

The workshop organized by COSTI with assistance from World Intellectual Property Organization (WIPO) and held on 13 June 2016 at the National Chamber of Commerce, Colombo discussed and developed the proposed SLINDEX. The objective would be to deploy SLINDEX as a development policy tool for the future.

2. National Level Innovation and Intellectual Property Policy Conference

This Conference was organized by the National Intellectual Property Office of Sri Lanka (NIPO) in collaboration with COSTI and with assistance of WIPO at the Hilton Colombo Residencies, in Colombo on 14 June 2016.

The objectives of the conference were to create a dialogue among relevant actors to identify challenges and opportunities to leverage strengths while overcoming weaknesses towards creating an innovation culture and to deliver a functional innovation system. While the introduction to the conference was given by Ms. Geethanjali Ranawaka, Director General, NIPO, the key note address on the 'Role of innovation in emerging countries and the state of Sri Lanka's innovation system' was delivered by Dr Sacha



Wunsch-Vincent, Senior Economist, WIPO. Both the Minister and the State Minister of Industry and Commerce attended the Conference.

3. Science and Technology for Society Forum Sri Lanka 2016

The Science and Technology for Society Forum Sri Lanka 2016, the first of its kind to be held in Sri Lanka, is an outcome of the visit of Hon. Ranil Wickremesinghe, Prime Minister of the Democratic Socialist Republic of Sri Lanka to Japan in November 2015, to attend and deliver the keynote address at the 'Science and Technology in Society Forum 2015' in Kyoto, Japan. The main objectives of the Forum were to foster excellence in Science and Technology and introduce advanced technologies to Sri Lanka's Industries and infrastructure development programmes and integrate Sri Lankan industries into global value chain.



COSTI developed the Forum Logo

In order to achieve the above objectives the Forum addressed five major themes closely related to Sustainable Development Goals; Science Technology and Innovation for Sustainable Development Goals, Citizen Science, Innovation Eco-system, Emerging Technologies and Nanotechnology.

The ceremonial opening of the Forum took place on 7th September 2016 at Nelum Pokuna Mahinda



Minister Susil Premajayantha welcoming HE the President

Rajapaksa Theatre, with His Excellency Maithripala Sirisena, the President of the Democratic Socialist Republic of Sri Lanka as the Chief Guest. Prof. Michael J Kelly, Prince Philip Professor of Technology of the University of Cambridge, United Kingdom delivered the keynote address. Over 1300 invitees attended the opening ceremony, amongst whom were over 100 Expatriate Sri Lankan and Foreign Scientists, Foreign dignitaries, Scientists from Sri Lanka, policy makers and administrators from public and private sector institutions, industrialists, entrepreneurs and businessmen.

The Scientific sessions of the STS Forum was inaugurated by Hon. Ranil Wickremesinghe, Prime Minister of the Democratic Socialist Republic of Sri Lanka on 08 September 2016 at Waters Edge, Battaramulla. At this occasion the keynote address was delivered by Hon. Koji Omi, former Minister of Finance of Japan and Founder Chairman, STS Forum Japan. Special event of the day was the official launching of the National Biotechnology Industry Association (NBIA) by the Prime Minister Hon. Ranil Wickremesinghe.



Hon. Prime Minister inaugurating the Technical sessions

The inauguration was followed by three days of plenary, key note addresses and breakout/panel discussion sessions. The Plenary sessions considered key nationally important areas closely allied to Sustainable Development Goals while five themes associated with these key areas were taken up at breakout sessions run in parallel; each theme being discussed under four sub-themes.

The final day of the Forum was dedicated to proposing the 'Way Forward' for each of the areas considered during the Plenary and breakout sessions and the adoption of the 'Colombo Resolution'. Key messages originating from presentations and subsequent discussions, both at Plenary sessions and five breakout groups, and the 'Colombo Resolution' have been documented. Details of the presentations and discussions that followed, and the Final Report of the Forum are available in the COSTI website www.costi.gov.lk/sts/.

The STS Forum Sri Lanka 2016 was a land mark event in the S&T history of Sri Lanka. It was a highly successful interaction that transpired with whole hearted and overwhelming support of the Sri Lankan expatriate and local scientific community.

4. IP Hub Project – Awareness programme

Considering Sri Lanka as a key stakeholder the first assessment mission was held from 15-17, June, 2016 in Colombo. Institutional capacity building and assessment sessions were conducted by the WIPO experts. As a follow up to this, a workshop was held on 10th September 2016 at Waters Edge, Battaramulla to facilitate more detailed discussion targeting a wider audience.

The main objectives were to: present the findings from the first assessment mission held from on 16th & 17th June, 2016 and discuss in greater details the WIPO recommendations pertaining to the establishment of the IP hub, including the composition of the steering committee for the project.

5. IP Hub – Follow Up meeting

IP Hub project is a global initiative of the World Intellectual Property Organization (WIPO), Geneva to enhance human resources and institutional capacities of developing countries. National IP Office (NIPO) functioning under the Ministry of Industry and Commerce is implementing the said project in Sri Lanka. The project would commence in 2017 with the organization and launch of the hub and spoke structure.

As a follow up to the previous meeting held in June 2016, a meeting was held in Colombo on 17 November 2016 at JAIC Hilton, Colombo for an in-depth discussion with specific institutions about the role and functions of the project. The objectives of the meeting were to: discuss on the Hub, Spokes, Secretariat and Steering Committee members for Sri Lanka, discuss on the training needs that will be factored into the 2017 activities in the project and plan the 2017 calendar of activities and events. Mr. Andrew Michael Ong, Director, Regional Bureau for Asia and the Pacific, Development Sector, WIPO, was the main resource person at this meeting.



Mr. Andrew Ong from WIPO- Enabling the Sri Lanka IP Hub Project

ROUNDTABLE DISCUSSIONS

1. Import and Export of Biological samples, consumables and equipment

COSTI organized a roundtable discussion at the Sri Lanka Institute for Development Administration (SLIDA) on 9th of April 2014, to discuss the issues relating to imports/exports of biological samples, consumables and equipment. The event was intended to:

- enlighten the relevant authorities about the difficulties faced by importers and exporters of biological commodities,
- enhance the participants' knowledge on the current procedures of imports and exports,
- formulate an efficient mechanism to expedite the clearance process.



Participants at the discussion



Key issues being discussed with DG, Customs

Participants represented various public and private sector R&D institutions in the country. During the discussion, key issues relating to the delay in the import and export of biological commodities were highlighted. The roundtable discussion concluded with the appointment of a working group to address the issues discussed during the meeting.

2. Value addition to Clay



A Banner highly appropriate for the event

COSTI conducted a Roundtable discussion on 'Value addition to Clay' at Sri Lanka Institute of Development Administration (SLIDA), Colombo on 9th May 2014.

The objectives of the Roundtable were to:

- create an interaction among the people involved in the clay industry and the researchers scattered throughout the country,
- discuss strengths, weaknesses, opportunities and threats to the industry and
- thereby seek ways and means to overcome the problems.

People involved in research relating to clay from universities and other research institutes along with those involved in the clay industry and trade participated.

Prof. Ajith de Alwis, Project Director COSTI, delivered the welcome address and emphasized the program's objectives. Hon. Minister (Senior) for Scientific Affairs Prof. Tissa Vitarana was present at the event and delivered a special speech.



Participants discussing issues related to value addition to clay

The roundtable discussion was enriched by presentations from several resource persons from universities, research organizations and the industry. They shared their valuable research findings, their problems and possible solutions. As such, for those involved in this trade the event was a tremendous opportunity to publicize their findings and to solve their problems.

The panel discussion took place under the chairmanship of Dr. Mubarak. The industry as well as research institutes raised a number of important issues and suggestions. How far these suggestions are feasible has to be seen once applied to the real scenario and their success may take some time. Finding solutions to industry problems of this magnitude cannot be achieved overnight. Finally, COSTI assured the participants that they will make every effort to cooperate with the industry to find solutions to their problems.

3. Establishing a Center of Excellence in Robotics Applications (CERA)



Establishing CERA.....

Participants representing both public and private sector attended the workshop. Participants included the cross section of relevant industry personnel, scientists, academia, senior officials of ministries and policy makers.

COSTI organized a workshop on ‘Establishing a Center of Excellence in Robotics Applications’ with the aim of identifying specific industrial needs and priorities, key industrial partners/collaborators and developing strategies for operationalizing CERA.

The workshop was held on July 16, 2014 at SLIDA, Colombo.



Discussing operationalization of CERA

4. Developing an Advance Marine Craft for deep Sea Fishing

Objectives of the Roundtable discussion held on 28 July 2014 were to:

- Recognize the factors that impede efficient and sustainable harvest of deep sea fish reserves,
- Identify specific needs and priorities for deep sea fishing industry in Sri Lanka,
- Identify advanced technologies for designing and developing an advance marine craft for deep sea fishing and
- Identify potential private sector collaborators to establish partnerships.



Discussing Marine Craft development

Participants from both public and private sector contributed to the discussion. While the public sector was represented by scientists and academia the private sector was represented by fishing community, boat building, processing and fish exporting industry. Key suggestions arising from the discussion are presented in the final report.

5. Sustainable development of Shrimp Farming Industry in Sri Lanka

The above Roundtable discussion was organized by The Prawn Farm Association in collaboration with COSTI. It was held in Chilaw in November 2014 to:

- Recognize the factors that impede the growth of shrimp farming industry in Sri Lanka,
- Identify specific needs, priorities, advanced technologies and possible innovations for developing shrimp farming industry in Sri Lanka,
- Create a dialog and receive ideas from both private and public sector stakeholders of the industry for introducing prawn species *Litopenaeus vannamei* to Sri Lanka.



Participants discussing shrimp farming industry

Participants at the Roundtable discussion were from small, medium and large scale shrimp farming community, voluntary organizations such as Sri Lanka Aquaculture Development Alliance (SLADA), Shrimp Breeders Association of Sri Lanka (SBA), Aquaculture Technology Society (ATS), Aqua Feed Importers and Distributors Association (AQFIDA), and Consortium for the Development of Aquaculture and public sector organizations such as National Aquaculture Development Authority (NAQDA), National Aquatic Resources Research and Development Agency (NARA) and the Department of Fisheries. Key concerns and suggestions arising from the discussion are presented in the final report.



Presenting the present day import and export scenario

6. Value Addition to Graphite



Discussing value addition to graphite

COSTI had identified graphite as a substance that could yield high profits if properly used for production of high tech goods. In order to facilitate the high-tech value addition, COSTI organized a Round Table discussion with a view to:

- Initiate an interaction between the mineral industry and researchers scattered throughout the country,
- discuss their strengths, weaknesses, opportunities and threats and seek ways and means to overcome their problems,
- promote the mineral industry in general and graphite industry in particular, and encourage value addition while discouraging raw graphite export.

Participants were researchers involved in graphite from Universities and other research institutes along with people involved in industry and trade. The report summarizes the presentations made by the speakers and the valuable points emphasized during the discussion.



Presenting Issues related to upgrading the graphite industry

7. Enabling Transition Towards a Green Economy



Identifying challenges and opportunities

COSTI organized a round table discussion on “Transition towards a green economy” which was held at SLIDA on August 26, 2014.

The objectives of Roundtable discussion were to:

- open up a dialogue among key stakeholders to identify challenges and opportunities in making a paradigm shift towards a green economy,
- create awareness on opportunities present in green growth options for inclusive development and possible science, technology and innovation intervention and
 - share success stories in green growth best practices highlighting the contribution of technological innovations for a smooth and fair transition.

Participants from both public and private sectors contributed to the discussion. Public sector was represented by scientists and academia and the private sector by industrialists, financial consultants and entrepreneurs. The round table discussion was graced by Prof. Tissa Vitarana Hon. Minister (Senior) for Scientific Affairs and Dr. B M S Batagoda, Deputy Secretary to the Treasury.

8. Role of Technology in Balanced Provincial Development: Lessons Learnt and Actions for the Future

COSTI organized a brainstorming Session on “Role of Technology in Balanced Provincial Development: Lessons Learnt and Actions for the Future” on September 5, 2014 at the Sri Lanka Foundation Institute (SLFI). The objective of this event was to provide a forum



Identifying STI interventions for Provincial Development

for the stakeholders to brainstorm and formulate an action plan to strengthen STI interventions for Balanced Provincial Development. Mr. Madhawa Waidyaratna, Additional Secretary (Technology transfer) of Ministry of Technology & Research was the keynote speaker at this event.

9. Energy Security

In line with its mandate for coordination of science and technology activities under the VI on “Energy Security”, COSTI organized a round table discussion on ‘Energy Security’ on September 16, 2014 at Sri Lanka Institute Development Administration (SLIDA), Colombo. The round table discussion included oral presentations and a panel discussion.

Expected outcomes of the workshop were the :

- Initiation of development of a status report on energy security,
- Identification of key thematic areas of national relevance,



Identifying areas of national relevance related to Energy Security

- Draft outline of NIPS, and launching of VI on Energy Security Representatives from the State Research Institutes, ministries, Industry as well as service sectors participated in this event.

10. Understanding ‘Hi-Tech’ value addition – A Dialogue with Export Development Board

COSTI supports the government to move ahead with new policies and change existing policies relevant to Hi-Tech industries. In order to measure the high technology incorporated in production and export capabilities of Sri Lanka, COSTI is of the view that the country requires a specific common understanding for the term “Hi-Tech”. Furthermore, the importance given to Hi-Tech exports is emphasized by the reference given to it where by the aim of the government is to increase hi-tech exports from the present 1.5% to 10% by 2020.



Understanding ‘Hi-Tech’ value addition with EDB

In order to achieve this national objective, COSTI conducted a constructive dialogue with the Export Development Board (EDB) for over 6 months where the urgent need for a definition emerged. With a view to continuing this dialogue with other relevant government stake holders and the industry representatives COSTI held the First Working Group Discussion in collaboration with the EDB at Sri Lanka Foundation Institute (SLFI), Colombo on November 10, 2014. A draft definition has been completed which awaits final stakeholder approval.

COSTI also participated in a meeting with the committee appointed by the EDB on the preparation of an Export Strategy document.

11. Value Addition to Quartz & Silica

COSTI organized a round table discussion on value addition to Quartz & Silica on 11 November 2014 at SLIDA. The purpose was to initiate close interaction between the industry and the researchers scattered throughout the country and also to discuss strengths, weaknesses, opportunities and hindrances to the industry.

The discussion was enriched by presentations from several experts from universities, research organizations and industry sectors. The industry as well as the research institutes identified certain issues so far overlooked by the authorities and heading with a clear plan to maximize the profits in a sustainable manner.

12. A National Climate Observatory System for Sri Lanka

With the proposal which was forwarded by International Water Management Institute (IWMI), COSTI had identified the urgent need for ‘A National Climate Observatory System’, a networked grid of



Discussing the mechanism of implementing a National Climate Observatory System in Sri Lanka

automated weather instruments on land and sea, that will report live, the state of climate and its immediate (and future) threats to people, economy and the infrastructure. With this objective COSTI organized several stakeholder meetings to develop a National Climate Observatory System for Sri Lanka. The final discussion was held on 11th November, 2014 at Sanvadani Hall, SLIDA.

13. Energy Storage Devices

COSTI, held a round table discussion with prominent researchers in the field of energy storing devices, industry leaders and scientists from SLINTEC to develop an energy storing device for domestic use. This device will be designed according to the Lithium-ion technology while using Sri Lanka's vein graphite as the carbon source.

The discussion was very successful since some of the scientists had their own experience in manufacture of real batteries such as those used in NISAN LEAF cars. They agreed to come up with a prototype.



Developing a battery for households

14. COSTI Co-partner with UOP in the 5th International Conference on Sustainable Built Environment

COSTI conducted the session titled "Housing for Sustainable Built Environment" at the 5th International Conference on 'Sustainable Built Environment' organized by the Faculty of Engineering, University of Peradeniya.

The session was intended to promote a dialogue among the housing sector experts to disclose the different types of innovations and policies that could be incorporated to achieve the sustainable built environment.

15. Round Table Discussion on Asbestos



Discussing the elimination of asbestos use from 2018

Various studies carried out over the years have revealed that all forms of asbestos are carcinogenic to humans and that many countries have taken the initiative to ban the material. Based on several requests the Government of Sri Lanka has decided to ban the importation and production of asbestos from January 2018.

Having considered health, construction, occupational safety and environmental aspects of production of asbestos, COSTI in consultation with the Ministry of Health, Nutrition and Indigenous Medicine, Central Environment Authority (CEA), the

National Building Research Organization (NBRO) and National Institute for Occupational Safety and Health (NIOSH) prepared an Action Plan with recommendations for the elimination of asbestos use in Sri Lanka and the gradual transformation of the present industry to an environmentally friendly industry by 2018.

16. Re-establishing Paranthan Chemical Factory

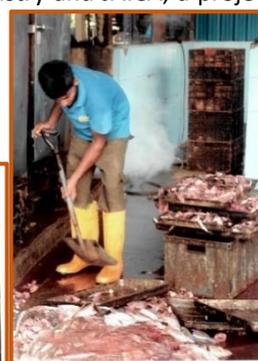
At the initiation of Paranthan Chemicals PLC, COSTI organized a discussion with interested parties to find ways and means of re-establishing the caustic soda/chlorine manufacturing plant that was destroyed during the military conflict in the Northern region.

If the plant is re-established it will produce an excess of hydrochloric acid in addition to the primary product caustic soda, which could be used for manufacturing/extraction of titanium oxide from the ilmenite sand in Sri Lanka.

17. Application of Biotechnology to convert fish waste to good quality fish meal

As an outcome of Dr. Hemantha Warnakulasuriya's visit to Japan to study the Japanese Environmental Recycling System (ERS) which applies basic principles of fermentation to convert waste material to value added products, and the subsequent discussions held with the Ministry of Industry and JAICA, a project was initiated at Peliyagoda fish market with the concurrence of a whole sale fish stall operator to convert fish waste to good quality fish meal. The main objective of the project was to produce good quality fish meal locally, thereby reducing importation and saving valuable foreign exchange.

It was also understood that there is a waste management issue at the new fish market in Peliyagoda. Approximately, 460,000 kg of fish is brought daily to the Peliyagoda fish market from various parts of the country. The market operates over 148 wholesale stalls and 128 retail stalls.



A common scene at Peliyagoda fish market

The Japanese ER system involves the use of indigenous microbes for fermenting fish waste thereby eliminating the traditional boiling process. The fermented waste is dried and then crushed to make fish meal.

18. Meeting with AEA scientists on the production of Chitosan from prawn waste



Discussing the possible use of Chitosan from fish shell waste as a growth promoter

A meeting was held with scientists from the Atomic Energy Authority of Sri Lanka in December 2014 on the possible promotion of 'Chito Powder', a Radiation Modified Chitosan extracted from prawn and other shell waste, as a growth promoter in agriculture. According to AEA sources, Chito powder has already been proven to be an effective growth promoter for vegetables but quantities available were not adequate for commercial use. COSTI attempted to obtain the collaboration of prawn industry in this industrial venture.

FOREIGN VISITORS TO COSTI

1. Dr. Rudiger Voss – visit leads to an MOU with CERN

Dr. Rudiger Voss, Head, International Relations, European Organization for Nuclear Research (CERN), Geneva, Switzerland, visited Sri Lanka from 01-04 November 2014.

During the visit he made 3 public appearances (at University of Peradeniya, University of Colombo and SLIDA, Colombo) and held discussions with Ministry of Education to enthuse scientists, university students and school teachers regarding the activities of CERN, especially in relation to recent advances and future research prospects in the area of theoretical physics.



Dr. Rudiger Voss describing CERN to Team COSTI



Dr. Voss with Team COSTI

As a follow up to his visit two Sri Lankan undergraduate students Mr. Gihan Lakmal from the University of Ruhuna and Mr. Malinda Shiram de Silva from the Faculty of Science, University of Colombo, were able to participate in the 2 month 2016 Summer Student Programme at CERN.



Ambassador Ravinatha Aryasingha and DG of CERN Mr. Rolf-Dieter Heuer signing the 'Expression of Interest Agreement' (EOI) on 25 June 2015

Furthermore, his visit facilitated the signing of an 'International Cooperation Agreement' between CERN and the Government of Sri Lanka enabling Sri Lankan scientists, engineers, researchers and other professionals to attend high-demand R&D programmes conducted by CERN and other programmes such as High School Teacher programme and Summer Student Programme. This would allow Sri Lankan science and technology professionals to gain firsthand experience and knowledge in the field of high energy physics.

2. Prof. Jan Prins

On 06 January 2015 a lecture titled "Biomechanics and Aquatic Research: An overview with a Sri Lankan context" was delivered by Prof. Jan Prins, attached to the University of Hawaii, at the invitation made by COSTI. He is a world renowned scientist involved in swimming research and has more than 40 years' experience in that field. His lecture concentrated on the application of biomechanics on land and aquatic based research.

3. Prof. Armstrong Osborne

Prof. Osborne, a researcher in Speleology attached to the University of Sydney, Australia, delivered a lecture titled "Prospects of Cave and Karst Science in Sri Lanka" on 05 October 2015, at the auditorium of the Ceylon Chamber of Commerce. Speleology or Cave Science is something new to this country, but can be easily deployed for the promotion of Sri Lanka's tourism industry.



4. Prof. Mark Taylor

Prof. Mark Taylor, Head of Products Accelerator, University of Auckland, New Zealand agreed for a stopover in Sri Lanka, while on his way to New Zealand from Europe.



Prof. Mark Taylor meets Senior Minister of Scientific Affairs Prof. Tissa Vitarana



Prof. Mark Taylor gave a public lecture on innovation aspects in a SME dominated landscape

During his stay in Sri Lanka he gave a Public Lecture on innovation aspects in a SME dominated landscape, a topic highly relevant to the present day Sri Lanka.

He also had discussions with the Senior Minister of Scientific Affairs Prof. Tissa Vitarana at the Senior Minister's Secretariat regarding the setting up of a Product Accelerator facility in Sri Lanka.

5. Prof. Stefan Bringezu

Prof. Stefan Bringezu, Director of Wuppertal Institute for Climate, Environment and Energy in Germany and the Head of Institute's research group on Material Flows and Resource Management visited Sri Lanka in February 2015. He is also the Professor of Sustainable Resource Management at the Centre for Environmental Systems Research at the University of Kassel. He was the lead Coordinating author of a report on 'Assessing biofuels: towards sustainable production and use of resources' published in 2009.



Prof. Stefan Bringezu talking to COSTI staff

During his stay he made 3 Public appearances: delivered a Keynote address at the Workshop on 'Life Cycle Assessment and Management of Sustainability' on 23 February 2015, addressed a Workshop on 'Global trends, EU politics and multiscale measures for sustainable resource management' on 24 February 2015 and gave a lecture to undergraduate students at University of Moratuwa on 25 February 2015.

6. Two Geochronologists from University of Hong Kong visit COSTI

Two Geochronologists Prof. Su` Phin Than and Dr. Tammy Tang from the University of Hong Kong visited COSTI and made a presentation on 'A Geochronological investigation of Wijayan Complex rocks of Sri Lanka' to Team COSTI.



Prof. Su Phin Than and Dr. Tammy Tang talking on Geochronology

MISCELLANEOUS

1. MOU with NIPO – Setting up of TISC



Setting up of TISC office at COSTI - PD COSTI signing a MOU with DG NIPO

COSTI recently joined hands with the National Intellectual Protection Office (NIPO) to setup a Technology and Innovation Support Center at COSTI called the “TISC”. The services rendered by an institute of this type are a long-felt need of the country. TISC is intended to provide a variety of services such as providing assistance to local innovators for patent research, patent drafting and patent filing.

Prof. Ajith de Alwis, Project Director of COSTI and Mrs. G.R. Ranawaka, Director General of NIPO signed the MOU at the COSTI office. This is a part of the ongoing 10-part action plan that NIPO has with WIPO.

2. MOU with UNDP, Colombo

COSTI entered into a Memorandum of Understanding with The United Nations Development Program on 4th November, 2015, for further development of the National Innovation Dashboard. The Country Director-Sri Lanka of UNDP, Mr. Joern Soerensen and the Project Director of COSTI, Prof. Ajith de Alwis signed the memorandum of understanding consolidating a partnership which will bring the discourse on ‘Science, Technology and Innovation’ into the forefront in Sri Lanka.



One of the goals of the National STI strategy is to ‘Establish a system for efficient and coordinated S&T Governance’. To this effect, COSTI had embarked on creating a ‘National Innovation Dashboard’ for Sri Lanka to capture STI activities within the country. COSTI partnered with the UNDP, who recognized the value of the Dashboard as a national asset, to mobilize the creativity and enthusiasm of youth to contribute to the development of our economy. In order to harness the incredible value of youth and their innovative thinking power, the partnership will work towards extending the Dashboard with an appendage for social innovation – An Idea Board.



COSTI/UNDP Consultation on Innovation Dashboard

With this enhancement, the Dashboard will also create an online platform that would provide a structured place for the innovative thinkers of Sri Lanka to convene, put forward ideas, develop them, and to set in motion the value adding ideas. Networks have an important role to play in young people’s innovation.

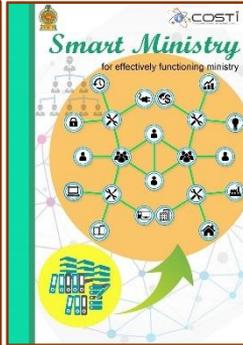
Networks are also ideal for building links between inventors and potential sponsors. Sponsorship is crucial if an idea is to be brought to life. The Dashboard will provide a platform where all stake holders can be linked together.

4. Smart Ministry

During a meeting COSTI had with the Minister of Finance, COSTI was given a challenge to develop a cost effective user friendly package to unlock the gridlocks that are omnipresent within the public sector, initially targeting his ministry.



COSTI Programme Director Dr. Geetha Abeysinghe presenting the Smart Ministry report to Hon. Minister of Finance Mr. Ravi Karunanayake



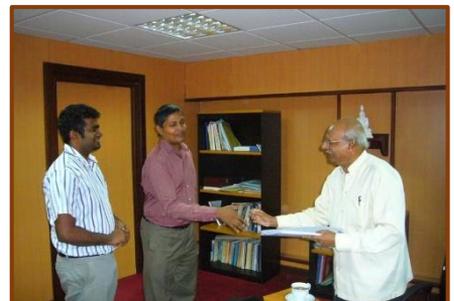
After discussions and sharing of information with various officers of the Finance Ministry a report with recommendations was handed over to the Minister, within the given period of two weeks. Furthermore, COSTI was invited to do a presentation on basecamp. As an outcome of the final report the basecamp system was introduced to the IT Department of Ministry of Finance.

4. Innovation Eye – e-News Letter

COSTI e-News latter the ‘Innovation Eye’ was launched in February 2014 with a view to informing the researchers and the business community on the activities of COSTI as well as to disseminate relevant information from the research landscape of the country.



The feedback received from over 5000 stakeholders to whom the e-version was distributed, was quite positive and therefore COSTI decided to continue to issue the newsletter. So far 3 Volumes and 5 issues have been published.



1st Edition of Innovation Eye being presented to Minister Tissa Vitarana

5. Dialogue between COSTI and Sri Lanka Rupavahini Corporation on ‘Science for All’

Team COSTI met with officials from SLRC in June 2014 to seek support for its initiative on ‘Science for All’. The aim was to develop a programme titled ‘Vidyawata Vinadiyak’ - one minute for science.



COSTI ‘Science for All’ team in consultation with staff of Rupavahini Corporation

COSTI also engaged with the Sri Lanka Business and Biodiversity Platform of the Ceylon Chamber of Commerce to seek partners for the above programme. However, the project never materialized for lack of sponsorship although four scripts had already been programmed by the SLRC based on suggestions compiled by COSTI.

6. 'Vidusara' Anniversary



Vidusara – The Anniversary Edition

Popular science magazine “Vidusara” celebrated its 27th anniversary on 5 November, 2014. The anniversary edition was dedicated to the theme “Science, Technology and Innovation for National Economic Prosperity”.

COSTI joined hands with Vidusara during this special event and COSTI staff provided a number of articles to the anniversary edition covering themes such as Science for the Society, Energy Security, Food Security, Small scale industrial development and High-Tech Innovations, among many others.

7. His Excellency the President visits COSTI Office

His Excellency Maithripala Sirisena, the President of Sri Lanka visited the COSTI Secretariat in February 2015 as part of his tour within the Presidential Secretariat, at Chatham Street, Colombo. The staff of COSTI greatly appreciated this visit where they were able to have a brief and informal discussion with him.



President Sirisena visiting COSTI Office at Chatham Street



Minister Filix Perera discussing CKDU with COSTI team

8. COSTI assigned to Ministry of Special Projects

With the dissolution of the Senior Ministers Secretariat, COSTI was assigned to the Ministry of Special Projects coming under the purview of Minister Felix Perera, from 9 April 2015. Prof Ajith De Alwis, Project Director of COSTI along with the other Directors had several discussions with Mr. G.K.D. Amarawardena, Secretary to the Ministry and other senior officials on COSTI’s past and on-going activities and future plans.

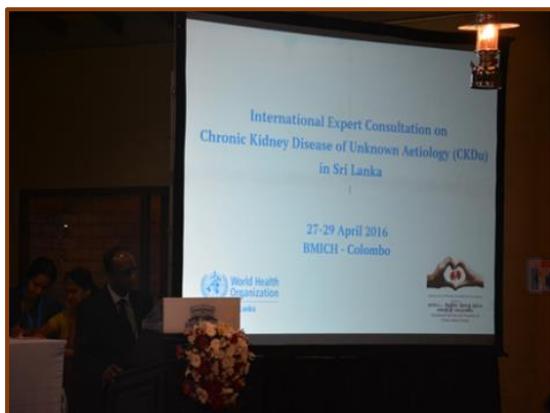
During the discussions, the officials of COSTI were able to point out the importance of the work carried out by COSTI towards the betterment of science and technology of the country. As a result, the Secretary assured the officials of COSTI that he would extend his fullest support and cooperation to COSTI. In addition, he emphasized the need for COSTI to be involved in ongoing projects of the Ministry, such as the programme on Chronic Kidney Disease of unknown etiology (CKDu), A Narcotics Free Sri Lanka and Vessel Traffic Monitoring System, which were added to COSTI’s work areas.

9. Support for CKDu – As a Project of Ministry of Special Projects

People living in the North Central Region including North Central Province and some parts of Eastern, North Western and Uva Provinces of Sri Lanka started to develop a form of chronic kidney disease which could not be attributed to commonly accepted causes. Since this Chronic Kidney Disease (termed Chronic Kidney Disease of uncertain etiology or CKDu) became a major public health problem causing devastating social economic and health impacts, COSTI upon the request of Ministry of Special Projects, undertook to coordinate activities related to the project and assist the Ministry to formulate an Action Plan to address this national issue.

Accordingly, all relevant action plans that have been developed, including the two specific action plans developed by the National Water Supply & Drainage Board and the Ministry of Health, were collected by

COSTI and amalgamated where applicable. That included the final draft of Action Plan that has been prepared to be submitted to the Cabinet, in December 2014, with the participation of all the relevant line Ministries.



COSTI coordinated the International Workshop on CKDu

In April 2016, the WHO convened an International Expert meeting on CKDu in Colombo, with the active participation of COSTI, and the Secretary to the President requested COSTI to prepare the final action plan based on the recommendations made at the above expert meeting. As a result, COSTI, taking all previous action plans and recommendations into consideration, prepared an Action Plan to Combat CKDu and submitted it to the Presidential Task Force for necessary implementation.



Media Workshop on CKDu coordinated by COSTI

With the support and sponsorship from the WHO, COSTI was able to hold two media meetings in April and May 2016, to improve awareness among the journalists on Non-Communicable Diseases, giving emphasis to CKDu.

COSTI also took the initiative of compiling a list of all the hypotheses that have been so far published and found out that there are 31 such hypotheses on the onset of CKDu. By reviewing these hypotheses closely, the research efforts can be focused on testing most promising hypotheses, thereby saving time, energy and resources immensely.

COSTI used the Basecamp (www.basecamp.com) to actively network among various stake holders and engage them in discussion. Over 300 participants representing all groups that have been working on this national problem, including expatriate scientists, media personnel and journalists, joined in the dialogue using the Basecamp.

At the invitation of the Ministry of Special Projects, three members of the COSTI Science Team conducted a field survey on RO plants located in the CKDu affected areas in Anuradhapura. The survey, aimed mainly at finding the technical status, and environmental and social impacts due to introduction of RO units in the NCP, was carried out on 09th and 10th June, 2015. The RO units installed by National Water Supply and Drainage Board (NWSDB) and Jinasena Pvt Ltd were visited and information was gathered from community discussions and experts in related fields.

Based on the information gathered during the field visit the visiting team identified two major concerns: lack of a proper waste handling procedure for RO units and possible health issues that may arise due to

long term consumption of water having low Total Dissolved Solids (TDS). Full report along with recommendations is available at COSTI website. The Technical Review Report has also been handed over to the relevant authorities for necessary action.

The WHO study conducted in 2011 proposed a diet study in the initial proposal, but due to various reasons, it could not be completed as anticipated. As such, a separate group interested in studying the dietary pattern of the patients suggested a dietary intervention to prevent the disease as well as to improve the quality of life of the patients. Consequently, a proposal was developed in collaboration with the President's Special Task Force on CKDu and COSTI submitted same to NPD for possible funding through its NIP initiative.



Technical Review Report on RO plants located in Anuradhapura

COSTI also had discussions with a Sri Lankan company specialized in water & wastewater purification that is involved in designing, manufacturing, installation and maintenance of RO based membrane systems. The company has its own manufacturing facility in India. The idea was to promote local technologies that will support providing clean water to people in the affected areas, so that the cost of providing such clean water will come down drastically.

COSTI has established collaborations between research groups and clinicians working in the affected areas for validating a non-invasive but economic way of early detection of CKDu for possible use in the intended mobile laboratories in the future.

10. A Narcotic Free Country

On 30th September 2015 two COSTI members participated at a meeting, to discuss the Government's program titled "A Narcotic free country", with the Heads of the Departments of concerned Ministries (19 Departments). This was a special project coming under the purview of the Ministry of Special Projects.

COSTI recommended an efficient fool-proof scanning system in order to systematically reduce the amount of narcotics and other contraband coming to the country. In addition, many valuable suggestions were also expressed by other participants.

11. COSTI is assigned to Ministry of Science Technology and Research

Subsequent to the abolition of the Ministry of Special Projects and as a result of a Cabinet decision, COSTI was assigned to the Ministry of Science, Technology and Research, coming under the purview of Minister Susil Premajayantha.

Reviewing the past work carried out by COSTI, both the Minister and Mrs. Wijialudchumi, the Secretary to the Ministry appreciated COSTI's work so far in the area of STI.

12. Virtual Institute Knowledge System (VIKS)

COSTI maintains a virtual site as a literature repository named Virtual Institute Knowledge System (VIKS) in DSpace (<http://dspace.costi.gov.lk:8080/xmlui/>). Many publications including newspaper articles have been uploaded for any interested parties to read/download, thereby contributing to the knowledge-base on many issues of scientific importance.

13. SCOPUS/SciVal Training Workshop

A staff member from Scopus/SciVal conducted a training workshop for Institutional Sigma coordinators and staff of COSTI on the use of Scopus and SciVal for accessing scientific literature from peer reviewed Journals.



Scopus/SciVal training workshop

14. COSTI collaborates with young environmentalists of Sri Lanka

COSTI collaborated with young environmentalists of Sri Lanka to launch a national survey on 'Climate change awareness' among the youth of Sri Lanka. In order to achieve the best results out of the survey, youth survey teams selected from each district, were given a basic training in research methodologies, survey methods, designing questionnaires, and sampling methods along with topics on climate change and environment. These teams were assigned with the task of collecting data on climate change awareness among the youth in their own districts. Based on the recommendations of this study, it is intended to establish a youth led taskforce to face climate change issues at national/global scale.

A pilot study was carried out in Kegalle District with the help of 30 trainees. The program is expected to cover all the Divisional Secretariats in twenty five districts of the country.

15. Field visit to the Dambulla Economic Center

According to published data, post-harvest loses of fruits and vegetables in Sri Lanka due to inappropriate packaging and transport are between 30%–50% of the total production. As such, several members of COSTI along with officers from Sustainable Energy Authority (SEA) and University of Wayamba carried out a field visit to the Dambulla Economic Center (DEC) on 25th August 2015.



Since considerable post-harvest loses still remain, although transport facilities have been upgraded up to a certain level at present, a project proposal was submitted to the SEA for investigating current post-harvest loses considering both energy and material balance. The methodology for the research will be integrated with cleaner production methodology (UNIDO) and the proposal was accepted by the board of SEA.



Unconventional packaging and handling leads to much wastage

16. Vessel Traffic Monitoring System (VTMS)

COSTI has identified the importance of the software solution the Vessel Traffic Monitoring System (VTMS) developed by UCSC, University of Colombo, called 'Siyara'. Although, it was awarded with the 'Asia Pacific Merit Award' for being one of the excellent software solutions, it was disregarded and never put into practice. COSTI was instrumental in gaining its rightful place by initiating the implementation of the project for the sake of the country. The news initially appeared on COSTI's newsletter "Innovation eye" (Vol. 1, No.1 February 2014) under the heading titled "Innovative software that is disguised in a coffer". Thereafter, COSTI received some favorable feedback from a number of key persons.

This is really the solution to monitor the fishing vessels of Sri Lanka to ensure their compliance with international standards and regulations governing fishing vessels. After having several successful meetings with the Ministry of Fisheries and other relevant stakeholders with the collaboration of the UCSC, COSTI was able to persuade the relevant authorities to come to an agreement. Finally, MOU was signed with the Fisheries Ministry to develop the VTMS for Sri Lankan fishing vessels.

17. Electronic and Electrical Export Sector Baseline Survey 2015

Although many government organizations have undertaken studies on research and development and promotion of the electronic industry in the country, information is lacking on the status of the industry which has made it difficult for policy makers to make crucial policy decisions. This resulted in the EDB Advisory Committee recommending that a country wide survey be carried out to identify the current status of the electronic and electrical industry in Sri Lanka.

Accordingly, COSTI jointly with EDB conducted a survey including SME's and startups, to map the present status of the industry and collect information on personnel, production, capacity, imports for production purposes and exports of finish products, collaborations, R&D, issues to be addressed etc. The survey report was launched at the Workshop conducted by EDB in October 2015.

18. Unleash your mind for tomorrow: Spurring the growth of innovation in Sri Lanka.

The above workshop was organized by Lakshman Kadirgamar Institute for International Relations and Strategic Studies on 25 November 2013 to highlight the importance of research and development and innovation in reaching the global market in today's context. The conference focused on issues and gaps in R&D and innovation, need of implementation of national policy and the role of different sectors to spur the growth of innovation in Sri Lanka.

Prof. Tissa Vitarana, Hon. Minister (Senior) for Scientific Affairs delivered the keynote address. Prof. Sirimali Fernando, CEO, COSTI and Prof. Ajith de Alwis, Project Director, COSTI also made presentations regarding the importance of Science Technology and Innovation in the socio-economic development of Sri Lanka.

19. Sahasak Nimavum

COSTI proudly showcased its land mark product 'Sri Lanka Innovation Dashboard' at Sri Lankan National Invention Exhibition "Sahasak Nimavum", organized by Sri Lanka Inventors Commission (SLIC). The exhibition was held at the Sri Lanka Exhibition and Convention Centre, Colombo from 22-24 September 2016.



Sri Lanka Innovation Dashboard at Sahasak Nimavum exhibition in Colombo

20. The 2nd International Symposium on 'Driving Research Towards Economy: Opportunities and Challenges'

The above symposium, organized by Sri Lanka Academy of Young Scientists in partnership with National Institute of Fundamental Studies and COSTI was held from 13-14 November, 2014 in Kandy with the objective of providing a platform for young academics to present research findings from multidisciplinary research projects. The symposium covered six thrust areas of global research and development and attracted over 40 presenters including a few from Pakistan and Bangladesh.

21. COSTI interacts with NPD regarding NIPs

COSTI staff had a cordial discussion with the senior management of NPD on the value of National Innovation Projects formulated by COSTI based on countries present day needs.



Meeting with NPD staff at COSTI

22. Appointment of Honorary Counsel (Scientific) to Sri Lankan High Commissions

COSTI met with the (former) Minister of Foreign Affairs Prof. G.L. Peries and impressed upon him the importance of having Honorary Science Counsel for supporting STI related activities at Sri Lankan High Commissions abroad. COSTI is of the view that such a move would help to promote Science Technology and Innovation in the country by attracting foreign scientists and Sri Lankan expatriates to collaborate with Sri Lankan scientists thereby foster excellence in Science and Technology for the benefit of the country.

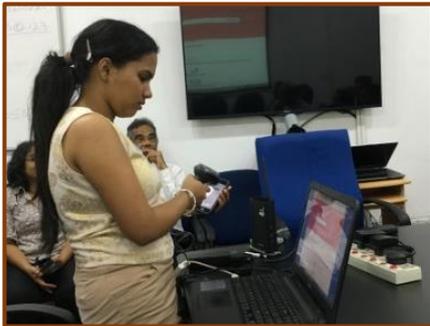
23. COSTI develops an App for Conference Management

COSTI IT team, developed a computer application for Conference Management that automates conference registration and participant management process. This system can be used at a Conference, Workshop or a Round Table Discussion, which requires the registration of participants. The application can register users online, generate a participant list and manage activities at the registration desk during the event.



Minister Susil Premajayantha submits his bar code for registration at the STS Forum

On on-line registration, the participants are sent a unique barcode. On the day of the event the attendance is recorded by reading this unique barcode of each participant using a bar code reading machine. One visible and the most useful advantage of this application is the elimination of long queues at the registration desk.



Conference Management Tool being applied at the WHO Conference

Other advantages of the Conference Management System are: Inviting participants through emails (email generation), online participant registration by filling a form, registration of participants on the day of the event using their barcode, participant list management by the system administrator – e.g. Selection of participants, confirmation, editing details, etc., sending participation confirmations via automatic email/SMS notifications with their unique barcodes, sending SMS reminders, a facility to issue name Tags to the participants and generating attendance reports.

The Application was successfully used for the First time at the STS Forum held in September 2016. It was once again used at the International Conference on CKDu organized by the WHO.

24. Open Source based mobile weather stations - project launching workshop

In collaboration with IWMI, COSTI launched a project for developing open source based mobile weather stations with a view to reducing flood damage and increasing preparedness of communities to such events. The workshop was held in May 2016 at IWMI in Battaramulla. This was an outcome of COSTI’s coordinating efforts to set up a National Climate Observatory System for Sri Lanka.

According to the Department of Meteorology, although Sri Lanka has over 2000 weather monitoring stations, only 38 are fully automated. All others are manually operated. The stations measure only a few selected parameters (eg. rain fall, wind speed and pressure), which are often not available to the public at critical moments.

The proposed open source based mobile weather stations are low in cost (estimated to be 1/20th of the cost of imported weather stations) and easy to maintain by a locally trained person. The sensors used can be customized to record required data and transmit them to a central station from where it could be made available to any interested party.

While NBRO has agreed to test five prototypes the Department of Agrarian Services has shown interest in a custom built mobile weather station for their use.

25. Science cartoons in ‘Vidusara’

Dr. Pathmakumara of the Science Team of COSTI contributed science related cartoons to the weekly Sinhala Science magazine Vidusara. The 100th cartoon was published in Vidusara on 17 December 2014.

COSTI staff have also contributed many scientific articles to popular magazines and newspapers.



Congratulating Pathmakumara for the 100th cartoon in Vidusara

26. Visit to Colombo Dockyard

Team COSTI visited the Colombo Dockyard on 04 April 2014 to see the largest passenger vessel build in Sri Lanka by Colombo Dockyard PLC for the Government of India, using Sri Lankan human resources and technical knowhow. This was a prelude to considering high-tech fishery vessel development.



COSTI team visiting the Dockyard

In consultation with the CEO, Colombo Dockyard Mr. Mangala Yapa

27. COSTI Away Day - 2013 and 2014

The first Away Day of COSTI was held on 11th October 2013 with the objective of providing Team COSTI a common platform to discuss matters pertaining to COSTI’s purpose and involvement in facilitating STI activities and the national research system in the country. COSTI ideals (Connected, Open, Sharing, Trustworthy and Inspiring) were developed at this meeting.

The second away day was held in 2014 to prepare an action plan for COSTI activities for 2015. Prof. Tissa Vitarana, Hon Minister (Senior) for Scientific Affairs joined the staff for fellowship and dinner.



Discussing various issues related to work.....2013



Value of team work being emphasized.....2014



COSTI staff found the ‘away days’ highly productive and enjoyable as they had the opportunity to express and discuss their ideas as well as sharpen their awareness on the goals of COSTI in a more relaxed atmosphere.

28. COSTI Knowledge Sharing Sessions

Most of the Friday afternoons were devoted for ‘Knowledge Sharing’ sessions. This was meant for COSTI team members to share their knowledge and experience in various science and technology fields among their colleagues, as Team COSTI is composed of scientists and technologists from very diverse fields.



Vindya talking on ‘Nai Gal’

During these sessions COSTI staff presented their knowledge and experience on a subject of their choice (usually the field of study that they have specialized in or a travel experience) and thereafter a discussion followed.



Padmakumara on Cave Science

Many diverse subjects/areas were presented and discussed: *viz a viz* Quartz and Spectacles, Cave Science, ‘Nai Gal’, Foot Print Science, ‘Seth Kawi’, Israel and many more. Knowledge sharing sessions were also used as a discussion platform prior to preparing concept notes for Virtual Institutes.

29. COSTI Office moves to Sethsiripaya in Battaramulla

With the re-assignment of COSTI to the Ministry of Science Technology and Research COSTI office had to be relocated, from the Presidential Secretariat in Chatham Street, Colombo 01 to Stage 1 building at Sethsiripaya, Battaramulla, where the Ministry of Science Technology and Research is also located.



COSTI Office was here - at Chatham Street



New location at Sethsiripaya – empty space

COSTI was allocated the former Auditorium of the Urban Development Authority on the 3rd Floor of Sethsiripaya - Stage 1 building, just about half the size of the office space that COSTI occupied at Chatham Street.



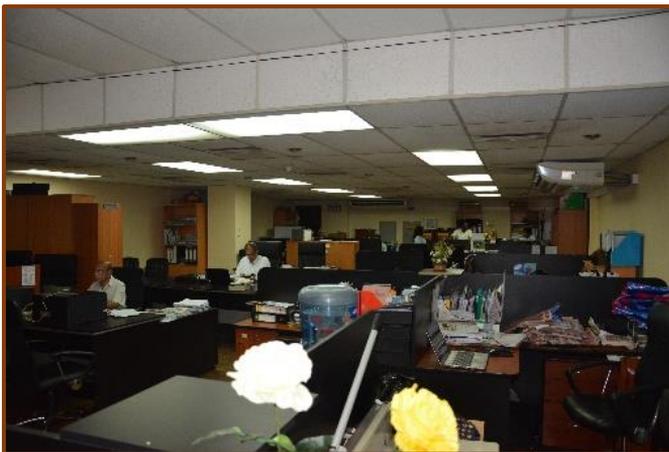
Packing to move

Although the new premises were allocated to COSTI in January 2016, the move to the new location took quite a while, since the Auditorium had to be refurbished to be able to provide adequate facilities for the full complement of COSTI staff. It had to be re-wired for electricity, telephone, internet facilities and air conditioning. Office furniture and electronics (eg. Internet Servers for Wi-Fi) had to be moved and re-installed.

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Dismantling cupboards and tables



New Office premises on 3rd Floor at Sethsiripaya Stage 1, Battaramulla

Although we shifted office on 08 April work at the new premises started only from 25 April 2016. The new Office now accommodates 19 COSTI staff members and is located on the 3rd Floor of Sethsiripaya Stage 1 building, on the same floor as the Ministry of Science Technology and Research.

30. COSTI Celebrates its First Anniversary

COSTI staff met at the Light House Gallery, Colombo to celebrate the First Anniversary. Prof. Vitarana, Minister (Senior) for Scientific Affairs also attended the luncheon and appreciated the hard work being undertaken by Team COSTI amidst many administrative and financial difficulties.



Team COSTI celebrating the 1st Anniversary



31. COSTI joins Beach Cleaning campaign in Mt. Lavinia

COSTI staff joined hands with students of University of Moratuwa in a beach cleaning campaign on 19 September 2015 to commemorate the International Coastal Clean Up Day.



COSTI staff engaged in beach clean-up campaign

32. Popular talk by Eng. Tilak Dissanayake

Eng. Tilak Dissanayake, a mechanical engineer who has been working in the commercial and defense sector of the Boeing Company in the USA, made a presentation on 'Product Design Engineering' and the possible use of modern technologies such as ICT, robotics and other manufacturing technologies in resolving long standing economic issues of the country in getting Sri Lanka out of the middle-income trap.



Eng. Tilak Dissanayake presenting a case for Product Design Engineering

33. Annual celebrations – New year, Vesak and Christmas

COSTI staff, being multi ethnic and multi religious has made it a point to celebrate Sinhala and Tamil New Year, Vesak and Christmas, three of the major events in the Sri Lankan Calendar, with appropriate decorations and sweet meats. These events have encouraged and sustained the harmonious atmosphere at COSTI.



Celebrations – always with plenty of good food

34. We bid farewell to many members of Team COSTI

Towards the latter part of 2014 and in 2015, because of uncertainty of COSTI's future, we witnessed the departure from COSTI of many of our talented young staff for more stable jobs. Dr. S.A.K. Abeywardene, Programme Director was the first leave COSTI, to settle down in Australia. Mr. Damith Chandrasekera, our Director, Administration left for a position in another local organization.

They were followed by Buddhika Jayasekera (to settle down in Australia), Chandana Hewawasam, Hemantha Premaratne, Ishan Bandara, Tharindu Bandara, Nalinda Karunaratne, Prashan Francis, Asanka Suraweera, Indika Ruwan Kumara, Priyantha Chandrasena, Dinushika Manawadu, Irushini Wedege, Padmakumara Jayasinghe, Pramukha Wijeratne, Pulendran Tharmendra, Wasantha Senadeera and Chathuri Pumika Rajapakshe (to settle down in Australia).



Samadhi and Tharuka - our first two interns

In 2015 and 2016 we saw the departure of Milan Dilip Ananda, Thushal Karunaratne, Jonathan Ponnadurai, Fathima Zahra (to settle down in Australia), Sanjaya Tilekeratne, Nilanka Karunaratne, Janani Kanapathiraj, Maduka Perera, Virangya Seneviratne, Wasantha Ekanayake, Kumudini Gunasekera and Maheeni Singapulli. We wish them all a successful future.

Two Programme Directors Dr. M. Mubaraq and Mr. Lakshman Wijewardene also resigned in 2014 and 2016, respectively.

Our first two interns, Tharuka Prasadini and Samadhi Basnayake also left COSTI in 2014 after successfully completing their internships.

We like to remember with much appreciation and gratitude, Madusanka (driver) who passed away after a tragic accident in July 2015. He was an obliging and energetic young man, very much liked by all COSTI staff.



What's remaining of Team COSTI at the end of 2016.....we survived though we lost so many talented people

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Some contributions from COSTI staff:

Lankan sapphires most sought after by royals

<http://www.dailynews.lk/business/lankan-sapphires-most-sought-after-royals>

Lanka's salt can enrich country's coffers

<http://www.dailynews.lk/business/lankas-salt-can-enrich-countrys-coffers>

Sri Lanka's Clay; Magnanimous gift to locals through the ages

<http://www.dailynews.lk/business/sri-lankas-clay-magnanimous-gift-locals-through-ages>

Plight of much sought after Sri Lankan cinnamon

<http://www.dailynews.lk/?q=business/plight-much-sought-after-sri-lankan-cinnamon>

Lanka's lacquer work handicraft face uncertain future -

<http://www.dailynews.lk/?q=business/lanka-s-lacquer-work-handicraft-face-uncertain-future#sthash.zqCVt3Iq.dpuf>

National Science Center, a Long felt need of the country

<http://www.dailynews.lk/?q=business%2Fnational-science-centre-long-felt-need>

Innovative approach brings about energy security to Lanka

<http://www.dailynews.lk/?q=business%2Finnovative-approach-brings-about-energy-security-lanka>

Ancient Lanka made guns powered by local gunpowder

<http://www.dailynews.lk/?q=business%2Fancient-lanka-made-guns-powered-local-gunpowder>

Lanka's clay can fetch exorbitant price tag

<http://www.dailynews.lk/?q=business%2Flanka-s-clay-can-fetch-exorbitant-price-tag>

Limestone; nature's bountiful gift to Lanka

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Vein quartz from Sri Lanka's " Silicon Valley"

<http://www.dailynews.lk/business/vein-quartz-sri-lankas-silicon-valley>

Another golden era for the graphite in the offing

<http://www.dailynews.lk/features/are-we-going-sell-graphite-song>

Lanka's graphite industry needs innovation

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Marketing Lanka's vein graphite

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Can petroleum be found in booming south?

<http://www.dailynews.lk/business/can-petroleum-be-found-booming-south>

Lanka's iron ore needs innovation to regain past glory

<http://www.dailynews.lk/business/lankas-iron-ore-needs-innovation-regain-past-glory#sthash.o4zuLpM4.dpuf>

Mineral sand, a money-spinner for innovators

<http://www.dailynews.lk/?q=business/mineral-sand-money-spinner-innovators>

Sri Lanka's Gold; past and present-

<http://www.dailynews.lk/business/sri-lankas-gold-past-and-present>

INDIGENOUS TECHNO Indigenous knowledge helps develop nanotechnologies

<http://www.dailynews.lk/?q=business/indigenous-techno#sthash.FjKZnoAG.dpuf>

Birth of Black Gold (Petroleum) ---

<http://www.dailynews.lk/business/birth-black-gold-petroleum>

Mineral sand; nature's bountiful gift to Lanka

<http://www.srilankaexporter.nce.lk/sri-lanka-exporter-issue88/>

Sri Lanka's lacquer work needs innovation to regain its past glory

<http://www.srilankaexporter.nce.lk/issue-89/>

<http://www.ft.lk/article/550677/Role-of-youth-to-combat-the-climate-giant;>

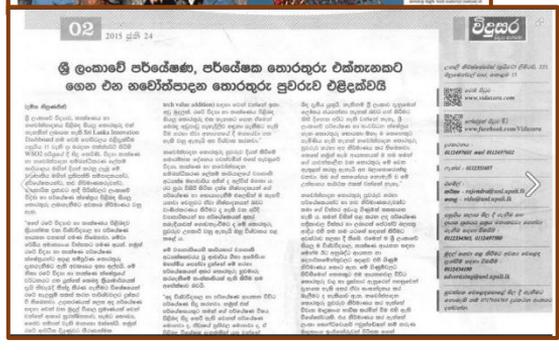
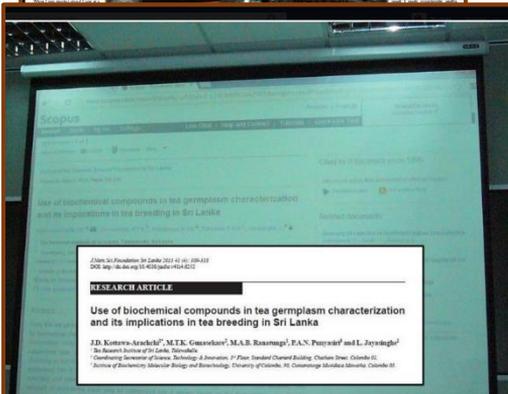
<http://www.thesundayleader.lk/2016/07/10/the-youth-get-together-to-combat-disastrous-climate-change/>

http://www.vidusara.com/2014/11/05/viduindex.htm

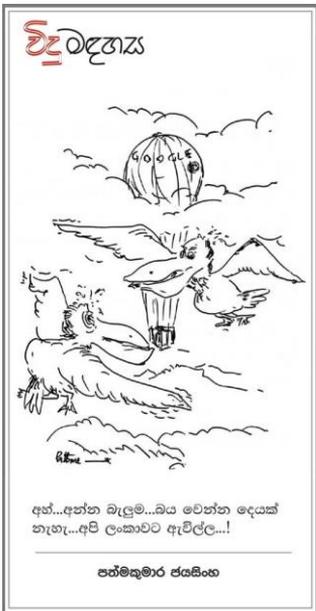
Lankan Sapphires- Most Sought After by Royals (Ed. Prashan Francis, COSTI), Sri Lanka Exporter 84 (April/June): 17, National Chamber of Commerce, Colombo, 2014

Innovation approach to accrue future income from Sri Lanka's Cinnamon (Ed. Prashan Francis, COSTI), Sri Lanka Exporter 87 (January/march): 49, National Chamber of Commerce, Colombo, 2015

A few selected Publications by COSTI staff



Few selected (science) cartoons published by Dr. Pathmakumara Jayasinghe in Vidusara Science Magazine



ANNEX 1. – OUR SUCCESS STORIES

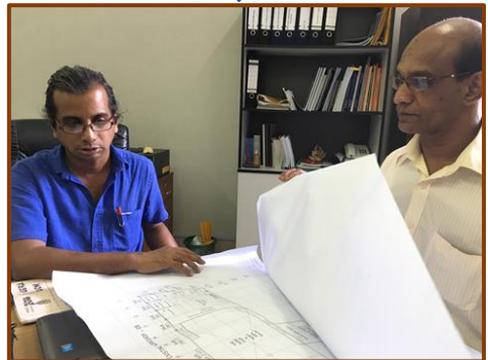
i) Centre of Excellence in Robotics Applications - CERA



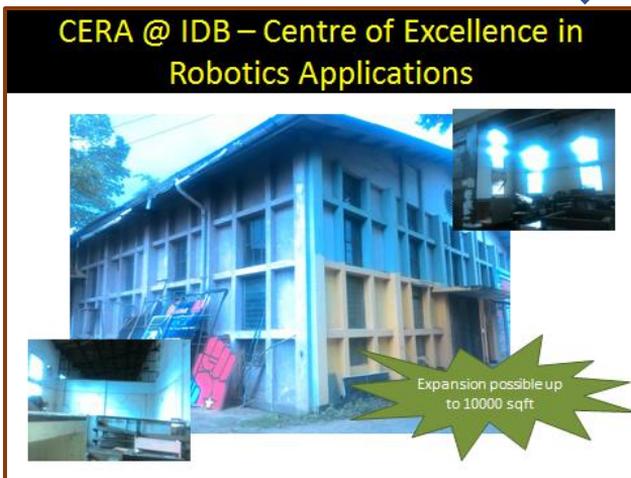
CERA being discussed.....



CERA gets approval of Ministry of Industry



CERA being designed and planned.....



The Final Product – CERA (is on the way)
Rs. 80 million has been allocated from the consolidated fund to initiate activities.



Establishing the facilitynow in progress

ii) National Innovation Dashboard



Planning details of the Dashboard.....



The developers – COSTI IT team with the software engineers



Handing over the Master copy



Grand launching of the Dashboard at IT City, Colombo



The Innovation Dashboard Home page



Proud Team COSTI after the launch of the Dashboard

iii) MOU with CERN – Exposure of Sri Lankan Scientists to CERN facilities

As a follow up to the visit of Dr. Rudiger Voss, former Head of International Relations, European Organization for Nuclear Research (CERN), Geneva, Switzerland, in November 2014, Government of Sri Lanka signed an Expression of Interest Agreement (EOI) with CERN on 25 June 2015. Sri Lankan Ambassador to Switzerland Mr. Ravinatha Aryasinha signed the agreement on behalf of the Government of Sri Lanka while Director General, Mr. Rolf-Dieter Heurer signed on behalf of CERN.



Signing the 'Expression of Interest Agreement

Subsequent to the EOI an MOU has been also been signed by the Hon Minister for Science Technology and Research, Mr. Susil Premajayantha with CERN thus enabling Sri Lankan scientists, engineers, researchers and other professionals to benefit by many of the CERN facilities. Based on the MOU Sri Lankan professionals can now attend high-demand R&D programmes conducted by CERN as well as other programmes such as High School Teacher programme and Summer Student Programme being organized by CERN. This would allow Sri Lankan science and technology professionals to gain firsthand experience and knowledge in the field of high energy physics.

For further details see: <http://lankamission.org/socio-economic-development/science-technology/1375-sri-lanka-initiates-collaboration-with-cern.html>

ANNEX 2 – ALMOST SUCCESSFUL - WE DELIVERED BUT**i) Establishment of a National Science Centre**

Having accepted COSTI's proposal for the establishment of a National Science Centre in Sri Lanka, former President Mahinda Rajapaksa in his 2014 Budget speech recognized the need for a Science Centre in the country in order to help promote the scientific knowledge required for the advancement of our society. Accordingly, Rs. 300 million was allocated for the financial year 2014 to initiate the process with the understanding that further financial support will be provided by the Government in the coming years.

COSTI, through negotiations obtained UDA approval to locate the Science Centre in a 3 acre land in Pitipana, Homagama (ref. letter of UDA Director, LD and Mgt. dated 29 Jan. 2014). A cost-benefit analysis was also prepared by COSTI with the assistance of DFCC Bank which showed that initial investment of Rs. 2,500 million can be fully recovered within a period of 10 years. However, COSTI faced numerous obstacles from various government institutions in the subsequent months which prevented the operationalization of the proposal. An attempt to submit a Cabinet paper by the Hon. Minister of Education in 2014 requesting that funds be allocated to that Ministry for preparing an action plan to establish the Science Centre too did not materialize.

Although attempts made by the National Science Foundation in 2014 did not materialize, the issue is once again being revitalized by the National Science foundation in collaboration with the Ministry of Science Technology and Research.

ii) Tax Incentive Scheme for Research and Development

As Minister of Finance His Excellency Mahinda Rajapaksha, the President of the Democratic Socialist Republic of Sri Lanka, in his budget speech for 2013 budget, proposed to grant a triple deduction for research expenditure and a lump sum depreciation for capital expenditure on required equipment and development of laboratory facilities to encourage private sector engagement in research and innovation. Accordingly, having reviewed various tax incentives being provided for R&D by countries such as Canada, United Kingdom and Singapore, COSTI in consultation with the Department of Inland Revenue, developed a 'R&D Tax Incentive Scheme' along with an application form for Sri Lankan businesses to obtain R&D Tax offsets for conducting R&D in Sri Lanka.

Although industry perceptions were assessed at a number of meetings, and the scheme submitted to the Treasury for their views and thereafter for implementation, the proposed scheme never materialized. If accepted and implemented by the Treasury and the Department of Inland Revenue, the scheme would have been an encouragement for the private sector to invest in R&D and thereby achieve the envisaged development targets of the government.

iii) A National Climate Observatory System for Sri Lanka

Based on a proposal submitted by IWMI, COSTI in consultation with IWMI, Department of Meteorology, Department of Irrigation, Mahaweli Authority, National Building Research Organization, University of Moratuwa, ITI, Department of Agriculture, Air Force and the Ministry of Disaster Management, developed a mechanism for operating a networked grid of automated weather instruments on land and sea, that will report live, the state of climate and its immediate (and future) threats to people, economy and the infrastructure.



Low cost prototype being tested at the Department of Meteorology

The low-cost prototype (around Rs. 50,000/-) of the weather station developed by IWMI was evaluated and arrangements were made for NBRO to operationalize the system on a limited scale.

If implemented, the Climate Observatory System would have benefitted the country immensely as it would have provided real time information on climatic parameters such as rain fall, wind speed, wind direction etc. island wide, mitigating possible weather related disasters throughout country.

**The road has been rough and gloomy
with many obstacles**

BUT there is light at the end of the tunnel.....



On 03 January 2017 the Cabinet of Ministers approved the proposal made by Hon. Minister of Science Technology and Research Mr. Susil Premajayantha to establish the National Science Technology and Innovation Coordinating Authority (NASTICA), to facilitate the coordination of research and development activities administered by 21 line ministries and about 80 research institutions and research centres, with the view of gaining the maximum outcome of investments made on science, technology and innovation for the socio-economic development of Sri Lanka.

We are proud of our achievements