

SCIENCE AND TECHNOLOGY STATUS REPORT OF SRI LANKA - 2021



National Science and Technology Commission Ministry of Education





SCIENCE AND TECHNOLOGY STATUS REPORT OF SRI LANKA -2021

(Prepared based on the data collected from 46 Public Sector S&T Institutions)

National Science and Technology Commission

(Ministry of Education)

6th Floor, Wing D, Sethsiripaya Stage II, Battaramulla <u>www.nastec.gov.lk</u>

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Compiled by:

Denisha Piyumali (Orcid ID: <u>https://orcid.org/0009-0008-2186-3530</u>) Sajini Dickmadugoda (Orcid ID<u>: https://orcid.org/ 0009-0007-0466-7565</u>) Koshila Maduwanthi (Orcid ID<u>: https://orcid.org/0009-0004-0104-6008</u> Rasitha Perera (Orcid ID: https://orcid.org/0009 0006-1937-6755)

Edited by:

Thilini Munagamage (Orcid ID: <u>https://orcid.org/0000-0002-0289 4090</u>) Seyed Shahmy (Orcid ID: <u>https://orcid.org/0000-0002-2339-1572</u>)

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National Science and Technology Commission (NASTEC)6th

Floor, Wing D,

Sethsiripaya Stage II, Battaramulla

Tel/Fax: 011-2186711/011-2186713

Email: <u>nastecoffice@gmail.com</u>

Website: www.nastec.gov.lk

Research Gate: https://www.researchgate.net/profile/National-Science-And-Technology-Commission-Nastec-Sri-Lanka

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MESSAGE FROM THE MINISTER OF EDUCATION

The Science and Technology Status Report of Sri Lanka is an annual document prepared by the National Science and Technology Commission (NASTEC) in compliance with the Science and Technology Development Act No. 11 of 1994. It provides an overview of science and technology landscape of Sri Lanka, covering aspects including funding, research initiatives, people resources, technical developments, and intellectual activities within the national science and technology environment of the country. NASTEC gathers information from numerous national scientific and technology public institutes within the country to prepare this report.

Within the context of the aforementioned, NASTEC has proposed a set of policy recommendations aimed at enhancing the performance of the S&T sector in Sri Lanka, based on the data collected for the year 2021.

I would like to express my gratitude to NASTEC for their diligent efforts in gathering information from pertinent institutions and stakeholders and for their timely and helpful advice that helped us to complete this national assignment. I also want to take this chance to express my gratitude to the CEOs and Chairpersons of the S&T institutions for their informational contributions that helped this project to succeed.

With Best Wishes

Dr. A.D. Susil Premajayantha (M.P.) Hon. Minister of Education Leader of the House, Sri Lanka Parliament

July 01, 2024

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FOREWORD

The National Science and Technology Commission (NASTEC), established by the Science and Technology Development Act No. 11 of 1994, functions under the purview of the Ministry of Education. One of the mandatory functions of the Commission is to compile and submit a report annually to the government, reviewing the science and technology (S&T) activities of the country in the preceding year. A survey was carried out to gather relevant data from science and technology (S&T) institutes in the public sector in order to examine the S&T activities of 2021. This study was completed using data collected from 46 public sector S&T entities that responded to the survey. The report reflects the performance of those public sector institutions under the sub-categories of (i) effectiveness of public spending on S&T, (ii) use of S&T developments, (iii) services provided by national S&T institutions, and (iv) development of human resources. Determining the institutions' current capability for S&T will be made easier with the help of the information gathered from this survey and by implementing the recommendations in this study, pertinent institutes can be strengthened. These interventions may come in the shape of policies, R&D interventions, capacity development, etc.

This report, which offers another perspective on the scientific environment at S&T organizations in the public sector, is regarded as a revolutionary effort. We anticipate that the analysis in this report will contribute to the collection of information needed for S&T organizations in the public sector to make decisions and that it will provide useful advice for enhancing performance.

I would like to take this opportunity to express my gratitude to the Chairmen, Directors, and CEOs of the public S&T institutions who provided the necessary data and information to complete this report and to congratulate the NASTEC staff for their dedication to producing the S&T status report for the year 2021.

Prof. Veranja Karunaratne Chairman NASTEC May 15, 2024

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PREFACE

The National Science and Technology Commission (NASTEC), by its mandate under the Science and Technology Development Act No. 11 of 1994, is the apex policy-formulating and advisory body on science and technology (S&T) matters to the Government of Sri Lanka. NASTEC submit a report annually to the Government, reviewing the S & T activities in Sri Lanka in the preceding year, with the objects set out in Section 2 of the Act and on the effectiveness of measures for the development of human resources, the performance of science and technology institutions, the effectiveness of public spending on S&T, and the use of them by the public sector and private sector undertakings¹. Within this context, the NASTEC was able to gather information of 46 public sector S&T institutions out of 65 through a survey for the year 2021.

Information was obtained under five main categories from the institutions: physical resources, research outputs, research inputs and institute services. To evaluate the institutes' national contribution to the industry, these data points were analyzed. The analytical conclusions of the report offer useful information for determining appropriate actions that may be made to improve the performance of the sector.

We are grateful to the Chairpersons, Heads of the institutions that participated in the survey by providing their institutional data, and liaison officers appointed by the institutions for their extended support in the entire process, which allowed NASTEC to compile this report successfully. We also appreciate the valuable advice and direction provided by the Commission-appointed subcommittee, the Acting Director, and the NASTEC team who got involved in preparing this publication.

Seyed Shahmy Senior Scientist May15, 2024

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¹ Science And Technology Development Act (No. 11 of 1994); http://www.commonlii.org/lk/legis/num_act/satda1101994368/s5.html

For a copy of the publication or suggestions for improvements, please write to:

Senior Scientist National Science and Technology Commission (NASTEC) 6th Floor, Wing D Sethsiripya Stage II Bataramulla E-mail:<u>info@nastec.gov.lk</u> <u>shahmy.s@nastec.gov.lk</u> <u>shahmy_phr@yahoo.com</u>

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ACRONYMS

- ACCIMT Arthur C Clarke Institute of Modern Technology
- APCR- Annual Project Completion Rate
- BMARI Bandaranayke Memorial Ayurveda Research Institute
- CPD Continuous Professional Development
- COVID 19 Coronavirus Disease 2019
- CDRD Centre for Defense Research and Development
- CEA Central Environmental Authority
- CBSL- Central Bank of Sri Lanka
- CRI-Coconut Research Institute
- DOM Department of Meteorology
- DEA Department of Export Agriculture
- DMUSS Department of Measurement Units, Standards & Services
- DMC Disaster Management Centre
- DNBG Department of National Botanic Gardens
- EOLSS Encyclopedia of Life Support Systems
- FD Forest Department
- FMRC Farm Mechanization Research Centre
- FORD Fields of Research and Development
- FRDI Fruit Research and Development Institute
- FUR Fund Utilization Rate
- GDP Gross Domestic Product
- GERD Gross Domestic Expenditure on R&D
- GJRTI Gem and Jewellery Research and Training Institute
- GoSL-Government of Sri Lanka
- GSMB Geological Survey and Mines Bureau
- HARTI Hector Kobbekaduwa Agrarian Research and Training Institute
- HORDI Horticultural Crop Research and Development Institute
- HRD Human Resource Development
- HRST Human Resources in Science & Technology
- ICT Information Communication Technology
- ID Irrigation Department

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- **IP-** Intellectual Property
- IPHT Institute of Post-Harvest Technology
- IPR Intellectual Property Rights
- ISCED International Standard Classification of Education
- IT Information Technology
- ITI Industrial Technology Institute
- LB-Lower Bound
- LKR Sri Lankan Rupees
- MRI-Medical Research Institute
- NASTEC National Science and Technology Commission
- NARA National Aquatic Resource Research and Development Agency
- NBRO National Building Research Organization
- NERDC National Engineering Research and Development Centre
- NIFS National Institute of Fundamental Studies
- NIPM National Institute of Postharvest Management
- NPQS National Plant Quarantine Service
- NPD-- National Planning Department
- NRC National Research Council
- NRDF National Research and Development Framework
- NRMC Natural Resources Management Centre
- NSF National Science Foundation
- NSTP National Science and Technology Policy
- OECD Organization for Economic Co-operation and Development
- PGRC Plant Genetic Resource Centre
- PPP Public Private Partnerships
- PRI Palmyra Research Institute
- PPS Plant Protection Service
- R&D Research & Development
- RPO Office of the Registrar of Pesticides
- RRDI Rice Research and Development Institute
- RRI-Rubber Research Institute
- SAARC- South Asian Association for Regional Cooperation
- S&T Science and Technology

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- SCI-Science Citation Index
- SCI-Expanded-Science Citation Index Expanded
- SCPPC Seed Certification and Plant Protection Centre
- SCS Seed Certification Services
- SDGs Sustainable Development Goals
- SLAB Sri Lanka Accreditation Board for Conformity Assessment
- SLAEB Sri Lanka Atomic Energy Board
- SLCARP Sri Lanka Council for Agricultural Research Policy
- SLINTEC Sri Lanka Institute of Nanotechnology (Pvt) Ltd
- SLSI Sri Lanka Standards Institution
- SMART Specific, Measurable, Achievable, Relevant, and Time bound
- SRI-Sugarcane Research Institute
- TTF- Technology Transfer Facilities
- TOT Transfer of Technology
- TRI Tea Research Institute
- UIS UNESCO Institute of Statistics
- WB-World Bank
- WIPO World Intellectual Property Office
- UB Upper Bound
- UNESCO United Nations Educational, Scientific and Cultural Organization
- UNCTAD United Nations Conference on Trade and Development
- VRI-Veterinary Research Institute

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EXECUTIVE SUMMARY

Sri Lanka hit a new level of socio economic crisis in 2021 with the continuation of the COVID-19 pandemic and later due to the political turbulence. This led to national lockdowns, and work from home arrangements for government sector employees that caused a notable reduction on completing S&T institutions assigned functions. Within these uncertainties, the Science and Technology (S&T) Status Report of Sri Lanka for 2021 was compiled on data collected from 46 Public sector S&T institutions. The work aims to assess the S&T activities in these institutions according to the objectives set out in the S&T Development Act of 1994/11.

The analysis of survey data from S&T institutes in the public sector reveals that permanent employees represent over 94% of the workforce at present. Additionally, women make up 54% of the scientific workforce, which is higher than the global average of 46% in fields related to the public sector². However, there is a clear disparity in the field of engineering and technology, where the percentage of women is significantly lower at 36%. This emphasizes the importance of concentrated reflects to increase female representative and promote an inclusive and more diverse workforce.

In an institutional context, the leading expertise among researchers are relevant to social sciences, with notable representation from agricultural and veterinary sciences, engineering and technology, followed by natural sciences. The average number of researchers working at a research institute was 45 with a slight change of the consistent pattern over the decade. The majority of these researchers were positioned within the mid-career stage, with only a minority, approximately 9%, possessing a Doctor of Philosophy (PhD) qualification.

The institutes reported a 6% employee turnover rate in 2021, which is significantly lower than the 14% global average³. However, the Human Flight and Brain Drain Index raised concerns, indicating a significant brain drain issue with an average value of 6.70 index points for Sri Lanka⁴. Addressing this significant brain drain is crucial for preserving talented individuals employed in the structure.

Additionally, to the 414 research labs, 78 workshops, 46 libraries, and 111 auditoriums, the surveyed institutions also have particular resources including technological parks, mobile labs,

² World bank Blog; <u>https://blogs.worldbank.org/governance/five-facts-gender-equity-public-sector</u>

³ <u>https://explodingtopics.com/blog/employee-turnover-statistics</u>

⁴ Fragile States Index data 2021: <u>https://fragilestatesindex.org/global-data/</u>

and research incubators. Each institution includes internet connectivity and basic ICT infrastructure, and 30 of these institutions have databases specifically for R&D services. The research staff as a whole is also equipped with sufficient ICT infrastructure.

The Government of Sri Lanka (GoSL) was the principal funder to the institutions indicated above, with the majority of funds flowing toward direct research and development (R&D) projects, followed by infrastructure development. R&D funding amounted LKR 5520.41 million, with the majority of the funds going to the sectors of agriculture and veterinary sciences. The fund utilization rate (FUR) was 59%. And, the national gross expenditure in R&D (GERD) amounted to 0.36 billion (USD) in 2021, which remained lower than that of major economies within the Asia-Pacific region⁵.

The institutions undertook a total of 983 research projects, mainly characterized as multi-year, with an annual completion rate of 54%. Notably, 62% of these projects were concentrated in the domain of agriculture and veterinary sciences. Throughout these endeavors, 56 products, 95 processes, and 64 technologies were developed. Additionally, the scholarly output contained 721 publications, including 225 in SCI and 9 in SCIE.

In 2021, Sri Lanka's scholarly publications per unit GDP amounted to 45.22, demonstrating close proximity to the global average of 51.34 but trailing behind the South Asian Association for Regional Cooperation (SAARC) average of 72.72. This current state of affairs could potentially improve with the establishment of a national framework for research excellence and financial incentives, which would be sufficient a long-standing desire among scholars.

Among the surveyed institutions, 35 researchers received acclamations for their scholarly accomplishments, encompassing 6 international honors. In 2021, out of a total of 329 patent applications filed at the national level⁶, it was observed that 18 patents, approximately 5% of the total, originated from the institutions analyzed in the survey. As part of the market acceptance process, 25 products and 22 processes were targeted towards initial consumer groups. Additionally, 40 recommendations were approved and 74 technologies were successfully transferred.

Research projects during the pandemic yielded innovative products and technologies, but there's a need to enhance the publication process for indexed journals and improve transparency in quality to effectively translate knowledge into practical applications.

 ⁵ Statista Data: https://www.statista.com/statistics/1346196/apac-gross-expenditure-on-research-development-by-country/
⁶ WIPO Country Profile: https://www.wipo.int/edocs/statistics-country-profile/en/lk.pdf

INTRODUCTION

The National Science and Technology Commission (NASTEC), established under the Science and Technology Development Act No. 11 of 1994 in Sri Lanka, serves as the principal policy-formulating and advisory body for Science and Technology (S&T) activities for the government. It is tasked with producing an annual report that evaluates the country's S&T status based on the Act's objectives, including the development of human resources, the performance of S&T institutions, the efficiency of public S&T expenditure, and the utilization of S&T by both public and private entities⁷. This report aims to provide stakeholders with comprehensive information in accordance with its statutory responsibilities.

The national research and innovation ecosystem contains research institutions, universities, knowledge-based services, and innovative businesses engaged in generating scientific knowledge, supporting higher education, fostering industrial innovation, and advancing national strategic objectives. Periodic review of the status of S&T is vital for driving socioeconomic development⁸, with a key focus on evaluating the performance of S&T institutions, as it profoundly influences the efficacy of the entire ecosystem.

To facilitate the task, NASTEC considered two attributes: first, activities of major S&T institutions in Sri Lanka, collected via a questionnaire-based sample survey; second, complementary information gathered from annual publications of prominent global and local learned societies and agencies, including the World Bank, UNESCO, World Intellectual Property Office (WIPO), University Grant Commission (UGC), and the Central Bank of Sri Lanka (CBSL).

The survey methodology involved the design of a questionnaire aimed at gathering data for the year 2021, distributed via email and mailed to 65 public sector S&T institutes. The questionnaire covered aspects such as human resources, physical resources, research planning, research inputs (funds), research outputs, and services provided to industries, peer institutions, and the general public. Each institution appointed a liaison officer to provide the required data, with a four-month deadline given for completion. Ultimately, 46 institutions responded with complete datasets within the stipulated timeframe.

 ⁷ Science & Technology Development Act (No. 11 of 1994); http://www.commonlii.org/lk/legis/num_act/satda11o1994368/s5.html
⁸ National Innovation system, OECD; https://www.oecd.org/science/inno/2101733.pdf

The compiled report utilized a descriptive and comparative methodology based on information gathered. Institutions surveyed were categorized into five disciplines following the OECD Fields of Research and Development (FORD) framework: Natural Sciences (i), Engineering and Technology (ii), Medical and Health Sciences (iii), Agricultural and Veterinary Sciences (iv), and Social Sciences (v) (Annexure 01). Table 1 presents the sectoral breakdown of the total number of institutions examined.

The report is structured into six main sections: Human Resources, Physical Resources, Research Planning, Research Funding, Research Outputs, and Institutional Services. Each section provides a detailed description accompanied by appropriate graphical representations of activities conducted in the reporting year 2021, along with trends observed from 2012 to 2021. Run charts were generated by calculating average figures per institute, considering variations in the number of institutes surveyed from 2012 to 2021. Due to limited availability of global and regional indices for the reporting year, some assessment results lack external authentication; however, the report validates these claims where possible. Recommendations and conclusions drawn from the survey serve as reference points for enhancing institutional performance.

While NASTEC assumes responsibility for annually preparing the S&T status report at a national level, several constraints are evident. These include the exclusion of private-sector institutions' status and incomplete coverage of the higher education sector. Moreover, although the report aims to evaluate the national S&T status, it relies primarily on data from a subset of 46 institutes, predominantly focusing on R&D activities within the broader S&T ecosystem. Given the limited number of private-sector institutions with specialized R&D facilities in Sri Lanka, caution is reasonable when generalizing the report's findings to represent the overall national S&T status.

The surveyed public sector institutions hold significant influence within the national S&T ecosystems, thereby the representation in the report is instrumental in informing policy decisions regarding policy directives, strategic interventions, human resource requirements, research planning, and funding priorities for these institutes.

Table 1: Sector-wise distributions of S&T Institutes

Sector	Number of Institutes	%
Agricultural & Veterinary Sciences	23	50%
Engineering & Technology	7	15%
Medical & Health Sciences	1	2%
Natural Sciences	7	15%
Social Sciences	8	17%
Total Institutes	46	100%

Among the 46 S&T institutes surveyed, the sector of Agricultural and Veterinary Sciences comprised the largest number of institutions (n=23), and Medical & Health Sciences sector comprised the lowest number of institutions (n=1). A list of institutions belonging to each sector is given in Table 02.

Table 2 : Sector-wise categorization of public sector S&T Institutions in Sri Lanka

Natural Sciences	Engineering & Technology	Medical & Health Sciences	Agricultural & Veterinary Sciences	Social Sciences
Central Environmental Authority (CEA)	Arthur C. Clarke Institute for Modern Technologies (ACCIMT)	Bandaranaike Memorial Ayurvedic Research Institute (BMARI)	Coconut Research Institute (CRI)	Department of Census & Statistics (DCS)
Department of National Botanic Gardens (DNBG)	Centre for Defence Research and Development		Department of Export Agriculture (DEA)	Institute of Policy Studies of Sri Lanka (IPS)
Gem &Jewellery Research and Training Institute (GJRTI)	Farm Mechanization Research Centre (FMRC)		Field Crops Research & Development Institute (FCRDI)	National Research Council (NRC)
Measurement Units, Standards & Services (MUSSD)	Industrial TechnologyInstitute (ITI)		Forest Department (FD)	National Science Foundation (NSF)
National Institute of Fundamental studies(NIFS)	National Building Research Organization (NBRO)		Fruit Research and Development Institute (FRDI)	Sri Lanka Accreditation Boardfor Conformity Assessment (SLAB)
Natural Resources Management Centre(NRMC)	National Engineering Research & Development Centre (NERDC)		Hector Kobbekaduwa Agrarian Research and Training Institute (HARTI)	Sri Lanka Inventors Commission (SLIC)
Sri Lanka Atomic Energy Board (SLAEB)	Sri Lanka Institute of Nanotechnology (SLINTEC)		Horticultural Crop Research & Development Institute (HORDI)	Sri Lanka Standard Institution(SLSI)

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Department of	Sustainable
Irrigation (DI)	Development
inigation (D1)	Council of Smi
	Lanka (SDCSL)
National	
Aquaculture	
Development	
Authority	
(NAQDA)	
National Aquatic	
Resources	
Research&	
Development	
Agency (NARA)	
National Institute	
of Postharvest	
Management	
(NIPM)	
National Plant	
Quarantine Semilars (NDOS)	
 Delmumo Desearch	
Palliyla Research	
Diant Constia	
Plant Genetic Besource Centre	
(PGPC)	
Plant Protection	
Services (PPS)	
Registrar of	
Pesticide Office	
(RPO)	
Rice Research &	
Development Institute	
(RRDI)	
Rubber Research	
Institute (RRI)	
Seed Certification	
Services (SCS)	
Sri Lanka Council	
for Agricultural	
Research Policy	
(SLCARP)	
Sugarcane Research	
Institute (SRI)	
Tea Research	
Institute (TRI)	
Veterinary Research	
Institute (VRI)	

The statutory functions of institutes relating to science and technology are organized into eight main sections.

- 1. R & D (Research and Development)
- 2. Research Funding
- 3. S&T Services
- 4. Innovation
- 5. S&T Policy Formulation

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- 6. Technology Transfer
- 7. Science Popularization
- 8. Training in Personnel

The number of institutions carrying out the functions is indicated in Table 03, while Figure 1.1 illustrates the sector-wise distribution of S&T institutions engaged in statutory functions.

Statutory Function	Number of Institutions	%
R&D	36	78%
Research funding	6	13%
S&T Services	29	63%
Innovation	24	52%
S&T Policy formulation	12	26%
Technology Transfer	35	76%
Science popularization	20	43%
Training of Personnel	32	70%

Table 3: Major Statutory Functions conducted by S & T Institutions



Figure 1.1: Sector-wise distribution of S&T institutions carrying out statutory functions

According to the OECD Frascati Manual, research and experimental development (R&D) comprises creative and systematic work undertaken to increase the stock of knowledge—

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including knowledge of humankind, culture, and society—and to devise new applications of available knowledge. R&D represents the initial phase in the development of potential new services or production processes. Notably, 78% of surveyed institutions identified R&D as a principal statutory function.

Research funding entails the providing of financial grants for various R&D activities, including basic research, applied research, and prototype development. Six institutes, constituting 13% of the surveyed institutions, engage in research funding. These institutes include DNBG, PRI, SLCARP, NARA, NRC, and NSF.

Analytical testing, quality assurance, laboratory accreditation, instrument calibration, personnel training, and other specialized S&T-related services offered by the institution are collectively considered as S&T services. Out of the 46 surveyed institutes, 29 (63%) engaged in at least one of the aforementioned S&T services.

In an epoch characterized by swift technological evolution, policy-making institutes must adeptly identify and formulate policies to address emerging science, technology, and innovative developments.⁹¹⁰. Twenty-six percent of the institutes surveyed were involved in S & T policy formulation activities.

Technology transfer (TT) refers to the process of conveying results stemming from scientific and technological research to the marketplace and a wider society, along with associated skills and procedures, and is, as such, an intrinsic part of the technological innovation process¹¹.Within the surveyed period, thirty-five (76%) institutes participated in technology transfer.

Science popularization entails the dissemination of scientific knowledge to the general public and the fostering of a scientific mindset among individuals. This comprehends both public understanding of science and the communication of research projects to the public. Among the surveyed institutes, 20 (43%) engage in science popularization activities as mandated. Notably, several institutes undertake multiple statutory functions concurrently.

Training of personnel refers to the process of enhancing the skills, knowledge, and

⁹ THE IMPACT OF RAPID TECHNOLOGICAL CHANGE ON SUSTAINABLE DEVELOPMENT (2019); UNCTAD; https://unctad.org/system/files/official-document/dtlstict2019d10_en.pdf

¹⁰ A FRAMEWORK for Science, Technology and Innovation Policy Reviews (2019); UNCTAD; https://unctad.org/system/files/official-document/dtlstict2019d4_en.pdf

¹¹ Knowledge for policy, European Commission; https://knowledge4policy.ec.europa.eu/technology-transfer/what- technology-transfer_en

competencies of employees to improve their performance and productivity within an organization.¹² Among the surveyed institutions 32 (70%) conduct training of personnel programs.

Innovation is the process of creating, developing, and implementing new ideas, products, services, processes, or methodologies that bring about positive change and provide value to individuals, organizations, or society as a whole¹³. Within the surveyed institutions 24 (52%) involved in the innovations.

¹²https://bizfluent.com/facts-6797726-meaning-personnel-training-.html

¹³ Open Innovation: The New Imperative for Creating and Profiting from Technology20041Henry W. Chesbrough. Open Innovation: The New Imperative for Creating and Profiting from Technology . Boston, MA: Harvard Business School Press 2003.

1. HUMAN RESOURCES

Human resources are considered an important type of resource for attaining the economic development of a country. The efficient utilization of HR depends on the government's substantial investment in its development¹⁴.

Human Resources in Science and Technology (HRST) are individuals who have completed tertiary education in an S&T field and/or those who are not formally qualified in this manner but work in an S&T occupation where such qualifications are required¹⁵. Worldwide, countries are migrating towards knowledge-based economies, and there is a growing demand for HRST. Knowledge-driven nations must generate a critical mass of well-trained professionals while linking with tertiary education per the international standard categorization of tertiary education (ISCED), in harmony with the sectors classified in the OECD, 1995.

The report categorizes the entire staff of the S&T institutions into two categories, namely, scientific and non-scientific. The first consists of researchers, research support/technical staff, and librarians/information officers, and the latter consists of accounting, administrative, and other staff (Definitions 1.1). The researchers' fields of study, the highest level of education, age and gender compositions, staff turnover, training, and the given incentives are extensively analyzed in the section HR.

1.1 Definition of Staff Category

Defined terms:

Scientific staff: Includes only research staff, research support staff, and librarians &information officers.

Research staff: Professionals who possess relevant qualifications and who are responsible for the conception or creation of new knowledge, products, processes, methods, and systems, and the management of the project concerned.

Research support staff: Employees with an appropriate technical qualification or diploma who support the functioning of S&T activities in the institution, but are not involved with the planning and implementation of such activities.

 ¹⁴ The Effect of Human Resource Development on Organizational productivity: (2013) http://dx.doi.org/10.6007/IJARBSS/v3-i10/295
¹⁵ Guidelines for collecting and Reporting data on Research and Experimental Development (OECD 2015); https://read.oecdilibrary.org/science-and-technology/frascati-manual-2015_9789264239012-en#page1

Librarians: Considered as informative scientists who belong to the scientific staff.

Administrative staff: All individuals who work in the institution's administration and are not directly involved in any scientific or research-related activity.

Accounting staff: All individuals employed in the institution's finance and accounting functions who are not directly involved in any science or research-related activity.

Supporting staff, non-research: secretarial, skilled/unskilled craftsmen, gardeners, animal housekeepers, etc. directly associated with or providing services to the researcher.

In 2021, a total of 9612 employees were working in the institutes surveyed, with 9075 (94%) being permanent, while 537 (6%) were on a contract basis.

The lowest number of employees reported was 11 working for NAQDA, while the highest number of employees reported was 1270 who have been attached to Department of Census & Statistics (DCS). Of the total, scientific staff accounted for 52.91%, n = 5086. Figure 1.2 depicts the distribution of scientific and non- scientific personnel by sector.



Figure 1. 2 Sectorial breakdown of scientific and non-scientific staff.

In the Agricultural and Veterinary Sciences, Natural Sciences as well as Health-Medical sectors, non-scientific staff surpassed scientific staff in numbers, whereas other sectors reported the opposite trend. The distribution of this ratio within the anticipated range is expected due to the nature of work conducted within these sectors. However, authentication of these findings was

impeded by the absence of global estimates during the reporting period when this report was compiled.

Sector	Scientific staff		Accounting Staff		Administrative Staff		Other	Total	
	Research Staff	Research Support Staff	Librarian / Information Officers	Accountants	Acc. Support Staff	Executives	Executive Support Staff	starr	
Agricultural & Veterinary Sciences	685	1234	30	18	129	72	1242	688	4098
Engineering & Technology	411	269	8	14	41	90	195	183	1211
Medical & Health Sciences	20	7	0	0	0	1	0	103	131
Natural Sciences	113	875	5	10	52	37	485	795	2372
Social Sciences	859	557	13	13	71	25	105	157	1800
Subtotal	2088	2942	56	55	293	225	2027	1926	9612
Total 5086		348		2	2252	1920	7012		

Table 4: Staff Strength – Distribution of staff employed in S&T institutions

Figure 1.3 shows the distribution of the number of researchers in the institutions. The lowest number of researchers were working in the PPS and FD (n = 2), and the highest number was 656 attached to DCS.



Figure 1. 3: Distribution of research personnel among S&T institutions

The average number of researchers per institute stood at 45, with 16 out of 46 S&T institutions (35%) employing fewer than 10 researchers. Figure 1.3 illustrates the distribution of research staff across the institutes. Additionally, 11 institutes (24%) boasted more than 50 researchers.

Figure 1.4 shows the trend of researchers working per institute over the period 2012–2021. Generally, there is a slightly increasing trend over the period specified.



Figure 1. 4: The number of researchers employed by each institute.

Opposing to the observed scenario at the institute level, national-level norms derived from UNESCO statistics indicate variations in the density of researchers in R&D per million populations. Between 2008 and 2013, there was an upward trend, although a decline was noted in 2014, followed by relatively stable values from 2015 to 2018. According to the UNESCO

statistics, the data has been updated until 2020 only. Therefore, the values are forecasted with upper and lower confidence bounds and presented as figure 1.5 and table 05. For 2021, the forecasted number of researchers (per million people) is 103.20 (LB: 102.34, UB: 106.40).

Year	No of Researchers in R&D per million people	Forecast	Lower confidence bound	Upper confidence bound
2012	108.64			
2013	107.99332			
2014	97.08263			
2015	104.08262			
2016	105.03859			
2017	104.71218			
2018	104.06004			
2019				
2020	104.55117			
2021		103.2062847	102.3475096	106.4006759

Table 5: Forecasted values for 2021 Researchers in R&D per million populations

Source: UNESCO Institute for Statistics - 2012-2020¹⁶



Figure 1. 5: The Researchers in R&D (per million people) in Sri Lanka

¹⁶ World Bank Data: https://data.worldbank.org/indicator/SP.POP.SCIE.RD.P6?locations=LK

14

1.2 Gender parity in Research Staff (Researchers)

Among the 2088 researchers surveyed, 54% were female (n = 1128) and 46% were male (n = 960), indicating a slight female predominance in gender parity across the institutions (Figure 1.6). Notably, The sample survey further revealed that, in 2021, the representation of women researchers in Sri Lanka which was 54%, is higher than the global estimation of 33%¹⁷.



Figure 1. 6: Gender distribution of research staff



1.2 Gender distribution of research staff by sector (based on the sectoral affiliation of the institute)

From a sectoral perspective, female researchers were more prevalent in the Agricultural and Veterinary Sciences, Social Sciences, Medical and Health Sciences, and Natural Sciences. Conversely, in the Engineering and Technology sector, male researchers predominated, indicating a need to encourage greater female representation in this field. (Figure 1.7)

¹⁷ L'Oréal-UNESCO for Women in Science: https://www.forwomeninscience.com/



Figure 1. 7: The gender distribution of research staff in different sectors

N*: Total number of researchers=2088

1.3 Areas of expertise of the Research staff (Researchers)

According to OECD guidelines, the survey categorized researchers' fields of specialization into Natural Sciences, Engineering and Technology, Medical and Health Sciences, Agricultural and Veterinary Sciences, and Social Sciences. The majority of researchers specialized in Social Sciences (n = 710, 34%), while the least specialized field was Medical and Health Sciences (n = 6, 0.3%). (Table 6)

and of stay assistant for research based on experiose (academic aripines) and genaer						
Field of Expertise	Male		Female	Total		
Agricultural & Veterinary Sciences	174	33.3	348	66.7	588	
Engineering & Technology	215	62.1	131	37.9	346	
Medical & Health Sciences	1	16.7	5	83.3	6	
Natural Sciences	148	36.6	256	63.4	432	
Social Sciences	367	51.7	343	48.3	710	
Other	55	55.0	45	45.0	100	
Total	960	46	1128	54	2088	

Table 6: Staff distribution for research based on expertise (academic driplines) and gender

Other*: Not specified



1.4 Sectorial composition of the research staff based on their highest academic qualifications.



Figure 1. 8: Composition of research the staff based on the highest qualifications held by them (Sectorial Distribution)



1.5 Research staff Age distribution.

Figure 1.9: Research staff age distribution

Young scientists and researchers are widely recognized for their creativity and energy, often displaying higher mobility and better training compared to previous generations. This demographic constitutes a significant pool of global talent poised to fundamentally alter the geography of knowledge. Early-career researchers play a pivotal role in knowledge economies

as key innovators and creators, contributing essential intellectual capital to strengthen national research and innovation systems. Considering emerging global challenges—such as rapid economic globalization, aging populations, increased demand for highly skilled labor, and the expansion of higher education systems—the imperative to nurture and promote young researchers is more urgent than ever.^{18 19}

The sample survey indicates that the majority of researchers were in the age group of 41-50 years (n = 678, 32%). Additionally, 26% were in the later career stage (age > 50), while only 13% were in the early career stage (age < 30 years). These findings underscore the necessity for sustainable recruitment and retention strategies to attract and retain talented young individuals in research careers, ensuring sustainable human resource management within the sector²⁰. (Figure 1.10)



Figure 1. 10: Age and gender distribution of research staff.

1.6 Highest education qualification of research staff

This survey assessed the educational qualifications of research staff, categorizing them into Ph.D., MPhil, MSc/MA, BSc, and Diploma. Figure 1.10 illustrates the distribution of research staff according to their highest educational qualifications.

¹⁸ The Global State of Young Scientists; Global Young Academy: https://globalyoungacademy.net/wpcontent/uploads/2015/06/GYA_GloSYS-report_webversion.pdf

¹⁹The Effects of Aging on Researchers' Publication and Citation Patterns; PLoS One. 2008; 3(12): e4048. 2008 Dec 29. doi: 10.1371/journal.pone.0004048

²⁰ Systematic literature review on sustainable human resource management (2019); https://doi.org/10.1016/j.jclepro.2018.10.091



Figure 1. 11: Distribution of research staff based on their highest educational qualifications

The majority of researchers held either a Bachelor's degree by coursework (n = 1083, 52%) or a Master's degree (MSc/MA) (n = 629, 30%) as their highest qualification. Only 4% possessed a research-based Master's degree (MPhil) (n = 83), and 9% (n = 192) held a doctorate. Further 3% of the research staff (n=63) have full professional qualification. Additionally, 2% of the research staff (n = 32) had a diploma as their highest qualification. These findings highlight the need for implementing systems that offer more research-based academic programs to support employee development and capacity building.

The gender distribution of research employees is depicted in Figure 1.12, depending on their highest educational levels



Figure 1. 12: Distribution of research staff by highest level of education and gender

1.7 Human Resource Development (HRD)



1.7.1. Workshops, seminars, and conferences (local and international)

Figure 1.13: Composition of staff training programs (local and foreign)

Human Resource Development (HRD) is the framework for assisting employees in developing their personal and organizational skills, knowledge, and capacities. Employee training and career development are examples of HRD opportunities. In the surveyed S&T institutes, HRD for scientific staff was facilitated through workshops, seminars, and conferences. In 2021, 2411 scientific staff members participated in training programs, with 1993 (83%) attending local training and 418 (17%) attending foreign training (Fig. 1.13).



Figure 1.14: Composition of scientific staff and research staff training programs



Figure 1. 15: Sector wise distribution of training programs participated by scientific staff

One thousand nine hundred ninety-three scientific staff attended training programs, with 83% receiving local training and 17% receiving international training. The trained scientific staff was comprised of researchers (n = 948), research support personnel (n = 1460), and librarians/information officers (n = 3) (Fig. 1.16).



Figure 1. 16: Training opportunities received by different scientific staff categories

1.7.2. Employee turnover in the scientific staff

Employee turnover refers to the number or percentage of employees who leave an organization and are replaced by new hires within a specified period. In 2021, the surveyed S&T institutes hired 202 scientific workers, including 142 research staff, 50 research support staff, and 10 librarians/information officers. Alongside, 264 scientific staff members left the institutes, comprising 165 research staff, 96 research support staff, and 3 librarians/information officers.
Reasons for turnover included switching to a new profession, pursuing higher studies abroad, and retirement. The estimated turnover rate for the scientific staff in 2021 was 6%, lower than the global average of 14%. ²¹The Human Flight and Brain Drain Index for Sri Lanka averaged 6.70 points in 2021, ²²(Figure 1.17) highlighting significant concerns regarding brain drain and underscoring the urgent need to address the loss of highly skilled personnel.



Figure 1. 17: The Human Flight & Brain Drain Index -2021 (Comparison with SAARC countries)



Recent values chart

Figure 1. 18: The Human Flight & Brain Drain index 2016-2021

Tables 07 and 08 detail the number of scientific staff hired and the number of employees who left the surveyed S&T institutes in 2021.

²¹ https://explodingtopics.com/blog/employee-turnover-statistics

²² Fragile States Index: https://fragilestatesindex.org/excel/

		Scientific Staff Category							
		Research Staff	Support/ Technical Staff	Librarian/ IT	Total				
	Agricultural & Veterinary Sciences	41	30	0	71				
	Engineering& Technology	56	20	0	76				
Sector	Medical & Health Sciences	0	0	0	0				
	Natural Sciences	7	0	10	17				
	Social Sciences	38	0	0	38				
	Total	142	50	10	202				

Table 7: Sector-by-sector description of scientific staff recruitment

Table 8 Sector-by-sector description of the scientific staff left

		Scientific Staff Category							
		Research Staff	Support/ Technical Staff	Librarian/ IT	Total				
	Agricultural & Veterinary Sciences	52	43	1	96				
	Engineering& Technology	36	19	0	55				
Sector	Medical & Health Sciences	0	0	0	0				
	Natural Sciences	16	12	1	29				
	Social Sciences	61	22	1	84				
	Total	147	68	3	264				



EMPLOYEE TURNOVER ESTIMATED (RESEARCHERS) RATE IN 2021=6%

*Average global employee turnover in 2021= 14% (Source: EXPLODING TOPICS website) In 2021, a total of 91 scientific staff were funded by their affiliated institutions to pursue postgraduate studies. This funding supported 19 postgraduate diplomas, 35 MSc degrees, 8 MPhil degrees, and 29 PhD degrees. The highest number of degrees awarded was in the Natural Sciences sector (n = 56). Details of the scientific staff funded for higher studies by their institutions are provided in Table 9.

		Ι				
		PhD	MPhil	MSc/MA	Postgraduate Diploma	Total
	Agricultural& Veterinary Sciences	10	1	4	0	15
	Engineering& Technology	0	0	8	0	8
Sector	Medical & Health Sciences	0	0	0	0	0
	Natural Sciences	19	5	15	17	56
	Social Sciences	0	2	8	2	12
	Total	29	8	35	19	91

Table 9: Sector-by-sector illustration of studies funded by the institutions

1.7.4. Incentives for the scientific staff

Institutional incentives benefit both employees and employers. Recognizing employees for stellar performance and productivity boosts their morale, job satisfaction, and involvement in organizational functions. Consequently, employers benefit from enhanced efficiency and increased productivity, as well as improved retention of qualified staff. Table 10 outlines the incentives provided to the scientific staff, with transport facilities/allowances and professional allowances being the most common, followed by research allowances, medical insurance, and housing/quarters.

Table 10: Perks given to the scientific staff of S & T institutions.

Perks	No. of institutions
Transport facility/allowance	31
Professional allowance	29
Medical insurance	22
Housing/Quarters	19
Research allowance	15
Other	7

2. PHYSICAL RESOURCES

2.1. Infrastructure Facilities

Basic infrastructure contains the essential facilities required for an institute's functioning. This includes laboratories, libraries, auditoriums, workshops, scientific instruments and equipment, archives, and ICT facilities such as networks, databases, internet access, servers, and computers.

Sectors	Labs	Workshops	Auditorium/ Conference Hall	Library	Central Instrumentation Facility	Other
Agricultural & Veterinary Sciences	156	14	63	24	8	63
Engineering & Technology	81	14	13	5	8	11
Medical & Health Sciences	6	0	3	1	0	0
Natural Sciences	164	41	20	12	0	7
Social Sciences	7	9	12	4	0	3
Total	414	78	111	46	16	84

Table 11: Basic infrastructure facilities available in S & T institutions

The survey considered various common infrastructures, including laboratories (n = 414), workshops (n = 78), auditoriums (n = 111), and libraries (n = 46). Additional infrastructure (n = 84) contained regional offices, circuit bungalows, mobile labs, instrument rooms, training rooms, pilot plants, engineering museums, technology parks, plant nurseries, cropping houses, screening houses, insect museums, pest control farms, plant houses, sprinkler irrigation systems, experimental farms, feed mills, disease-free poultry houses, and animal houses.

2.2. IT-related facilities

Among the 46 surveyed S&T institutes, only the Palmyrah Research Institute lacks institutional websites and internet facilities. Additionally, only 30 institutes have a database for research and services. Table 12 provides further details on the IT infrastructure of these institutes.

Sectors	Website	Data base on Research services	Inter net	Free access to Online Journal	Other
Agricultural & Veterinary					
Sciences	22	13	22	0	0
Engineering &					
Technology	7	2	7	0	1
Medical & Health					
Sciences	1	0	1	0	0
Natural Sciences	7	7	7	1	0
Social Sciences	8	8	8	4	3
Total	45	30	45	5	4

Table 12: Number of Institutes with IT-related facilities

2.3. ICT Resources

Table 13 presents the availability of basic ICT facilities for both scientific and non-scientific cadres. Scientific staff utilized a total of 3425 personal computers, while non-scientific staff utilized 1318 personal computers. Generally, scientific staff had greater access to ICT facilities compared to non-scientific staff.

Table 13: ICT facilities available in S & T institutions

Sectors	Computer_ Central and Laptops		Prin	Printer Scanners		ers	Video Conferencing Equipments		Other	
	Scientific	Non- scientific	Scientific	Non- scientific	Scientific	Non- scientific	Scientific	Non- scientific	Scientific	Non- scientific
Agricultural & Veterinary Sciences	1113	655	474	337	79	46	25	9	11	64
Engineering & Technology	922	358	193	129	31	37	1	2	139	23
Medical & Health Sciences	6	3	3	2	0	1	0	0	0	0
Natural Sciences	378	190	93	54	12	8	1	2	9	6
Social Sciences	1006	112	274	33	54	6	46	5	5	2
Total	3425	1318	1037	555	176	98	73	18	164	95

3. RESEARCH PLANNING

3.1 The Planning of Research Projects in Relation to National Policies and Strategies

In planning R&D activities, institutes were queried about the source documents used in preparing their Annual Action Plans. The documents considered included the National Science and Technology Policy, National Research and Development Framework (NRDF) developed by NASTEC, and sectoral master plans or strategies relevant to the respective line ministries or authorities.

3.1.1 The National Research and Development Framework (NRDF)

The National Research and Development Framework (NRDF) is a comprehensive, cabinetapproved R&D framework designed to align the scientific and technological community's research activities with national priorities. The framework identifies ten critical focus areas requiring immediate R&D interventions, organized into a 10 x 10 matrix, creating 100 possible combinations. The focus areas are: (1) water; (2) food, agriculture, and nutrition; (3) health; (4) shelter; (5) environment; (6) energy; (7) mineral resources; (8) apparel industry; (9) ICT and knowledge services; and (10) basic sciences, emerging technologies, and indigenous knowledge.

The ten interventions are: (1) policy formulation; (2) pure and applied research; (3) promotion of innovation; (4) application of nanotechnology; (5) application of biotechnology; (6) application of indigenous knowledge; (7) testing, standardization, accreditation, and assurance of intellectual property rights (IPR); (8) capacity building; (9) application of information communication technologies (ICT); and (10) popularization.²³ Since 2017, many state-funded research and development institutes have widely considered NRDF programs to prioritize research fund allocation to institutes and projects.

²³ National Research and Development Framework (2016); http://www.nastec.gov.lk/reports/nrdf



Figure 3. 1 NRDF refer to the Annual Action Plan



Figure 3. 2: NSTP refer to the Annual Action Plan

Of the 46 surveyed institutes, 28 (61%) referenced the NRDF, and 24 (52%) referenced the National Science and Technology Policy (NSTP) as source documents for preparing their Annual Action Plans. Figures 3.1 and 3.2 provide snapshots of the number of institutes, categorized by sector, undertaking interventions related to the focus areas of the NRDF and NSTP, respectively.

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The highest number of institutes carrying out interventions related to the NRDF focus on food, nutrition, and agriculture (n = 27), followed by the environment (n = 17), basic sciences, emerging technologies, and indigenous knowledge (n = 16), and water (n = 12). (Figure: 3.3)



Figure 3. 3: Institutes carrying out Interventions related to the NRDF's 10 Focus Areas

3.2. Other Source Documents

In addition to the NRDF, the action plans of relevant institutes were guided by policy directives and specifications from corresponding line ministries and sectoral master plans. Such as FMRC: Based on Department of Agriculture requirements; NBRO: NBRO Corporate Plan, National Disaster Management Plan, Sendai Framework for Action, Sustainable Development Goals; BMARI: Formats of the Ministry of Health; FD: Forest Policy, Forestry Sector Master Plan; HARTI: National Research Priorities on Socio-Economics and Policy Analysis (2017-2021), National Agricultural Policy; HORDI: HORDI Sector/Corporate Plan; NIPM: CARP Research Guidelines; PPS: Ministry of Agriculture Guidelines; SLAB: National Quality Policy, SDGs; and SLIC: Government policies and SDGs.

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4. RESEARCH FUNDING

Acquiring adequate research funding for S&T institutes is essential for fostering innovation and driving economic growth. These institutes conduct cutting-edge research, develop new technologies, and address critical societal challenges. Sufficient funding enables the attraction and retention of top talent, fosters industry collaboration, and enhances research infrastructure. It allows researchers to explore new knowledge frontiers and translate findings into practical applications, promoting technological advancements and economic diversification. Prioritizing research funding demonstrates a commitment to a vibrant and competitive scientific ecosystem, driving progress and societal advancement

For many nations, there is a clear correlation between R&D and economic growth. Governments often integrate R&D incentives into their economic plans to enhance productivity. Globally, R&D spending has reached a record high of approximately US \$2.348 trillion²⁴, with the United States and China leading in this aspect. Groundbreaking discoveries and innovations, especially those that significantly improve the lives of disadvantaged populations, can have a transformative impact on a global scale, demonstrating the true advantages of R&D.

The institutes acquired funding from various sources, including the Treasury, National Science Foundation, National Research Council, foreign grants, and other entities. Funds received were categorized into four groups based on the nature of the activities: (1) research projects, (2) science popularization activities, such as conducting workshops and seminars, (3) infrastructure improvement, including the purchase of laboratory equipment, construction and renovation of buildings, and acquisition of land and vehicles, and (4) other activities. Figure 4.1 presents a pie chart depicting the disbursement of funds across these activities.

²⁴ https://forecast.rdworldonline.com/product/2021-global-rd-funding-



Figure 4. 1: Distribution of funds

In 2021, Science and Technology (S&T) institutes received a total of LKR 9,202.14 million from various funding sources. Of this amount, LKR 6,071.46 million, representing 66%, was utilized. The majority of the funds were allocated to two primary areas: conducting research projects, which received LKR 5520.41 million (60%), and improving infrastructure facilities (upgrade of the institution), which received LKR 1842.4 million (20%). The activities related to the upgrade of the institution include the purchase of laboratory equipment, the construction of buildings, and the acquisition of land, vehicles, and properties.

The Treasury emerged as the principal funding source for research projects. Within the research funding domain, Social Sciences secured the highest allocation, amounting to LKR 3242.39 million. Detailed fund utilization across different sections is presented in Table 14, while Table 15 outlines the contributions from various funding sources to research projects.

Sector	Funds Received / Rs. Mn.	Funds Spent / Rs. Mn.	% Utilization
Agricultural & VeterinarySciences	1920.44	1540.41	80.2%
Engineering & Technology	133.33	115.94	87.0%
Medical & Health Sciences	0.00	0.00	0%
Natural Sciences	224.25	225.95*	100%
Social Sciences	3242.39	1373.98	42.4%
Total	5520.41	3256.28	59.0 %

Table 14: Funds received and spent for research projects: distribution among identified sectors

Funding source	Funds Received / Rs. Mn.	Funds Spent / Rs. Mn.	% Utilization
Foreign	39.31	48.84*	100%
Multilateral	118.03	81.77	69%
NRC	0.74	0.74*	100%
NSF	3.00	3.80*	100%
Other	140.48	111.19	79.2%
Treasury	5218.85	3009.93	57.7%
Total	5520.41	3256.28	59.0 %

Table 15: Funds received and spent for research projects by different funding source

*The prior financial committed allocation, which the data on spending reveals is slightly larger than the received amount from the funders, accounts for a small fraction of the funds used in the reporting year.

The surveyed institutes received LKR 35.9 million specifically allocated for science popularization activities, workshops, and seminars. Additionally, LKR 1,803.4 million was allocated for conducting activities other than the above. Figure 4.2 illustrates the funds received and expended for research projects across various sectors, detailing the sources of funding and their respective utilization.



Figure 4. 2: Fund utilization for research projects across various sectors and funding sources.



Figure 4. 3: Funds received for science popularization, workshops and seminars

<u>Trends in research funding at public sector institutes (distributes by the institute), 2012-</u> 2021

Based on the sample survey data from 2012 to 2021 a slight upward trend in research funding per institutes with a remarkable increase in 2014 and a declined after 2016 has been noted. However, beginning in 2020, a remarkable upward trend in research funding is observed once again. (Figure 4.4)



Figure 4. 4: Research funding per institute

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Return on R&D Investment

In 2021, global R&D expenditure saw a substantial growth of approximately 5.5%, reaching around \$2.5 trillion USD. This increase was influenced by significant investments from major economies, particularly in Asia, where China, Japan, India, and South Korea led the charge. The growth reflects the continued prioritization of research and innovation despite the economic challenges posed by the COVID-19 pandemic.²⁵And when considering global research and development (R&D) expenditure as a percentage of GDP varied significantly across different countries. The global average was around 2.7% of GDP.²⁶



Figure 4. 5: R&D expenditure percentage of GDP, Global 2000-2021 (Source: World Bank)

²⁵ Research and Development World: https://www.rdworldonline.com/2021-global-rd-funding-forecast-released/

²⁶ World Bank Data: https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?end=2021&start=2000

In 2020, Sri Lanka's expenditure on research and development (R&D) was approximately 0.12% of its GDP.²⁷ (Figure: 4.6) This is significantly lower than the global average, which was around 2.7% of GDP (Figure: 4.5). Japan's R&D spending amounted to 3.3% of its GDP, solidifying its position as a leading country in the East Asia region.²⁸ Meanwhile, in South Asia, India leads in R&D expenditure as a percentage of GDP, amounting to 0.7%.²⁹



Figure 4. 6: R&D expenditure percentage of GDP, Sri Lanka 1996-2020 (Source : World Bank)

As a result, of the countries in the region which were recently stated, Sri Lanka has the lowest percentage of R&D investment. These findings emphasize the necessity of constant efforts to increase R&D spending in Sri Lanka in order to promote innovation and increase the nation's economic growth.

²⁷ World Bank Data: https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=LK

²⁸ The Global Economy https://www.theglobaleconomy.com/rankings/Research_and_development/Asia/
²⁹DST Website: https://dst.gov.in/sites/default/files/

5. RESEARCH OUTPUTS

5.1 Research Projects

In 2021, the surveyed institutions undertook a total of 983 research projects (refer to Annexure 3), with a completion rate of 54% (n = 533). The majority of these projects were one-year endeavors initiated in the preceding year. Figure 5.1 illustrating the sectoral distribution of these research projects per institute.



Figure 5. 1: Research projects conducted per institute 2021

The sector of Agriculture and Veterinary Sciences carried out the highest number of research projects (n = 547, 54%), of which 250 were ongoing and 297 were completed in the fiscal year, respectively. The institutes that carried out the highest number of research projects were Field Crops Research & Development Institute (FCRDI) (n = 153, 18%), followed by the Coconut Research Institute (n = 79), Horticultural Crop Research & Development Institute (HORDI) (n = 76).

5.2 Contributions to the UN's sustainable development agenda through intended project activities

With the global population projected to surpass nine billion by the year 2050³⁰, societies are confronted with a numerous of complicated challenges. These challenges contain a variety of issues, notably climate change, poverty alleviation, and the rapid urbanization.

Acknowledging the pressing need to confrontation these challenges, the United Nations exposed a transformative framework termed the Sustainable Development Goals (SDGs) in 2015.

³⁰ https://en.wikipedia.org/wiki/Projections_of_population_growth

Comprising 17 distinct objectives, these goals represent a universal summons to action, with the overarching objective of eradicating poverty, safeguarding the environment, and fostering global peace and prosperity by the year 2030.

Under the UN agenda, each member country has pledged to pursue national targets personalized to their individual societal contexts³¹, as part of their commitment to the collective endeavor outlined in the SDGs. Achieving this mandate necessitates the strategic utilization of creativity, expertise, technological innovations, and financial resources to drive sustainable development initiatives forward. By harmonizing their actions with the SDGs, nations endeavor to address issues such as poverty reduction, inequality mitigation, facilitation of inclusive economic expansion, promotion of environmental sustainability, and enhancement of societal welfare.

The SDGs serve as a comprehensive framework for global cooperation, encouraging governments, civil society organizations, businesses, and individuals toward a unified vision. Achieving these goals demands innovative solutions, policy reforms, and targeted investments across vital sectors like education, healthcare, clean energy, infrastructure, and sustainable agriculture. By following to the SDGs, nations can address interlinked challenges holistically, ensuring a reasonable and more sustainable future for current and forthcoming generations. The UN agenda underscores a collective responsibility, emphasizing the significance of international solidarity and collaborations to realize a world where all individuals thrive, while respecting the finite resources of our planet.

According to the survey, a substantial number of projects planned under the R&D of the institutions were integrated to make a contribution towards SDG targets at a national level.

³¹ Sustainable Development Goal- United Nations Development; Programme (UNDP).https://www.undp.org/content/undp/en/home/sustainable-development-goals.html

Figures 5.2 and 5.3 provide an overview of the initiatives and activities proposed for implementation in S&T institutions' Action Plans concerning the SDGs. The highest number of research initiatives (n = 32, 15%) were aligned with the SDG targets for Zero hunger, followed by initiatives focused on Life below water (n = 28, 13%), among others.



Figure 5. 2: Line of Sight -Number of activities (planned) in Alignment with SDGs



Figure 5.3: Line of Sight of Intended Project Contributions to SDGs Partnerships for the goals

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The Paris Agreement, adopted in 201532, holds significant importance for Sri Lanka due to its vulnerability to climate change impacts. Sri Lanka's active participation in the Agreement, through the submission of its nationally determined contributions (NDCs), underscores its commitment to mitigating emissions and adapting to climate change. The country's efforts include transitioning to renewable energy, enhancing energy efficiency, and adopting sustainable land use practices to achieve a low-carbon and climate-resilient economy.

Several S&T institutes have aligned their activities with the Paris Agreement, yielding notable outcomes. These include the installation of real-time climate monitoring stations in tea plantation districts, disaster risk reduction initiatives, the establishment of a Center of Excellence for environmental pollution monitoring and mitigation, research and mitigation of landslides, construction of disaster-resilient housing for resettlement, participation in a National Thematic Research Program on Climate Change and Natural Disasters, and the accreditation of Greenhouse Gas Validation and Verification Bodies. These initiatives contribute to reducing greenhouse gas emissions, enhancing adaptation and resilience, promoting sustainable practices, and addressing climate-related challenges, thereby supporting the goals and principles of the Paris Agreement for a sustainable and climate-resilient future.

5.3 New products, processes, or technologies created as a result of research

Through their research projects, S&T institutes developed 56 new products, 95 new processes, and 64 new technologies during the year 2021 (Annexures 4–6). Figure 5.4 indicates the sector-wise development of products, processes, and technologies.



Figure 5.4: Development of new processes, technologies, and products in 2021.

³² The Paris Agreement 2015: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

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5.4 Trend in research output (products-processes-technologies developed) across public sector institutes (distributed per institute), 2012-2021

As shown in the graph below, the number of product-process-technologies developed per institution experienced a slight increase over a nine-year period from 2012 to 2021. (Figure 5.5)



Figure 5.5 New products, processes, or technologies developed per institutes surveyed between 2012 and 2021.

5.5 Number of Publications

Research findings are commonly disseminated through publications and conference presentations, which are critical channels for the dissemination of scientific knowledge. Conference presentations are frequently published as conference proceedings, thereby contributing to the body of published research literature. The volume of such literature is indicative of the level of scientific activity and the extent of global research collaborations. Additionally, analyzing the citations received by published research offers valuable insights into the impact and influence of the research output.

The number of published articles increased by 2.06% since 2021, when over 5.03 million papers were published globally.³³ The global publication trend has shown a steady increase in research output across various countries, reflecting a widespread commitment to advancing scientific knowledge and fostering international collaboration.

Research findings and outcomes (dissemination) were communicated through various

³³ https://wordsrated.com/number-of-academic-papers-published-per-year/

publications (outreach and reach) targeting diverse audiences. These publications included journals (Science Citation Index and Science Citation Index Expanded) (SCI/SCIE), peer-reviewed journals, abstracts, monographs, books/book chapters, bulletins, newsletters, and working papers (Table 16 details institute publications in 2021).

		No. of Publications								
Sector	SCI Jour nals	SCI exten ded journ als	Refere ed Journ als	Citatio ns	Abstr acts of paper s prese nted at confe r ences/ symp osia	M o no g ra p hs	Bo o ks	Cha pters in Boo ks	Oth er	Total
Agricultural										
Sciences $(n = 23)$	78	3	58	65	138	0	18	9	146	515
Engineering &Technology (n										
=7)	15	0	42	0	88	0	0	1	13	159
Health										
Sciences (n										
=2)	0	0	0	0	0	0	0	0	0	0
Natural Sciences (n										
=8)	82	6	32	0	130	7	41	0	75	373
Social Sciences (n										
=9)	50	0	37	0	140	0	6	6	261	500
Total	225	9	169	65	496	7	65	16	495	1547

Table 16: Various scientific publications produced by S& T institutions in the year 2021



5.6 Trend in Research publications (Distributed per Institute), 2012-2021

Figure 5.6: Per institute, research work is published and distributed.

(*Only the number of published articles in the Journals and the Conference proceedings were considered in this analysis)

5.7 Number of Scholarly publications per unit GDP and GERD- Regional, world comparison with Sri Lanka (2021)





Figure 5.7 illustrates the scholarly publications per unit GDP in South Asian countries in comparison to the globe (2021). Sri Lanka (45.22) generates just below the global (51.34) and SAARC averages (72.72).

However, the comparison in per-unit gross domestic expenditure on R&D (GERD) in South



Asian countries is limited to the published data from 2012–2016.

Figure 5.8: Number of scholarly publications per unit GDP and GERD. Regional, world comparison with Sri Lanka 2012-2016

(Image Credit: South Asia; Challenges and benefits of Research collaboration in a diverse region³⁴)

Figure 5.8 presents the per-unit gross domestic expenditure on research and development (GERD) across various South Asian countries relative to global benchmarks, measured in terms of scholarly publications for the period 2012–2016. Notably, Sri Lanka and Pakistan exhibit significantly higher outputs, with publication rates of 6.8 and 5.7 articles per unit GERD, respectively. These figures substantially surpass both the global average of 1.7 articles and the SAARC regional average of 2.6 articles per unit GERD. This data underscores the exceptional efficiency of Sri Lanka and Pakistan in translating R&D investments into scholarly outputs compared to their regional and global counterparts.

³⁴Marmolejo F, Nagashima Y, Lothrop SC, Alborta SX, Aedo C, Miwa K, et al. South Asia: Challenges and Benefits of Research Collaboration in a Diverse Region. The World Bank, 2019: https://documents1.worldbank.org/curated/en/735021553593295199/pdf/South-Asia-Challenges-and-Benefits-of-Research-Collaboration-in-a-Diverse-Region.pdf

5.8 Number of Scholar publications by population Size and number of Full Time Equivalent (FTE) Researchers - Comparison of Sri Lanka with Global and regional statistics (2021)



Figure 5.9: Scholarly Comparison of Sri Lanka with Global and Regional Statistics

Only data from 2012 to 2016 are available for the comparison of the number of scholarly publications by the number of FTE researchers.



Figure 5.10: Comparison of Sri Lanka with Global and Regional Statistics (Image Credit: South Asia; Challenges and benefits of Research collaboration in a Diverse region³⁵)

³⁵ Marmolejo F, Nagashima Y, Lothrop SC, Alborta SX, Aedo C, Miwa K, et al. South Asia: Challenges and Benefits of Research Collaboration in a Diverse Region. The World Bank, 2019: https://documents1.worldbank.org/curated/en/735021553593295199/pdf/South-Asia-Challenges-and-Benefits-of-Research-Collaboration-in-

As depicted in Figure 5.8, Sri Lanka leads in generating scholarly papers per full-time equivalent (FTE) researcher among South Asian and comparative countries, second only to Bhutan. During the period from 2012 to 2016, Sri Lanka, India, the SAARC region, and Malaysia all exceed the global average in the number of academic papers produced per FTE researcher. In contrast, China aligns with the global norm. This data highlights the relative efficiency of Sri Lanka and other noted regions in leveraging researcher capacity to produce academic publications.

5.9 Patents filed by S & T institutions

Recent history indicates that technology and knowledge are critical drivers of economic growth and development. Since the establishment of the first invention protection mechanism in the 15th century, the patent system has continuously evolved to foster innovation and stimulate economic progress.³⁶ According to the survey, a total of 18 patents were granted to the institutes, comprising 17 national patents and 1 foreign patent, with three of these patents being implemented (Table 16). The distribution of patents among the institutes is as follows: NERDC (6 patents), NRC (4 patents), TRI (3 patents), ITI (3 patents), NBRO (1 patent), and PRI (1 patent).

		National		In			
Sector	Implemented	Not Implemented	Sold	Implemented	Not Implemented	Sold	Total
Agricultural & Veterinary Sciences	0	3	1	0	0	0	4
Engineering & Technology	2	6	2	0	0	0	10
Medical & Health Sciences	0	0	0	0	0	0	0
Natural Sciences	0	0	0	0	0	0	0
Social Sciences	0	3	0	0	1	0	4
Total	2	12	3	0	1	0	18

Table 17: The number of patents granted to scientists/institutions by sector.

a-Diverse-Region.pdf

³⁶ https://www.wipo.int/patent-law/en/developments/economic.html

5.9.1 IP Fillings in Sri Lanka

Year	Patent	Trademark	Industrial	GDP
		(class	Design	(constant
		count)	(design	2017
			count)	US\$)
2012		7211	678	218.80
2013	445	6899	295	226.23
2014				237.45
2015	265	7440	405	249.34
2016	316	9351	309	260.53
2017	331		485	269.85
2018	382	9161	487	278.68
2019	412	7990	606	285.17
2020	412	1669	459	274.86
2021	329	7717	227	284.91



Figure 5. 23: IP Filling & Economic Growth (2012-2021)

Data Source: Statistical Country Profile WIPO World³⁷

5.9.2 The Patents	field and aranted between	2012 to 2021

Patent					
Patent Applications					
Year	Resident	Non-Resident	Abroad		Patent Applications
2012			33		Resident Non-Resident Abroad
2013	328	188	117	400	
2014			17		
2015	218	263	47	300	
2016	280	293	36		
2017	277	266	54	200	
2018	343	260	39	100	
2019	356	255	56	100	
2020	353	251	59	0	2012 2013 2014 2015 2015 2017 2018 2019 2020 2021
2021	266	273	63		
					douroe, vinno elaberoe delabase, las uplates, derzoes
Patent Grants					
Year	Resident	Non-Resident	Abroad		Datast Grants
2012			6		Resident Non-Resident Abroad
2013	71	165	5	250	
2014			6		
2015	38	224	12	200	
2016	41	82	13	150	
2017	55	123	13	100	
2018	64	148	11		
2019	40	135	15	50	
2020	52	221	17	0	
2021	66	128	32		
					Source. WIPO statistics database; last updated: 02/2023

Figure 5.12: Patent applications of Sri Lanka (2012-2021)

In 2021, 66 resident patents were granted out of 266 applications filed (Figure 5.12). Our sample survey accounted for 18 of these granted patents, representing 27% of the total.

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 $^{^{37} \} https://www.wipo.int/ipstats/en/statistics/country_profile/countries/lk_content.html$

5.10 Awards received by scientific staff/institution

A total of 35 accolades were awarded to scientists affiliated with the surveyed institutions, which includes 29 national and 6 international awards (Table 18).

Sector	International	National	Total
Agricultural & Veterinary Sciences	6	8	14
Engineering & Technology	0	9	9
Medical & Health Sciences	0	0	0
Natural Sciences	0	12	12
Social Sciences	0	0	0
Total	6	29	35

Table 18: Awards received by scientists

5.11 Products and processes commercialized by the institution

In 2021, 22 processes and 25 products were sought to attract possible primary consumer groups through various activities such as demonstrations, exhibits, mass media, and direct dialogues as part of taking research outputs into the market. Tables 19 and 20 represent the number of processes and products commercialized by the surveyed S&T institutes, respectively, and Figure 5.13 demonstrates their sectorial contribution.

Table 19: Processes that have been commercialized by S&T institutions

Sector	Institute	Number of Processes Commercialized
Agricultural & Veterinary	DEA	1
Sciences	HORDI	2
	NAQDA	1
	RRI	9
	SRI	2
	VRI	6
Engineering & Technology	NBRO	1
Natural Sciences	None	0
Medical & Health Sciences	None	0
Social Sciences	None	0
То	tal	22

Table 20: Products that have been commercialized by S&T institutions

Sector	Institute	Number of Products Commercialized
Agricultural & Veterinary Sciences	HORDI	3
	NAQDA	1
	NIPM	2
	PRI	2
	RRI	1
	SRI	1
	VRI	2
Engineering & Technology	ACCIMT	2
	ITI	4
	NBRO	1
	NERDC	2
	SLINTEC	3
Natural Sciences	None	0
Medical & Health Sciences	None	0
Social Sciences	NSF	1
Total		25



Figure 5.13: Commercialized products and processes in each sector

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5.12 Technology Transfers, and implemented recommendations.

Technology transfer (TT) involves the dissemination of scientific production or distribution methodologies from one entity—such as an enterprise, institution, or country—to another. This transfer occurs through mechanisms like foreign investment, international trade, patent licensing, technical assistance, or training. The commercial exploitation of research encompasses diverse approaches, including licensing agreements, joint ventures, or partnerships, to distribute the risks and rewards associated with market introduction of new technologies. Additionally, corporate vehicles such as spin-outs are employed when the originating organization lacks the requisite resources or expertise to develop and commercialize the technology independently.³⁸

In 2021, a total of 74 technologies were transferred, distributed as follows: 38 in the agricultural and veterinary sciences sector, 16 in the engineering and technology sector, 6 in the natural sciences sector, 6 in the medical and health sciences sector, and 3 in the social sciences sector. Additionally, 40 recommendations were adopted: 19 in the agricultural and veterinary sciences sector, 8 in the engineering and technology sector, and 6 in the natural sciences sector. Figure 5.14 illustrates the number of technologies transferred and recommendations adopted across each sector.



Figure 5.14: Technologies transferred and recommendations adopted in each sector

Institutions have encountered several barriers during technology transfer processes, including inadequate linkages between R&D institutes and industry, a shortage of trained technology transfer personnel, insufficient funding and resources, low prioritization due to exclusion from

³⁸ https://www.globalnegotiator.com/international-trade/dictionary/technology-transfer/

institutional mandates, investor reluctance, and industry resistance to adopting new technologies.

5.13 Sectorial comparison of S & T Output Indicators

Figure 5.15 presents a sector-by-sector comparison of three output indicators—products, processes, and technologies per researcher—across five sectors: agriculture and veterinary sciences, engineering and technology, natural sciences, social sciences, and medical and health sciences. The data indicates that the agricultural and veterinary sciences sector leads in outputs per researcher, with values of 1.6 for products, 3.8 for processes, and 2.1 for technologies.



Figure 5. 15 Radar chart comparing product, process, and technologies per scientist by sector in 2021

5.14 The impact of published scholarly works on the Relative Activity Index (RAI) and Field-weighted Citation Impact (FWCI) of SAARC regional perspectives

Based on the most recent data available (2012–2016), the SAARC region has identified key areas for regional cooperation, including agriculture, rural development, environmental management, natural disaster risk reduction, and biotechnology. These priorities are reflected in the academic specialization within South Asia. At the national level, Sri Lanka predominantly focuses on agriculture, with medical sciences being a significant secondary area of concentration. In terms of citation impact, South Asia aligns with the global average in engineering and technology but shows comparatively lower citation impact in other fields. Notably, Sri Lanka exhibits a higher



citation impact in agriculture and medical sciences relative to the global average³⁹.

Figure 5. 34: RAI and rebased FWCI for the world, South Asia, and Sri Lanka that published over 1,000 publications between 2012 and 2016. Source: Scopus00AE

³⁹ https://documents1.worldbank.org/curated/en/735021553593295199/pdf/South-Asia-Challenges-and-Benefits-of-Research-Collaboration-in-a-Diverse-Region.pdf

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6. SERVICES PROVIDED BY S&T INSTITUTIONS

The majority of the surveyed Science and S&T institutes are mandated to deliver a variety of technical services to diverse target groups, including industries, farmers, other S&T institutions, and the general public. These services encompass testing, equipment calibration, training, product and process certification, accreditation services, and consulting. Table 21 provides detailed data on the number of clients served by S&T institutions across these various services, as well as the total revenue generated by each sector from these services.

Sector	Testing	Calib ration of equip ment	Calibr ation standa rds calibra ted by DMUS S	Trainin g	Prod uct and Proce ss Certif icatio n	Accr edita tion Servi ces	Consult- ancies	Other Services	Revenue Earned (Rs. Mn.)
Agricultu ral & Veterinar y Sciences	79,252	19	0	23725	419	0	3,180	3725	167.828161 2
Engineer i ng & Technolo g y	12,400	5417	0	0	1	0	2,701	329	800.343
Medical &Health Sciences	0	0	0	0	2	0	34,652	56284	0
Natural Scienc es	2,153	774	0	30164	0	0	2	22	266.032366
Social Scienc es	11,445	477	0	654	0	9	9	7610	574.936
Total	105,250	6,687	0	54,543	422	9	40,544	67,970	1,809.14

Table 21: Number of clients served with different services by S&T Institutions

The highest number of clients were served by the testing (n =105250), followed by other services (n =67970). The Agricultural & Veterinary Sciences sector served the highest number of clients (n= 123,385), but the highest revenue was earned by the engineering and technology sector (LKR 800.343 million). The S&T institutes of all the sectors served a total of 299,938 clients in the year 2021, and a total revenue of LKR 1809.14 million was earned through client-based services. It should be noted that some S&T institutes provide their services free of charge. Table 22 indicates

the levels of revenue generated by different S&T institutes.

Revenue Generated						
Rs. Mn. 0-9	Rs. Mn. 10-20	Rs. Mn. 21-100	Rs. Mn. >100			
GJRTI	CEA	DNBG	SLAEB			
SLINTEC	MUSSD	ACCIMT	NBRO			
DEA	NERDC	TRI	CRI			
FCRDI		SLAB				
HARTI						
HORDI						
NAQDA						
NIPM						
PPS						
SCS						
NSF						
VRI						

 Table 22: Revenue generated by S&T Institutes in 2021

6.1 Revenue Generation Trends by Institute, 2012-2021



Figure 6. 2: Distribution of revenue generated per institute, 2012-2021

From 2014 to 2018, the revenue generated per institution experienced a consistent upward trend. However, this trend reversed in 2019 when revenue dropped to LKR 31 million from LKR 40 million. The decline continued in 2020, with revenue per institution falling further to LKR 28 million. This downturn can be attributed to the impacts of the COVID-19 lockdowns and the 54

broader economic challenges facing the country, which adversely affected the operational capabilities of institutions.

In 2021, there was a notable recovery, with revenue per institution rising to LKR 39 million, approaching the levels observed in 2018. This recovery indicates a significant rebound in institutional performance, suggesting a recovery from the economic disruptions experienced in the preceding years.

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RECOMMENDATIONS

Although the S&T ecosystem of Sri Lanka is already aware of the majority of the recommendations in this report, they are purposefully reiterated to emphasize their adoption. Institutions would surely function better overall if they were implemented, which would eventually contribute to better macroeconomic conditions and the promotion of economic sustainability through creative culture. Numerous country index rankings in areas like science, technology, innovation, and socioeconomics might possibly rise in the medium term. Human resources, physical resources, research input, research output, and services provided by S&T institutions are the five thrusts or parts into which the recommendations are divided.

Thrust 01: Human Resources: Investment in Human Capital Development

I. Employee retention and brain gain:

The main causes of staff turnover in the S&T sector need to be pinpoint so that suitable action can be made right away to mitigate these causes in order to keep the researchers on board. The execution of those steps ought to be consistently observed and periodically assessed to ensure the intended results are achieved.

II. Introduce opportunities for postgraduate studies:

Create a postgraduate scholarship program to encourage employee development programs in collaboration with national and international research/education institutes.

III. Introduce performance-based reward systems:

Create a performance-based reward system including grants, incentives, and promotions to recognize and promote exceptional research from both novice and seasoned researchers. Introduce competitive, performance-based pay and benefits programs for researchers and other staff members.

IV. Filling the vacant cadre positions:

It was discovered that the filled cadre posts and the approved cadre posts differed significantly. Therefore, in order to guarantee the institutes' performance in accordance with the mandate, all vacant cadre positions must be filled as soon as possible, or at least partially. Until then, steps must be taken to recruit temporary staff in place of the vacant cadre positions to maintain institute's performance in

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a timely basis.

V. Career Development and Mentoring:

Encourage participation in the scientific community by implementing mentorship programs that connect seasoned researchers with scientists in their early stages of career either inside or outside of S&T establishments. The plan might help young, gifted researchers advance in their areas of specialization.

VI. Fostering a gender equality workforce:

The findings indicate that while gender parity for researchers has been reached across institutions, there is still a little gender difference in the domains of engineering and natural sciences. They should promote greater female representation inside their system in order to support it.

VII. Promote public-private partnerships for research funding:

Promote cooperation and collaborative ventures between businesses, industry, and academic institutions. These kinds of partnerships help close the knowledge gap between fundamental and applied research, guaranteeing long-term scientific progress toward meeting societal demands and assist in promoting research that have an economic impact or have the ability to be commercialized.

VIII. International collaborations:

Promoting an international research network for the purpose of strengthening capacity of the institutional staff. These partnerships offer chances for exchanges and training programs, as well as knowledge transfers, which give the researchers access to a wide range of research contexts and specialties. Additionally, strengthening capacity via foreign training should receive more attention and should have a funding support or a sponsoring system.

Thrust 02: Physical Resources: Optimizing the Physical Resources for R&D Development

IX. Strengthen the infrastructure for research to facilitate top-notch research:

Establish cutting-edge equipment, labs, and technology-sharing spaces. Create a national policy on equipment sharing for research in order to set up central
facilities for sharing equipment, which would maximize the use of expensive research equipment.

X. Create a centralized database system:

Provide a centralized database system that unifies service and research data from all of the institutes. Authorized staff members and researchers should be able to search, retrieve, and add to the knowledge base through this database. Ascertain that version control, indexing, and data classification are done correctly.

XI. Monitor the project progress:

Provide a centralized tracking system with SMART performance indicators connected to the main deliverables to monitor the project's progress.

XII. Promote institutes to leverage information sources:

Encourage institutions to make use of the information sources that are accessible for resource allocation, strategic planning, and well-informed, data-driven decision-making.

XIII. Knowledge dissemination:

To expedite the desired research outcomes, encourage open, transparent knowledge exchange through collaborative efforts between local and international universities.

Thrust 03: Research funding: Enhance Research Funding for R&D Development

XIV. Strengthen Funding:

Increase the research and development (R&D) expenditure of the country and make sure that the institutions receive a large amount of the funding for research and development. Diverse funding channels, including grants, fellowships, and cooperative public-private R&D projects, international grants can be used to implement this strategy.

XV. Competitive funding mechanisms for research projects:

Research project funding should be allocated based on national priorities. These might be in line with government-designated sectoral focus areas, as well as global goals such as climate change and sustainable development goals.

XVI. Quick state procurement processes:

Reduce the time it takes to get necessary chemicals, reagents, and lab equipment by streamlining the state procurement process or following an e-procurement procedure.

Thrust 04: Research Outputs: Research to business

XVII. Collaboration between industry and academia:

Initiatives for information exchange, partnerships, and joint ventures promote industry-academia collaboration. This cooperation facilitates information and know-how technical exchange and promotes innovative funding techniques to ensure commercially focused research undertakings, notably from industry and the private sector.

XVIII. Promoting entrepreneurship:

Establish a legislative framework so that stakeholders can act as intermediaries between researchers and enterprises. Researchers' perspective would shift from one of job seekers to one of employment providers. Provide necessary funding, business ventures, seed funding for start-ups, etc. for researchers to commercialize their research inventions and innovations.

XIX. Promote high-end journal publications

Encourage researchers and scientists to publish in international high-end indexed journals instead of conference proceedings, local journals, etc. to increase the value of their research.

XX. Flexible legislative framework:

Simplify the rules governing the creation of new technology, procedures, and products. Overly bureaucratic processes can inhibit innovation and discourage companies from investing in state-of-the-art technologies. Encouraging a

legislative framework that is more flexible speeds up the acceptance and use of innovative solutions.

XXI. Establish technology transfer facilities:

Create Technology Transfer Facilities (TTFs) and encourage the idea of innovation parks and hubs, where businesses, startups, and academic institutions may come together to work together, develop, and commercialize advances in product, process, and technology.

XXII. Invest in initiatives that help research-based technology become more widely adopted and used:

Invest in initiatives that help research-based technology become more widely adopted and used. These programs give financial incentives, training, and technical support to businesses and organizations that are willing to apply creative ideas. These initiatives speed up the application of research products and procedures in practical contexts by lowering adoption barriers.

Thrust 05: Services provided by the S&T Institutions: Ensure the delivery of quality services

XXIII.Updated and modernized services:

The services provided by S&T institutions should be updated and modernized to guarantee that they meet the expectations of their clients by being accurate, timely, efficient, and recipient-friendly.

XXIV. Market Research and Strategic Development for S&T Institutes

Conduct regular market research to identify trends in relevant sectors and formulate market-oriented strategies. Strengthen these efforts through public and private industry partnerships to develop new products and services.

XXV. Enhancing Service Delivery Through Expertise

Employing staff with the right expertise and abilities will enhance service delivery, increase customer satisfaction, and foster repeat business.

XXVI. Improving Business Credibility Through Transparent Invoicing

Streamline the invoicing process to ensure transparency. Clearly communicate the

pricing structure, payment terms, and applicable discounts or incentives to clients. This will help build trust and credibility, ultimately boosting the business.

XXVII. Optimizing Product and Service Delivery Through Continuous Evaluation

Continuously assess and enhance the effectiveness and efficiency of product and service delivery processes. Gather client feedback and integrate it into the activities within the product value chain.

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Limitations

The Science and Technology (S&T) Status Report of Sri Lanka for 2021, compiled from data collected from 46 public sector S&T institutions, faces several limitations. The socio-economic crisis and the continuation of the COVID-19 pandemic led to national lockdowns and work-from-home arrangements for government employees, significantly reducing the completion of assigned functions within these institutions. Furthermore, the report lacks representation from private-sector organizations and higher education institutions, hindering a comprehensive view of the national S&T landscape. Extrapolating these findings to reflect the state of S&T at the national level is therefore not advisable. In particular, the Medical and Health Sciences sector in the report was unable to draw information from the institutes, with only one institute providing data despite the presence of many public institutions in this sector. Additionally, the absence of recent national and global statistics related to Sri Lanka limits effective data comparison. Despite these constraints, the evaluated public-sector S&T institutions are recognized for their substantial contributions and impact on the country's S&T ecosystem. To enhance context, the report's findings have been cross-referenced with available national statistics and globally recognized indices where appropriate.

Conclusion

Despite the outlined limitations, Science and Technology (S&T) institutions in Sri Lanka have significantly bolstered the national S&T ecosystem, especially amid the COVID-19 pandemic and ensuing economic crisis. Their efforts have been crucial in enhancing performance and addressing immediate challenges. However, there is an urgent need to increase funding for research and development. Implementing a systematic evaluation framework is essential to track the long-term impact of state-funded R&D, ensuring these initiatives are effective and aligned with national goals and economic priorities. Addressing these needs will enable Sri Lanka to achieve sustainable growth and resilience in its S&T sector, thereby supporting overall economic development.

Annexures

Annexure 01 – OECD classification by field of R&D (FORD) (OECD, 2015)

Natural sciences

- Mathematics
- Computer and information sciences
- Physical sciences
- Chemical sciences
- Earth and related environmental sciences
- Biological sciences
- Other natural sciences

Engineering and technology

- Civil engineering
- Electrical engineering, electronic engineering, information engineering
- Mechanical engineering
- Chemical engineering
- Materials engineering
- Medical engineering
- Environmental engineering
- Environmental biotechnology
- Industrial biotechnology
- Nano-technology
- Other engineering and technologies

Medical and health sciences

- Basic medicine
- Clinical medicine
- Health sciences
- Medical biotechnology
- Other medical science

Agricultural and veterinary sciences

- Agriculture, forestry, and fisheries
- Animal and dairy science
- Veterinary science
- Agricultural biotechnology
- Other agricultural sciences

Social sciences

- Psychology and cognitive sciences
- Economics and business
- Education
- Sociology
- Law
- Political science
- Social and economic geography
- Media and communications
- Other social sciences

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National Review of the Status of Science and Technology in Sri Lanka – Year 2021

Questionnaire Survey

Objective of the Survey:

The National Science and Technology Commission (NASTEC) is mandated to submit an annual report to the Government of Sri Lanka on the status of Science and Technology (S&T) in the country. The information provided by your organization will be used only in the preparation of this report.

The instructions and definitions attached to this questionnaire should be read carefully before you fillthe questionnaire and the format given in the questionnaire should be adhered to when replying. Please ensure that **all the responses are limited to activities carried out during year 2021.**

(I) GENERAL INFORMATION

- 1. Name of the Institution :
- 2. Postal Address :
- 3. Telephone :
- 4. E-Mail:
- 5. Web:
- 6. Fax :
- 7. Ministry/ Department :
- 8. Statutory functions : (*Please select relevant cage/s by a "x"*)

You may select more than one cage depending on the nature of your mandate

R & D	S&T policy formulation
Research funding	Technology transfer
S&T services	Science popularization
Innovation	Training of personnel

- 1. Please list any other major functions of your institution.
- 2. Does the Institution have a Corporate Plan/ Strategic Plan?

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(I) HUMAN RESOURCES

(Please provide information on both permanent staff and staff on contract basis for more than 6 months in year 2021)

A) Staff Strength

i) Scientific, accounting & administrative staff (head count)

Staff	Total Approved Cadre Positions (Permanent staff)	Filled Cadre Positions (Permanent staff)	Staff on contract basis
Scientific	,	1	
1. Research Staff*			
2. Support Staff			
3. Librarians, Information			
Officers			
Accounting			
1. Accountants			
2. Support Staff			
Administration			
1. Executives			
2. Support Staff			
Other			
TOTAL			

* Research staff should include research officers, scientific officers, engineers and research scientists. Total filled number of permanent cadre positions and staff on contract basis in Research staff in (i) should tally with the total values of (ii), (iii) and (iv).

ii) a) Research staff* based on areas of expertise & gender (head count)

Area	Male	Female	Total
Natural Sciences			
Engineering & Technology			
Medical & Health Sciences			
Agricultural &			
VeterinarySciences			
Social Sciences			
Other (specify)			
TOTAL			

ii) b) Public Research Profile of researchers

Research Profile	Number
Google Scholar Profile	
Research Gate Profile	
Others	

iii) Highest level of qualification of research staff* based on gender (head count)

Area	Male	Female	Total
Doctoral			
Degree			
MPhil			
Degree			
MSc/M			
ADegree			
Bachelor's			
Degree			
Diploma			
Full			
professional			
qualifications			
TOTAL			

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iv) Research staff* by age group and gender (head count)

Age (years)	Male	Female	Total
> 51			
41 - 50			
31 - 40			
< 30			
TOTAL			

v) Staff remunerations

Institutions

Categories of scientific staff	Salary scale	Minimum qualification specified at recruitment
Research Fellow		
Senior Research Officer		
Research Officer		
Scientific Officer		
Information Officer		
Research Assistants (PhD students)		
Other		

Universities

Categories of Academic staff	Salary scale	Minimum qualification specified at recruitment
Senior Professors		*
Professors		
Senior Lecturers		
Lecturers		
Librarian		
Research Assistants (PhD students)		
other		

B) HR Development

i) Scientific staff trained at workshops, seminars and conferences (local and international)

Titles of	Duration	Number Participated			Local / Foreign
programmes	(In Days)	Research/ academic staff	Support / Technica lstaff	Librarian / Information officers	

(Head count)(Please attach a separate sheet if necessary)

ii) Postgraduate degrees/research training funded by institution for scientific staff within 2021(head count)

Degree program	Research staff	Support / Technica Istaff	Librarian / Information officers	Duration
Doctoral Degree				
Mphil Degree				
MSc/MA Degree				
Postgraduate Diploma				
Training attachments				

iii) Scientific staff recruited by the institution within the year (excluding transfers among regional centers of the same institution)

Category	Highest qualification	Number
Research staff		
Academic Staff		
Support / Technical staff		
Librarian / Information officers		

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iv) Scientific staff that left the institution within the year (*excluding transfers among*

regional centers of the same institution)

Category	Reasons for leaving	Number
Research staff	Retirement	
	Obtained a new Job – local	
	Obtained a new Job – Foreign	
	Personal	
	Higher Studies	
	Other	
Academic staff	Retirement	
	Obtained a new Job – local	
	Obtained a new Job – Foreign	
	Personal	
	Higher Studies	
	Other	
Support / Technical staff	Retirement	
	Obtained a new Job – local	
	Obtained a new Job – Foreign	
	Personal	
	Higher Studies	
	Other	
Librarian / Information officers		
Liorarian / information officers		
	Obtained a new Job – local	

Obtained a new Job – Foreign	
Personal	
Higher Studies	
Other	

v) Benefits given to research staff

Perks	Research/Academic	Support / Technical	Librarian /
	staff	staff	Information officers
	(Yes/No)	(Yes/No)	(Yes/No)
Research allowance			
Medical insurance			
Transport facility / allowance			
Professional allowance			
Housing / Quarters			
Other (specify)			

(II) PHYSICAL RESOURCES

i) Infrastructure Facilities

Infrastructure facility	Number
Laboratory units	
Workshops	
Auditorium/Conference Hall	
Library	
Central instrumentation facility	
other	

ii) other facilities

Facility	Availability
	(Yes/No)
Institutional website	
Database on research / services	
Internet with free access to Journals	
other	

iii) Major equipment available (please attach a separate sheet if required)

Name of Equipment	Name of Equipment Percentage time utilized	Num	ıber	Year of purchase	Reason if not in workin gorder
		Total	In workin gorder		

iv) IT facilities

Facility	Number		
	Scientific staff	Administration staff	
Computers, Central			
Computers, Personal and Laptop			
Printers			
Scanners			
other			

Science and Technology Status Report of Sri Lanka 2021

v) Specialized Software relevant to research

Specialized Software Package			
	Cost of purchase	Last renewal date	License Fee

(III) RESEARCH PLANNING

Other Documents (*Please List*)

I. Whether reference made to the following documents in the preparation of Annual action plan of the institute



II. NRDF based activities identified / implemented (10 focus areas & 10 interventions)

(Please select relevant cage/s by a "x")

Interventions Focus Areas	Policy Formulation	Pure & Applied Research	Promotion of Innovation	Application of Nanotechnology	Application of Biotechnology	Application of Indigenous Knowledge	Testing, Standardization & Accreditation and Assurance of IPR	Capacity Building	Application of ICT	Popularization
Water										
Food, Nutrition & Agriculture										

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Health					
Shelter					
Environment					
Energy					
Mineral Resources					
Textile and Apparel					
ICT & Knowledge Services					
Basic Sciences, Emerging Technologies & Indigenous Knowledge					

III. State future activities/projects identified by your institution to address UNSustainable Development Goals (SDGs)

SGD Goal	Future	Time	e frame	Expectedoutcome
	activities/projects	Year if	Year of	
	planned	initiation	completion	
1. No Poverty				
2. Zero hunger				
3. Good healthand				
well- being				
4. Quality				
education				
5. Gender				
equality				
6. Clean waterand				
sanitation				
- + 22 - 1 - 1 - 1				
7. Affordable				
and cleanenergy				
8. Decent workand				
economic growth				
9. Industry, innovation				

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and infrastructure		
10. Reduced inequalities		
11. Sustainable cities and communities		
12. Responsible consumptionand production		
13. Climate action		
14. Life belowwater		
15. Life on land		
16. Peace, justice and strong institutions		
17. Partnershipsfor the goals		

(IV) RESEARCH INPUTS

i) Funds received during the year 2021

Funds received	Source of funding	Amount requested	Amount received	Amount spent
for		(Rs. Mn)	(Rs. Mn)	(Rs. Mn)
Research	Treasury			
projects	NSF			
	NRC			
	Multilateral (e.g. UN Agencies, GEFetc)			
	Foreign (e.g.			
	JICA, MIKE UK,			
	etc)			
	Private sector			
	Other			
Science popularization, Workshops, Seminars	Treasury			
	NSF			
	NRC			

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	Foreign		
	Other		
Upgrade of the institute *	Treasury		
institute	NSF		
	NRC		
	Foreign		
	Other		
Other	Treasury		
(please specify)	NSF		
	NRC		
	Foreign		
	Other		

* Include purchase of laboratory equipment, construction of buildings, renovations, purchasing of land, vehicles, buildings etc. relevant to research

ii) If the funds received are not spent (there is a balance) what are the reasons? (*Please select relevant cage/s by a "x"*)

Reason	Yes	No
Lack of human resources (researchers, technical staff, support staff)		
Lack of research equipment		
Delay in receiving funds		
Delay in receiving equipment, chemicals etc.		
Delay in procurement		
Inefficient planning and coordination		
Administrative issues		
Other (please specify)		

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(V) RESEARCH OUTPUTS

Broad area of the research projects	Name of the research project	Collaborations if any (International, other organizations, universities)	Expected output/ outcome	Start date & End date	Duration	Ongoing / completed
e.g. : 1. Food science						
2. Engineering						
3. Biotechnology						

i) **Research Projects** (*Please attach a separate sheet if required*)

ii) New products/ processes/ technologies developed through research during year 2021 (*Please*

listand attach a separate sheet if required)

(Please refer section VI of Guidelines)

	Processes	Technologies	Products
Total			

iii) No. of publications

Publications	Number of publications
SCI Journals	
SCI extended journals	
Refereed Journals	
Total number of citations	
Abstracts of papers presented at conferences/symposia etc.	
Monographs	
Books	

Chapters in Books	
Others (Please specify)	
(e.g. Bulletins, Newsletters, Magazines, Working papers)	
Total	

iv) **Patents received by scientists/ institution** (*Please list*)

Item patented	Whether Patented	Whether	Whether
	by	National/International	implemented or sold
	individual/institute		

v) Awards received by scientific staff / institution

Award received	Whether received by individual/institute	For what (eg: Research, Science Popularization)	Whether National/International

vi) What are the products/ processes commercialized by the institution?

(Please list)

Processes	Products
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

vii) How was the commercialization initiated?

(Please select relevant cage/s by a "x")

Commercialization Process	Yes	No
Demonstrated to private sector		
Through exhibitions		
Through *mass media		
Direct discussion with interested parties		
Other (please specify)		

*broadcasting (TV, radio, film), digital (internet & mobile) & printing (newspapers, magazines, pamphlets & books)

viii) If the institution was unable to commercialize the product/process what are the reasons/barriers?

Reasons/ Barriers		No
No proper popularization mechanism		
Lack of trained staff		
Lack of funds		
Administrations issues		
Other (please specify)		

ix) What are the technologies transferred or recommendations developed (*Please list*)

Technologies transferred	Recommendations developed
e.g.: New method of water filtering	e.g. New fertilizer mixture
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

x) What are the barriers faced in technology transfer?

Barriers	Yes	No
Poor linkage between R&D sections and the industry		
Lack of trained staff in technology transfer		
Lack of funds and inputs		
Low priority		
Unwillingness of Investors		

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Not included in the existing institutional mandate	
Other (please specify)	

(VI) SERVICES (FOR INDUSTRIES, S&T INSTITUTIONS, GENERAL PUBLIC)

Types & Area of services	Number of clients served	Revenue earned
		(Rs. Mn)
Testing facilities		
Eg: Water		
Fertilizer		
Calibration of equipment		
Whether calibration standards calibrated by Department of		
Measurement Units, Standards & Services		
Training		
(list the training programmes conducted to outside sources		
and indicate the number participated)		
Product/Processes Certification		
Accreditation of Services		
Consultancies		
Others		

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Annexure 03: Research Projects

	Arthur C. Clarke Institute for Modern Technologies		
S_No	Project	Expected output/ Outcome	
1	Nano Satellite developments-KITSUNE	A 6U nano satellite developed with engineers from ACCIMT for payloadservices for future benefits	
2	Quad copters for Sri Lanka Navy (Special Boat Squadron)	Tactical Surveillance purposes of SLNAVY (Two units)	
3	Vertical Takeoff Landing UAV	Capacity development of engineers, development for defense sector purposes	
4	Material Development to Reduce Grounding Resistance	To develop the material	
5	Low cost solution to Improve Systems through PdM	Producing industry solutions	
6	Design and fabrication of a Smart Phone based ECGTrace Analyzer	Design and develop the prototype	
7	Temperature Monitoring / Controlling System forPoly tunnel	Design and develop the prototype	
8	Alarm wear-Handheld / LED Strip device with mobile interface	Design and develop the prototype	
9	Xilinx Tea Colour Separator	Locally designed developed machine fortea factory tea processing	
10	Real-time climate monitoring automatic weatherstations (Maintenance and expansions)	Installation of weather stations designated by TRI and commissioned them in the tea plantation areas (8 units)	
11	Development of testers for battery testing	Design and develop the prototype	
12	Real-time river water level information system (IoTproduct)	Information system to Irrigation Department	
13	Remotely monitoring Water level (SCADA system)	Demonstration panel for CPD, staff capacity building	
14	MIS Development	Efficient System for Decision Making	

15	International Collaborative Research on Cataclysmic Variable Star	Research Publication
16	Spectroscopic investigation of Delta Scuti stars (Asteroseismology)	Research Publication
17	Design and Construct a Long Wave Antenna System for e-CALLISTO Network	Construction of Long Wave Antenna System for e-CALLISTO Network
18	Rice Yield Forecasting & Cultivated Paddy Area Identification - Major Paddy Cultivation Districts	Develop a Rice Yield Forecasting model
19	Forest cover types mapping of Sri Lanka using Open Access Satellite data	Forest cover type maps
	Central Environmental	Authority
1	Assessment of impacts of Mini Hydro Power Projects, giving special reference to biodiversity, forselected mini hydro projects in Kalawana DivisionalSecretariat Division	 Generate species check lists for Mudalige kanda and handuwelkanda forests in Kalawana Divisional SecretariatDivision. Preparation of forest conservation plan for Kalawana Divisional Secretariat Division.
2	Study of BOD and COD ratio in different industrysector with a view to utilize one measurement	 Identification and categorization of theindustries into toxic, biodegradable and acceptable or stable zones using BOD/COD ratio. By zonation of the BOD/COD ratio, thetreatment strategy could be identified to achieve the safe level of organic matter in an environment.
3	Survey on Environmental awareness level of thecommunity in Kegalle	 Promoting environmental communication among the community Reduce the level of negative impact of human activities on the environment
4	Study of water quality in vegetable wash water at selected locations of commercial vegetable washingby Checking COD, BOD and TSS	• Preparation of a chemical profile Make aware the responsible agency to avoid the contamination of drinking water sources with pesticide residue and heavy metals.
5	A comparative study on Environmental awareness, and attitudes among the secondary	• Identification of gaps on environmental awareness and attitudes on environment of the

	level school students in Rathnapura district	secondary level students among all divisions.
6	Development of Ecosystem Services Indicators for Kambarawaganga study area	• Update of land use cover, Series of maps for ecosystems services, Final Rank map of ecosystems services.
7	Health Quality Assessment of a Highland stream using selected Physico-Chemical parameters, Biological Factors and Microplastic level	• Identification of significant relationship of the diversity and abundance of fresh water macro invertebrates (Odonate larvae) with selected environmental parameters
8	Assessment of Surface water quality in Kalu ganaga basin using CCME Water quality Index	• Rank the surface water qualityin Kalu ganaga basin for Ambient water quality categories based on CCME WQI.
		• Maintain an ambient water quality database for Kalu ganga as a main important inland surface water body in Ratnapura and Kalutara districts.
		• Investigate the physical, chemical and biological suitability in Kalu ganga comparison to Ambient Water Quality Standard for water source simple treatment and bathing and recreational purpose.
		 Investigation of micro plastics in Kalu ganaga water samples.
5	A comparative study on Environmental awareness, and attitudes among the secondary level school students in Rathnapura district	Identification of gaps on environmental awareness and attitudes on environment of the secondary level students among all divisions.
6	Development of Ecosystem Services Indicators for Kambarawaganga study area	Jpdate of land use cover, Series of naps for ecosystems services, Final ank map of ecosystems services.
7	Health Quality Assessment of a Highland stream using selected Physico-Chemical parameters, Biological Factors and Microplastic level	Identification of significant relationship of the diversity and abundance of fresh water macro invertebrates (Odonate larvae) with selected environmental parameters
8	Assessment of Surface water quality in Kalu ganaga basin using CCME Water quality Index	• Rank the surface water qualityin Kalu ganaga basin for Ambient water quality categories based on CCME WQI.
		 Maintain an ambient water quality database for Kalu ganga as a main important inland surface water body in Ratnapura and Kalutara districts.

		 Investigate the physical, chemical and biological suitability in Kalu ganga comparison to Ambient Water Quality Standard for water source simple treatment and bathing and recreational purpose. Investigation of micro plastics in Kalu ganaga water samples.
	Coconut Research In	nstitute
1	Evaluation of hybrid vigour of brown dwarf crosses for yield and tolerance to moisture stress in different agro ecological zones	Increased yield and enhanced tolerance to moisture stress across diverse agro-ecological zones.
2	Evaluation of hybrid vigour of Sri Lankan Tall and Sri Lankan Dwarf crossed with exotic varieties	Enhanced overall yield, disease resistance, and agricultural resilience in coconut cultivation
3	Evaluation of intra-varietal dwarf coconut hybrids for home gardens and beverage purposes	Reveals their suitability for both home gardens and beverage production, showcasing a dual- purpose potential that combines ornamental value with quality coconut yield for processing.
4	Evaluation of King coconut germplasm to release a new cultivar for beverage industry	Collection of 4 King coconut populations, screening with SSR markers
5	Development of potential inter and intra varietal hybrids using local and exotic varieties conserved at field gene banks	Improved crop resilience, yield, and adaptability, contributing to the sustainable advancement of coconut cultivation.
6	Collection and conservation of local and exotic germplasm and utilization in breeding programmes	Safeguard and harness diverse genetic resources, fostering the development of resilient and high- performing crop varieties.
7	Screening varieties /accessions/cultivars for red- weevil tolerance.	Completion of the screening of varieties/accessions/cultivars for red weevil tolerance
8	Screening varieties/accessions/cultivars for quality of activated carbon	Identification and selection those with optimal characteristics for producing high-quality activated carbon.
9	Induction of somatic embryogenesis and plant regeneration in ovary derived callus	Study on effect of amino acid and polyamine on callogenesis and somatic embryogenesis.
10	In vitro and biochemical approach to investigate somatic embryogenesis and tissue culture responsiveness in coconut	Study on histological and biochemical variation associated with somatic embryogenesis and tissue culture responsiveness in coconut

11	Identification of new explants for vegetative propagation of coconut	Evaluation of potential of tender leaf explant as new explants for vegetative propagation of coconut
12	Dynamical evolution of hormonal signalling pathways in plant micro- propagation	Modelling hormonal signalling network of somatic embryogenesis for identification of important regulators of the system
14	Investigation of genotypic specificity in coconut plumule culture protocol	Evaluation of potential of meristem culture protocol for multiplication of high value coconut cultivars
15	Identification of drought tolerant coconut mother palms through phenotypic, physiological and gene expression studies	Enabling the selection and propagation of resilient genetic resources for sustainable coconut cultivation in water-scarce environments
16	Development of Molecular Markers for Identification of WCLWD Resistant Parent Palms	Expecting funds from the budget or China program to initiate the study
17	Characterization of drought tolerant coconut genotypes using gene expression studies	Enabling the selection and propagation of resilient genetic resources for sustainable coconut cultivation in water-scarce environments
18	Determination of the effect of pollen type on hybrid fruit setting (Pilot Field Testing)	enabling the strategic selection of pollen sources for optimizing fruit yield and quality in hybridized plant populations
19	preliminary study on the effects of anti- transpirants on coconut seedlings under water stressed conditions	Identification of the effective anti- transpirant/s and effective concentrations
20	Development of sustainable moisture conservation method by using carbonized plant material (bio-char) for mature coconut plantations	Development of a sustainable moisture conservation method for mature coconut plantations.
21	Development of a sustainable moisture conservation method by using carbonized plant material (bio-char) for coconut seedlings	Enhanced water retention in the soil, fostering improved seedling growth and water-use efficiency in coconut cultivation
22	Assessment of the effectiveness of Biochar as a soil conditioner on managing sustainable fertility of Coconut lands, with special emphasis on effective microorganisms	Evaluation of the impact of Biochar application on soil health, nutrient retention, and microbial activity, contributing to enhanced sustainability and productivity in coconut cultivation
23	A non-destructive method for determining leaf area of seedlings with split leaves	100% Designing a formula to determine leaf area of coconut seedlings with split leaves

24	Identification of climate resilient coconut varieties using antioxidative enzyme activity under drought stress	Collection of data on plant house experiment & field experiment for the identification of antioxidative enzyme activity as a tool to determine the tolerance of coconut to drought
25	Identification and evaluation of new mulching material on soil moisture conservation and the growth of coconut seedlings	The identification and evaluation of new mulching materials for soil moisture conservation aim to assess their effectiveness in enhancing water retention and promoting optimal growth conditions for coconut seedlings, contributing to improved cultivation practices and seedling establishment.
26	Effect of drought on female flowers of coconut in hybrid coconut production	Identification of effect of drought on the length of female phase and the effect of bagging under drought in hybrid seed nut production with TT and DG
27	Coconut for the future: Assessing the effect of global warming and drought on the coconut industry of Sri Lanka	Assessing the impact of global warming and drought on the coconut industry in Sri Lanka involves examining the vulnerabilities, adaptive strategies, and potential resilience measures essential for sustaining coconut cultivation amid changing climatic conditions.
28	Identification of future vulnerability of coconut plantations in the coconut triangle to climate change	Data analysis to find out the combined impact of local climate and soil properties on soil moisture patterns
29	Evaluation of drought tolerant Sri Lankan tall accession Ambakelle special and its progenies in different agro climatic zones	The evaluation of drought-tolerant Sri Lankan Tall accession 'Ambakelle Special' and its progenies across diverse agro- climatic zones aims to assess their adaptability and performance under varying environmental conditions, providing valuable insights for sustainable coconut cultivation in regions susceptible to water scarcity
30	Evaluation of drought tolerant mechanisms in selected coconut varieties for improving drought tolerant mechanisms	
31	Quantification of below ground carbon stock and development of an allometric model to estimate the variation of below ground carbon stock of coconut palms in different age groups and in major land suitability classes	Providing crucial insights for carbon sequestration and sustainable land management

32	Evaluating the effect of micronutrients on the growth and performance of coconut seedlings	Offering valuable insights for optimizing nutrient management strategies to promote healthier and more productive coconut cultivation
33	Evaluation of Municipal Solid Waste Compost to use as an Organic Manure source in Coconut Plantations	Providing a sustainable and environmentally friendly approach to enhance soil fertility and promote healthy growth in coconut cultivation
34	Assessment of the effectiveness of boron fertilizer on nut setting and leaf Boron status	Effectiveness of Boron fertilizer on nut setting and leaf Boron status
35	Assessment of nutrients sufficiency levels to recommend fertilizer dosages for improved cultivars	Provision of tailored recommendations for optimizing plant health and productivity, ensuring that crops receive the appropriate balance of essential nutrients for their growth, development, and overall well-being.
36	Assessment of the polybag potting mixtures to improve the vigour of the seedlings in coconut nurseries	Identification and recommend of an effective potting mixture that promotes better root development, nutrient uptake, and overall seedling health, contributing to the successful establishment of vigorous coconut seedlings in nurseries To identify the alternative potting mixtures for polybag seedlings
37	Growth performance evaluation of high value resin crops under coconut	
38	Evaluating the adaptability of new intercrop species and varieties (Durian, Vanilla, Aloe Vera, and Tea)	
39	Evaluation of new herbicides (Continuous)	Provision of valuable insights into the effectiveness and safety of the new herbicides, enabling informed recommendations for their application in agriculture while considering factors such as weed spectrum, application rates, and potential ecological consequences
40	Investigating the Alternative Uses of Panicum maximum (Guinea Grass)	Production of two (02) sets of compost and two (02) sets of Vermicompost and recommending Guinea grass as a raw material for the production of compost and vermicompost

41	Evaluation of the effect of fertigation on the yield of coconut.	Collection of water-soluble inorganic fertilizer samples, testing the dissolution rates of fertilizers and cost analysis. Field selection for field experiment and designing the irrigation system.
42	Assessment of prevalence of black beetle and red weevil in climatic zones	Provide crucial insights into pest dynamics
43	Development of coconut cultivars resistance to coconut mite	Ensure long-term agricultural productivity and economic stability for coconut farmers.
44	Evaluation of Sri Lanka Tall and Sri Lanka Dwarf crossed with exotic varieties for resistance/ susceptibility to the damage by coconut mite	Contributing to the resilience of the coconut industry against pest challenges
45	Screening of coconut varieties/ hybrids tolerant to Weligama Coconut Leaf Wilt Disease	Developing resilient cultivars, ensuring sustainable coconut farming, and mitigating the impact of the disease on coconut yields and overall agricultural productivity
46	Conducting surveys to assess the impact of release of predator mites to control Aceria mite	Percentage reduction in rejected nuts due to mite damage assessed with time
47	Deciphering rhizosphere microbiome for Leaf Scorch Decline (LSD) and Weligama Coconut Leaf Wilt Disease (WCLWD) affected palms and the efficacy of resistance inducers for disease management.	
48	Identification of xylem-phloem restricted fastidious prokaryotes in LSD and WCLWD affected palms and designing primers for detection	
49	Conversion of non- systemic insecticide into a systemic insecticide by nanotechnology	Conversion of non- systemic insecticide into a systemic insecticide by nanotechnology
50	Study behavioral responses of Plesispa to leaf volatiles	Completion of EAG studies; improvement of black beetle pheromone synthesis protocol. Improving red palm weevil repellant.
		Commencing field evaluation, Continuation of laboratory screening of essential oils.
51	Development of a mass rearing technique for N. paspalivorus	Collection of mites from the field and establishment of a laboratory culture

52	Screening varieties for Plesispa beetle	
53	Studies on whitefly and its possible biocontrol agents	Collection and identification of white flies associated with coconut. Commence laboratory rearing of whitefly colonies. Surveying of possible biocontrol agents of whitefly and laboratory maintenance of biocontrol agents. Testing of new insecticides Conducting population dynamics studies
54	Improvement of Extra VCO production process through fermentation	Study of microorganisms responsible for separation of oil in coconut milk
55	Development of coconut butter	Improvements to the coconut butter developed
56	Determination of the effect of fresh ground coconut kernel to reduce domestic wastage and study on health benefits of creamed coconut	Determination of the effect of fresh ground coconut kernel to reduce domestic wastage and study on health benefits of creamed coconut
57	Development of a Nano devise for the detection of adulteration in coconut oil	Development of nano technology enabled electronic device for detection of palm oil in coconut oil
58	Development of a spread cheese using Coconut Skimmed Milk	Development of a protocol to produce coconut skim milk based spread cheese
59	Production biodegradable packaging from coconut protein isolates and biocelluloses	Application of packaging material as a food wrap and improving quality characteristics
60	Improvements for the coconut paring oil production process	Study the influence of different treatment on the stability of coconut testa oil
61	Determination of isotopic fingerprinting to authenticate sri Lankan kernel products	Preliminary investigation by analysing samples of desiccated coconut obtained from different mills
62	Nutritional studies of coconut sap based sugar	Evaluation of Glycemic Index of traditional and value added jaggery. Informs consumers and the food industry about the potential health benefits and applications of this alternative sweetener
63	Development of a technology for coconut coir retting using consortium of microorganisms	Comparison efficiency of retting husks in conventional retting pits and cement retting pits and

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		investigation of quality of coir fibre
64	Improvement of a cushion/mattress using coir fiber	Evaluation of cushion samples for quality aspects using human subjects
65	Quality Improvement of Gloves and Rubber Boots by Applying Coconut Husk Products	Develop composite material for rubber glove preparation
66	Fabrication of a dryer for drying coir pith	Fabrication of a drying system for coir pith drying, inhouse testing, field testing
67	Determination of the effect of virgin coconut oil in the treatment of Alzheimer's Dementia	
68	Determination of the effect of virgin coconut oil in ameliorating Type 2 diabetes in human. Determination of the effect of fresh coconut kernel, coconut oil and other edible products in the patients with diabetes mellitus and impaired glucose tolerance	Enhance awareness and provide scientific evidence on consumption of VCO
69	Determination of the efficacy of adjunctive extra virgin coconut oil/ coconut products used in people with mild cognitive impairment and mild to severe Alzheimer's disease (community based randomized, double blind placebo controlled pragmatic study)	Efficacy of the adjunctive extra virgin coconut oil/ coconut products used in people with mild cognitive impairment and mild to severe Alzheimer's disease determined
70	Anti-diabetic and anti-oxidative potentials of partially-defatted coconut parings of indigenous coconut cultivars	Phyto chemical identification of coconut testa extracts responsible for anti diabetic and anti oxidative activities
71	Study on coconut flour based low GI food items	Formulation of defatted coconut flour based testa flour based food with nutritional analysis
72	Identification of the contributing factors for coconut prices and developing the price forecasting model	Development of a price forecasting model
73	Assessment of international organic fertilizer standards and related crop export regulations on the use of local organic fertilizer sources to organic coconut industry in Sri Lanka	Compare and contrast the parameters of commercially available compost with standard published by the SLSI
74	Dynamics of household coconut and edible oil consumption of Sri Lankan consumers	Quantify the household edible oil consumption - number
75	Value chain analysis of sap based products of coconut industry in Sri Lanka	Identify the value chain of sap based industries and propose policies to develop the industry

76	Market dynamics and industry setting of coir fiber sector	Identify the issues in the coir sector and provide recommendations for national coir policy		
77	ICT to overcome value chain inefficiencies in scattered small scale value chains (King coconut, sap based products, organic and coir)	Introducing a mobile app and a software		
78	Value chain analysis of coconut milk, milk powder and cream	Identify the value chain of coconut milk, milk powder and cream and propose policies to develop the industry		
79	Evaluation of the success of coconut replanting programs of Sri Lanka	To identify gaps in coconut replanting program of Sri Lanka		
	Department of Census &	Statistics		
1	Pilot survey on implementation of decisions			
	taken at the 19th international conference of statisticians			
2	Child module included in the HIES			
3	Household survey on drinking water quality			
4	Global adults tobacco survey (GATS)			
5	Business pulse survey			
6	International comparison program for Asia and Pacific			
7	Awareness program for field staff			
8	Inclusion of food insecurity experience scale (FIES) module to the household income and expenditure survey (HIES)			
	Department of Export Agriculture			
1	Investigation of the feasibility of expanding Vanilla cultivation in Central Province, Sri Lanka	Identifying the feasibility of expanding Vanilla as a cultivation in Central province		

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2	In-vitro propagation of Garcinia and wallapatta	Mass plant production using tissue culture technology and new variety development
3	Pepper canopy improvement through different planting material originated from different cutting types and canopy training.	Identification of suitable cutting types to pepper canopy improvement
4	A comparative Study of growth, yield and quality of Half-Sib progenies of Sri Gemunu& Sri Vijaya Cinnamon varieties	Identification of efficient method to replace existing seedling cultivations with improved genetic material
5	Growth and yield performance of Macadamia VP plants at different spacing levels	Introduction of Macademia VP cultivation to Sri Lanka
6	Determination of pollination behavior of wild cinnamon based on flower morphology, floral behavior and molecular markers: A case study on mother plants of Cinnamomumdubium (Nees), Cinnamom litseaefolium (Thwaites) and Cinnamomumcapparucoronde (Blume), and their progenies at mid country research station, Dalpitiya, Sri Lanka	Determination of factors affecting pollination behavior of Genus Cinnamomum
7	Comparative Study of the effectiveness of using alternative potting media for propagation of black pepper	Identification of alternative potting media for black pepper
8	Investigation of etiology, disease development and management of rough bark disease of cinnamon	Identification of causal agent, investigation on disease development and integrate management of RBD of cinnamon
9	Studying the ecology of cinnamon wood borer (Ichneumenopteracinnamomumi)	To find out the seasonal abundance of cinnamon wood borer
10	Identification and studying the biology, ecology and management of cinnamon thrips	To identify the thrips taxonomically & to identify the biology and the ecology
11	Study the white root disease infection, its pathogenicity and ecological factors that enhance the disease in cinnamon	To confirmation of the pathogen To find out the disease development pattern in host
12	Study the disease progressive pattern and yield loss by canker incidences in cinnamon	To study the symptom development of canker in cinnamon stem with different maturity levels.
13	Effect of Cinnamon Leaf compost and inorganic fertilizer and their combinations on growth and yield of Cinnamon	evaluate the effect of compost on growth, yield and disease resistance of cinnamon

14	Effect of dolomite application on growth and yield of cinnamon grown in acid soil cinnamon grown in acid soil	To find out the effect of dolomite on
		growth and yield of cinnamon
15	Determination of Optimum pH level for growth of Cinnamon	Find the best dolomite dose for optimize the soil pH that maximize the
•		growth of Cinnamon
16	Identification of visible indicators of cinnamon (Cinnamomum zeylanicum Blume) to monitor major and minor soil nutrients	Identify the cinnamon deficiency symptoms
17	Effect of biofilm-bio fertilizer on growth and yield of cinnamon	Identify the effective dose of biofilm bio- fertilizer
18	Effect of market available Cinnamon fertilizer mixtures on growth and yield of Cinnamon (Cinnamomum zeylanicum Blume)	evaluate the effect of available fertilizer with compared to current Cinnamon fertilizer recommendation on
19	Effect of type of planting materials and different rate of inorganic and organic fertilizer on growth and yield of cinnamon	To compare growth and yield performances between vegetatively propagated plants (Sri Gamunu& Sri Wijaya) and cinnamon seedling plants.
20	Effect of different levels N, P and K fertilizers on growth, yield and quality of the cinnamon	To find out a suitable level of N, P and K nutrients on growth, yield and quality of the cinnamon
21	Evaluation and comparison of superior quality characteristics of accession A1 (Pieris cinnamon) with selected cinnamon accessions (Sri Gemunu and Sri Wijaya)	To identify and evaluate the superior quality characteristics of accession A1
22	Multiplication and evaluation of selected hybrid cinnamon plants under recommended agronomic practices for quality, growth, and yield performance	To identify superior quality cinnamon accessions
23	Evaluation of seasonal variation in rooting ability of shoot cuttings of cinnamon varieties "Sri Gemunu" and "Sri Wijaya"	To estimate the trend for cutting germination and sprouting of released cinnamon varieties according to the months of year
	Department of National Bo	tanic Gardens
1	DNA barcoding morphological taxonomy and phylogeny of <i>Syzygium</i> spp.	Clades with morphological characters of <i>Syzygiums</i> pp.
2	Botanical survey for exploration of threatened plants	Record data of threatened plants

3	Study of seasonal patterns of <i>Exacum</i> pedunculatum in Naula, Bobella	Impact of rainfall pattern on the population
4	Diversity of genus <i>Diospyros</i> in RBG, Peradeniya	Identification of all <i>Diospyross</i> pp. in RBG
5	Applications of Micro Propagation and Developing a growing mediar seed propagation of Lipstick Plant (<i>Aeschynanthus radicans</i>)	
6	Investigation of most suitable Gibberellin Acid concentration and fertilizer application to stimulate flower bud of Lipstick plant (<i>Aeschynanthus radicans</i>)	
7	Screening fungicides for prevention of fungi causing damping off disease on Dendrobium Orchid (<i>Dendrobium sp.</i>)	
8	Seed Germination techniques for <i>Rohdodendron</i> arboretum subsp.zeylanicum	
9	Hilltop flora of Sri Lanka	
10	Strategic recovery plan for natural wild populations of the endemic and endangered species <i>Osbeckia lanata Alston</i> .	
	Farm Mechanization Rese	arch Centre
1	Design and Development of 4W Tractor attached Vaccume Seeder	Vaccume Seeder for OFC
2	Design and Development of Pulse Processing Machine	Pulse Processing Machine for green gram
3	Design and Development of Cowpea Thresher	2W tractor driven thresher for Cowpea
4	Floating Tiller for Boggy land	Prime mover suitable for boggy land cultivation
5	2W Tractor attached Groundnut Seeder	2W Tractor attached seeder for groundnut
6	Adaptive Modification of Groundnut Harvester	4W Tractor attached harvester for groundnut
7	Design and development of 4 Wheel tractor attached weeder	4 Wheel tractor attached weeder for high land
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8	Design and development of Chilli seed extractor	Chilli seed extractor with input capacity of 30kg/h
9	Design and development of 4 Wheel tractor attached seeder	4 Wheel tractor attached seeder with 15Acers/day field capacity
10	Design and develop 2 row transplanter with 8" row spacing	Transplanter for paddy
	Field Crops Research & Devel	opment Institute
1	Evaluation of exotic chilli hybrids	Identification of daptable exotic varieties
2	Evaluation of exotic Big and Cluster onion varieties for recommendation	Identified eadapatable exotic varieties
3	Hybridization of mungbean parental lines	Develop new lines with desiarble characters
4	Preliminary Yield Trial of mungbean	Develop new mungbean varieties
5	National Coordinated Varietal Trial for mungbean varieties	Develop new mungbean varieties
6	Variety Adaptability Trial -mungbean	Develop new mungbean varieties
7	Blackgram Breeding - Hybridization	Develop new lines with desiarble character
8	National Coordinated Varietal Trial Blackgram	Develop new black gram varieties
9	Variety Adaptability Trial	Develop new black gram varieties
10	Seed multiplication of new black gram varieties MIBG 3 & MIBG 4	Develop quality seeds

11	Hybridization and selection of cowpea	Developed new lines with desirable characters
12	Preliminary Yield Trials -cowpea	No. of lines
13	Hybridization and selection of soybean	Develop new lines with desirable characters
14	Preliminary Yield Trials of soybean	Develop new soybean variety
15	Evaluation of maize exotic hybrids	Identified exotic hybrids performing under local conditions
16	Purification of OPV "Ruwan"	Purified recommended variety
17	Purification of OPV "Bhadra"	Purified recommended variety
18	Development of double cross maize hybrids using available hybrids and make segregation population in inbred lines development program	Isolated of inbred lines for advancement
19	Maintenance of sweet corn inbred lines	Maintained Genetic purity of locally developed inbred lines
20	Maintenance of popcorn inbred lines	Maintained Genetic purity of locally developed inbred lines
21	Development of sweet corn and waxy-corn inbred lines through generation advancement	Develop homogeneous and homozygous lines
22	Development and evaluation of sweet corn hybrids using locally developed inbred lines	Developed hybrids for further evaluation
23	Morphological characterization of developed sweet corn inbred lines	Characterized sweetcorn inbred lines
24	Development of composite (Synthetic) variety for Sweet corn	High performing sweet corn population
25	Evaluation of exotic sweet corn hybrids	Locally developed popcorn hybrids for further evaluation

26	Evaluation of exotic baby corn hybrids	Locally developed baby corn inbred lines
27	Evaluation of finger millet in AYT (Developed pedigree lines using generation advancement)	Identified lines for further evaluation
28	Evaluation of Finger millet in NCVT	Identified lines for VAT
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29	Evaluation of proso millet in AYT	Identified lines for NCVT
30	Evaluation of foxtail millet in VAT	Identified lines under farmers management
31	Evaluation of developed sweet sorghum lines in NCVT	Identified adaptable lines
32	Development of cherry tomato inbred lines	New varieties
33	Evaluation of exotic Water melon varieties	New varieties
34	Maintenance of Grapes & Mango germplasm	Good quality eco-friendly fruits planting materials and demonstration field for famers
35	Maintenance of Guava, Lime plantation and Wood apple germplasm	Good quality eco-friendly fruits planting materials and demonstration field for famers
36	Maintenance of Drumstick, Dragon fruit, Banana, Passion fruit and papaya cultivation,	Good quality eco-friendly fruits planting materials and demonstration field for famers
37	Testing of Trichoderma to control diseases in seeded and layered guava plants	Effect of Tricodema strains on the quantitative characters of guava
38	National coordinated rice varietal testing for 3 & 3.5 months age rice varieties	Adapted rice varieties

39	Testing of flowering stability of rice varieties under changing natural temperature & solar radiation gradient	
40	Evaluation of different local Chilli hybrids for major pests	Identification of pest resistant/tolerant lines
41	Testing of bio pesticides to control leaf curl complex in chilli	Identification of effective bio pesticides for chilli pest
42	Efficacy of the net materials to control chilli leaf curl complex	Evaluation the pest population suppression level
43	Evaluation of mung bean lines, cowpea lines, ground nut lines and soybean lines for major pests	Identification of pest resistant/tolerance lines
44	Effect of different nitrogen fertilizer levels on Fall Armyworm damage in Maize	
45	Testing of pheromone lures to control Fall Armyworm in Maize	Identification of effective pheromone lures to FAW
46	Testing of repellents to reduce peacock damage in Maize	Identification of effective repellents
47	Evaluation of cowpea lines for major diseases	Resistant/tolerant varieties
48	Evaluation of ground nut lines for major diseases	Resistant/tolerant groundnut lines for blast
49	Evaluation of Soybean lines for major diseases	Resistant/tolerant Soybean lines major diseases
50	Evaluation of finger millet lines for major diseases	Resistant/tolerant finger millet lines for blast
51	Testing of new herbicide to control weeds on onion and Maize	Effective Weedicides to control weeds on onion
52	Exploring the possibility of using of anti- transpirants to minimize the impact of moisture stress on growth and yield of big onion	Identified anti-transpirant to increased yield under water stress condition
53	Development of sustainable farming practices for upland rain fed and irrigated cropping systems through a novel conservation agriculture approach	Identified a sustainable conservation farming technique

54	Estimation of plant nutrient uptake of Other Field Crops under organic and inorganic management	
55	A study on improvement on the productivity of black gram	Improve the black gram yield
56	Screening of blackgram varieties for agronomic performances under organic farming conditions	Identified black gram varieties for organic farming
57	Study on suitable nursery media for chilli seedlings raised in nursery trays	suitable nursery media for raising chilli seedlings in trays
58	Screening of chilli varieties for agronomic performance under the organic farming	Identified chilli varieties for organic farming
59	Effect of different growing media and fertigation combinations on growth and yield of hybrid chilli (Capsicum annum) under protected house conditions	Identification of suitable growing media for hybrid chilli and the identification of best fertigation combination under protected house condition
60	Effect of plant population on growth and yield of cowpea varieties Dhawala, MICP1 and Waruni under lowland conditions	Optimum plant densities for different cowpea varieties and soybean for higher grain yield production
61	Study the compatibility of rhizobium inoculum with fungicide, insecticide and seed coating material on root nodulation and yield formation in soybean	Determine the possibility of using liquid inoculum for polymer seed coating in Soybean
62	Effect of organic manure application on performance of soybean rhizobium inoculant and grain yield in dry zone of Sri Lanka	Select the best source of organic manure which gives highest yield performance in soybean
63	Effect of organic manure application on yield performance of OPV- Ruwan and MI Maize Hybrid 5 in dry zone of Sri Lanka	Select the best source of organic manure which gives highest yield performance in maize
64	Effect of initial seed moisture content, materials used for packing and the location of the storage on enhancement of maize seed storage duration while protecting the seed viability	Select the optimum moisture content and packaging material for storing maize seeds without loosing the seed viability
65	Evaluation and multiplication of local Dioscorea germplasm	Selection of suitable Dioscorea species for Dry Zone conditions of Sri lanka
66	Study on the effect of time of planting of Dioscorea alata on vine growth and tuber yield	Determination of best time of planting for optimum growth and yield of Dioscorea alata
67	Study the effectiveness of low temperature on phase changes of life cycle of onion variety Dambulla selection	Produce new varieties within short period

68	Impact of harvesting stage of Onion crop on post-harvest losses	Reduce post-harvest losses
69	Development of a new cropping system for Onion seed crop to get additional income during the season.	To get additional income at the mid- season
70	Impact of usage of seed-crop bulbs as planting material in seed yield and its quality.	Reduce cost of production
72	Testing the effectiveness of different fertilizers to incorporate into the already developed drip irrigation based agronomic management package for onion	Effectiveness of different fertilizer products to incorporate into the already developed drip irrigation based agronomic management package for chilli
73	A study on the response of Maize in relation to application of 'HERP' and 'ESSP'	Effectiveness of 'HERP' and 'ESSP' on maize
74	Testing of commercial fertilizer products for maize under the fertilizer testing program	Recommendation of special fertilizer product for farmers
75	Effect of Supper Water Absorbent (SAW) on land, water and fertilizer use efficiencies of chilli under organic conditions	Effectiveness of Super Water Absorbent products in crop production
76	Effect of Supper Water Absorbent (SAW) on land, water and fertilizer use efficiencies of onion under organic conditions	Effect of Supper Water Absorbent (SAW) on land, Water and fertilizer use efficiencies of chilli & Onion
77	Field verification studies on locally developed soil moisture sensing based automated irrigation systems for maize	Soil moisture sensing based automated irrigation systems
78	Field verification of the crop advisory system developed on the web-based weather forecasting for the maize crop	Supported already operational process of generation, dissemination and application of fore-cast based agricultural advisories by the DoA using web-based weather forecasting
79	Generation advancement of QPM incorporated maize BC4F8 line	QPM incorporated maize line/variety
80	Line x Tester analysis to select Maize inbred lines showing high GCA	QPM incorporated maize hybrids
81	Optimization of chilli plant regeneration protocol for chilli variety MI-1, MI hot	optimized protocol for chilli plant regeneration
82	Determination of presence and expression of Anthracnose resistant gene in F2 population of Chilli	resistant level of anthracnose

83	Breeder seed production- Chilli- MICH 3 Chilli- MICH HY 01	Breeder seeds for seed multiplication process
	Breeder seed production -Maize Parental line – CAL 1471 Maize Parental line – CAL 1426 Maize Parental line – CAL 147 Maize Parental line - CL0 2450	Increase seed availability of parental line for F1 seed production
85	Breeder seed production- Maize F1 seeds - MI Hybrid 03, 04, 05	Increase seed availability of recommended maize hybrids
86	Breeder seed production -Finger millet -Rawana Finger millet -Oshada	Maintained genetic purity of recommended Finger millet variety
87	Breeder seed production -Snake gourd- MI- Short and Bitter gourd - MC-43	To maintain genetic purity of recommended variety
88	Breeder seed production -Ash Gourd - Mk Ash Gourd 01	Purity maintenance & supply Breeder seeds for seed multiplication process
	Forest Departme	ent
1	Tissue culture, Tree domestication	New planting sources
	Fruit Research and Develop	ment Institute
1	Develop quality assurance protocol for compost production from organic waste in Sri Lanka	
2	Genetic improvement and varietal development of mandarin through hybridization	
3	Development of high yielding and good quality varietal hybrids of pineapple	
4	Identification of bioactive compounds of selected underutilized fruit crops	
5	Management of guava wilt throughbiological control agents	
6	Regulation of Fruit set and postharvest life and investigation of variabilityof bioactive compounds in edible Annona muricata accessions found in Sri Lanka	

7	Development of promising pomegranate lines through in vitro mutation induction	
8	Development of hybrids and open pollinated varieties and seed production	
9	Increasing Farmers income of Sri Lanka by improving quality and productivity of Mandarin	
10	Improvement of productivity of fruit crops of selected fruit villages	
11	Demonstration of New technologies to enhance the quality and production of selected fruit crops in Sri Lanka	
	Gem and Jewellery Research and	l Training Institute
1	Exploration and Assessment of Sri Lanka	03 Final Reports and Maps
2	Development and policy/ technical guidelines for gem mining	1 policy / technical Guidelines
3	Heat treatment of low quality Spinel (Kirinchi) in Sri Lanka. Modification of Lakmini Gas Furnace	3 Value addition technologies, 01 manuscripts
4	Introduce the most Effective and efficient colour and clarity enhancement for semi precious gem minerals found in gem gravel beds in Sri Lanka	1 Technology
5	Non mercury alternative method for gold separation in small scale Jewellery manufacturing sector	1 Method
	Hector Kobbekaduwa Agrarian Resea	rch & Training Institute
1	Agricultural extension and advisory service in the food crop sector in Sri Lanka: challenges Challenges, issues and options.	Research Report
2	Seed Sector in Sri Lanka: Performance, Potentials and Strategies to Way Forward	Research Report
3	Export Potentiality of Major Fruits in Sri Lanka: An Economic Analysis	Research Report
4	Evaluation of 2006 dairy development policy in Sri Lanka.	Research Report

5	Production and Marketing of Big onion in Sri Lanka: A Value Chain Analysis	Research Report
6	Maize Value Chain Analysis: Status, Constraints and Opportunities in Feed and Food Industry	Research Report
7	Potato Value Chain: Status, Challenges and Opportunities.	Research Report
8	Value Chain Analysis for Soybean:	Research Report
9	Comparative Advantage and Export Competitiveness of Selected Food Commodities	Research Report
10	Promote Mushroom Industry through Farm Entrepreneurship in Sri Lanka	Research Report
11	Integrated Solutions for Water and Energy Consumption in Selected High Value Fruit Crop Production in Sri Lanka.	Research Report
12	Modern vegetables value chains of Sri Lanka which uses on line sales methods.	Research Report
13	Production and Marketing Trends of Chilies in Sri Lanka Coordinator:	Research Report
14	Initiating farm mechanization through agricultural service providing hubs run by local agri-entrepreneurs: challenges Challenges and opportunities.	Research Report
15	Land Reforms and Land Consolidation: Towards Sustainable Rural Development.	Research Report
16	Commercialization of organic fertilizer production: Issues and prospects-	Research Report
17	Nationally Important Agricultural Heritage Systems (NIAHS) of Sri Lanka: Recognition and Conservation.	Research Report
18	actors Determining Soil Conservation Practices used in Upcountry Vegetable Farming in Sri Lanka	Research Report
19	Intensification of active paddy land use through youth participation and organic paddy cultivation.	Research Report

	Horticultural Crop Research & Development Institute		
1	Generation advancement, purification and inbred line development of the selected lines of capsicum for the development of new hybrids.	High yieding local capsicum hybrid varieties	
2	Establishment of a base population to develop new OPVs or inbred lines of capsicum	High yielding better quality OP varieties	
3	Evaluation of exotic capsicum varieties.	Recommend most adaptable exotic varieties for commercial importation	
4	Hybrid/OP variety development program of Luffa	High yielding Luffa varieties with desirable pod qualities	
5	Varietal development program of Bean	High yielding Bean varieties with desirable pod characters and resistant to root rot and yellowing	
6	Hybrid/OP variety development program of Okra	High yielding Hybrid Okra varieties with desirable qualities	
7	OP variety development program of Yard Long Bean (Mea)	High yielding Mae varieties with desirable pod qualities	
8	Variety development program of Winged Bean	Purified winged bean farmer variety	
9	Evaluation of exotic vegetable varieties:	Recommended varieties with good quality	
10	Breeder seed production of DOA recommended vegetable varieties	Ensure initial seed availability	
11	NARP-Development of integrated strategy for the management of seed-borne bacterial canker disease of Tomato in Sri Lanka. [285-02-02-15- 2507-11 NARP]	Disease confirmation at molecular level and development of controlling strategies	
12	Biocontrol method (Rhizosphere fungi) for Tomato Early Blight control and plant growth promoting	Bio control method for Tomato Early Blight associated Alternaria spp and a plant growth promoter.	
13	Endophytic fungal assemblages of capsicum and their effect on plant growth and anthracnose disease control in Sri Lanka	Bio fungicide against Anthracnose disease	
14	New disease identification in under-utilized vegetables and tuber crops	Identified new diseases in underutilized vegetables and tuber crops	

15	Collaboration research on "Development of resistant varieties for Bean Horsegram	Horsegram Yellow Mosaic Virus
	Yellow Mosaic Virus (HgYMV) and Fusarium wilt disease" (Collaboration with breeding division).	(HgYMV) resistant bean varieties Fungal root rot resistant bean varieties
16	Bio-efficacy of liquid formulation of Trichoderma asperellum (Acc no: MH727475) in vegetable disease control	Trichoderma asperellum effectively control following fungal diseases. - Soil born fungal diseases of capsicum, tomato, brinjal, long bean and bean - Powdery and downy mildew of Luffa, bitter gourd and cucumber - Cercospora leaf spot and powdery mildew of okra - Early blight disease of tomato - Leaf spot disease of bean
17	A new leaf spot disease of salad cucumber (Cucumis sativus) cultivated in protected houses in Sri Lanka and its managemen	The causal pathogen Corynespora cassiicola
18	Bio efficacy testing of New PGR Sample (Agfort) for Viruses of Pumpkin	Effectiveness of New PGR Sample (Agfort) for Viruses of Pumpkin was identified using disease incidence, Disease severity and Yield. And however there was no significant variance among PGR applied and the control plots [DSI less than 20%].
19	Development of nutrient managemnet package for mitigating of low water stress on tomato cultivation	Nutrient Management package for mitigate the water stress condition in tomato
20	Establishment of soil calibration levels for nutrients (N, P, K, Mg. S) for different vegetable crops	Suitable nutrient level in soil for vegetable production
21	Effect of application of calcium nitrate on growth, yield and quality of tomato	Nutrient management for tomato fruit and seed quality
22	Development of nutrient Management package for organic vegetable production	Appropriate nutrient management technology for organic vegetable production
23	Effect of continuous application of compost on vegetable Yield (Observational experiment)	Soil quality changes and vegetable yields obtained due to long term application of compost
24	Screening of Different Varieties in vegetable crops for low input organic farming	Suitable vegetable varieties for low input organic farming
25	Effect of Application of Liquid organic fertilizer on organic vegetable production	Reduction of organic fertilizer rates Introduction of suitable liquid organic fertilizer product

26	Development of field test kit for determine the Phosphorous and Potassium in soil	Low cos field test kit
27	Efficacy testing of special fertilizer	Quality fertilizers for market
28	Heavy metal accumulation in soil and vegetables from different types of organic fertilizers	Data on heavy metal accumulation in soil and vegetables by organic fertilizers
29	Development of specific phosphorus solubilizing microbial (PSM) inoculums to make use them in fixed phosphorus rich vegetable growing soils	Phosphate solubilizing microbial inoculum
30	Evaluation of MRL and PHI of pesticides	Consumer safelty
31	Random analysis of fruits and vegetables for food contaminants	Consumer safelty
32	Pesticide formulation analysis; Assessment on Quality assurance of pesticide formulations including its impurities (samples directed by the ROP/ for court cases)	Quality pesticide for better results
33	Evaluation of Pre-harvests (PHIs) and Maximum Residue Limits (MRLs) of selected pesticides through pesticide residue supervision trials in tomato and leafy vegetables	Evaluation of MRLs and PHIs of pesticides through local climatic conditions
34	Evaluation of Agricultural commodities for pesticide residues and heavy metals random check	Assurance of food safety through residue analysis
35	Analysis of Food crop and water samples taken from SL-GAP for food contaminants	Supplying better service for the out stations
36	Determination of pre-harvest intervals of pesticides and assessment of the fate of the pesticides for selected crops (bitter-guard trials will be carried out at two research stations)	Evaluation of MRLs and PHIs of pesticides through local climatic conditions
37	Determination of lead accumulation and distribution in different rice cultivars (Pot trial) and water quality monitoring at water supplies at agricultural areas	Investigate the characteristics of lead accumulation in rice
38	Evaluation of impacts of pre-harvest application of Gibberellic acid on yield, post-harvest life and quality of Kolikuttu banana variety Agra (2021- 2022)	Quality controlled product
39	Asia Pesticide Residue Mitigation through the Promotion of Biopesticides (2021-2023)	Implementing MRLs and promotion of bio – pesticides

40	Study the effect of agronomic and plant physiological aspects on growth and tuber yield of selected sweet potato varieties	Data on rooting and tuberization Cultivation technique to increase yield
41	Study on cattle manure application and land preparation method on low input cultivation of bean	An agronomic management package for beans
42	Study on Land Preparation Method, Mulching and Organic Manure Application on Low Cost Organic Cultivation of Tomato	An agronomic management package for tomato
44	Adabtability test for cucumber newly developed lines-(HORDI)	Select suitable variety for low country wet zone
45	NCVT and VAT for developed cassava line	Develop Cassava line
46	Development of farmer friendly harvesting method for Diascorea pentapila	Development of farmer friendly harvesting method
47	NCVT and VAT for developed sweet potato line	Develop Cassava line Completed
48	Study of the diversity and abandance of predatory arthropodes in Brinjal eco systems	Identify predatory arthropods in brinjal eco system
49	Development of sustainable plant nutrient management package for hybrid vegetable	Identify plant nutrient package for hybrid vegetable
50	Effect of different botanicals for Cercospora leaf spot disease in leafy vegetable cultivation LWZ	Selection of botanicals for disease management
51	Evaluate the adaptability of Pluerotus ostreatus a strain from china for growing under local conditions	High yielding mushroom strains
52	Introducing Juncao technology (wild grass) in Oyster mushroom cultivation	Identify more suitable grasses for mushroom cultivation
53	Development high yielding, high quality lenairi type brinjal variety	Development of F1 hybrids –(20)
54	Development of high yielding, high quality, basal rot tolerant polon mae variety	F2-F3 generation advancement
55	F1 Hybrid and OPV development and seed production	

56	Assessment of the impact of diamond back moth management strategies in integrated programme on cabbage in Up Country of Sri Lanka	Develop effective IPM package for managing DBM of cabbage fields under Up Country region of Sri Lanka
57	Management of potato tuber moth infestation by using low toxic materials in stored potatoes	Develop effective IPM package for managing DBM of cabbage fields under Up Country region of Sri Lanka
58	Management of potato tuber moth infestation by using low toxic materials in stored potatoes	Recommend user friendly and safer materials for the management of potato tuber moth in stored potatoes
59	Evaluate the potential use of diatomaceous earth for the management of potato pests (Leaf miner, Aphid and whitefly)	Recommended new, low toxic and safety material for the management of major potato pest under UCWZ conditions
60	Induced systemic resistance against potato late blight caused by Phytophthora infestans through application of calcium	Environmental friendly management strategy for potato late blight
61	Optimization of the qRTPCR protocol to quantify the bacterial wilt pathogen in seed potato production lands	A protocol to quantify the bacterial wilt pathogen in potato growing lands
62	Development of management strategies for powdery scab infection in G1 seed potato growing polytunnels	Management strategy for powdery scab infection in G1 seed potato production polytunnels
63	Evaluating the remote sensing methods for monitoring the severity of late blight of potato	A smartphone based method to monitor potato late blight in potato
64	Evaluation of fungicide spraying schedules based on weather conditions for efficient management of potato late blight	Fungicide spraying pattern to manage potato late blight under upcountry wet zone condition
65	Breeding of potatoes	Development of high yielding carrot varieties locally
66	Breeding of carrots	Development of high yielding carrot varieties locally
67	Development of natural food colorant from pumpkin (Cucurbita maxima) varieties available in Sri Lanka	Natural Food colorant and post- harvest loss of pumpkin
68	Nutrient enriched orange flesh sweet potato noodles	Wheat flour replaced by nutritious sweet potato flour in noodle production
69	Production of ice-cream, a novel product enriched with β-carotene using Orange fleshed sweet potato powder	A novel product enriched with β carotene

70	Technology for pumpkin incorporated fruit leather.	Novel value added products for pumpkin
71	Tomato varieties suitable for sauce production as dehydrated powder form.	Find suitable tomato varieties grown in Sri Lanka which can be used as dehydrated powder form in sauce preparation.
72	Phyto-chemical properties, physiochemical properties of bitter gourds of advanced breeding lines.	New bitter gourd varieties with high phytochemical and physiochemical properties.
73	Characterization of recommended tomato varieties for physiological and bioactive/functional components	To find their suitability for different cooking/processing purposes.
74	Analyzing maturity indices of recommended tomato varieties	Maturity indices for selected tomato varieties
75	Effect of maturity stage and cold storage conditions for extending shelf life of tomatoes	Elongation of shelf-life of tomato
76	Application of non-thermal technologies for fruit and vegetable combined cloudy mixed juice processing. (NARP)	Formulating no sugar or low sugar added juice products and introducing innovative processing technology and their dissemination.
77	Evaluation of locally available cassava (Manihot esculenta) varieties for starch production & physicochemical characters of starch.	Starch characteristics of cassava
78	Identification of processing technology and quality evaluation of easy to cook products from underutilized vegetables.	To increase the consumption and to minimize the post-harvest losses of underutilized vegetables.
79	Effect of different storage methods on shelf life, physical, physicochemical properties and toxicity effect of popular local cassava (Manihot esculenta) variety MU 51	Cassava postharvest package
	Industrial Technology	Institute
1	Extraction, isolation and formulation of plant protection products (PPP) from local medicinal plants for the management of sucking pests of fruits, vegetables and ornamental plants. NRC PPP 16-03	
2	Enhancing the nutritional status of people by introducing healthy food products from Jak, Pumpkin, Banana and Fish while reducing post- harvest losses of these commodities	
3	Development of Nutritious and Healthy Food Corners for the Children/Adolescents NRC Grant No.19-007	

	A stable composites based on Titanium dioxide and clay as an effective photocatalyst	
4	NRC Grant No.20-014	
5	Research & Development Activities for Development of Kithul Industry for Year 2021	
6	Purification of Graphite of Sri Lanka as a high value addition RG/GAPF/2021/EB/01	
7	Application of anaerobic digestion for the treatment of Poultry processing wastewater and determination of CH4and CO2 emission factors.	
8	Development of data base on nutritional, chemical, molecular and morphological characteristics of selected traditional and widely consuming improved rice varieties of Sri Lanka: Suitability to use as chemical and molecular finger prints in identifying rice varieties at grain level.	
9	Spray drying of selected fruits, vegetable juices and yam pulps and innovative spray dried powder based product development.	
10	Chemical residues in bovine milk produced by medium and large scale dairy farms and their public health concern in Sri Lanka.	
11	Development of technologies to utilize waste whey in local dairy bio processing industries for the production of value added/functional beverages.	
12	Establishment of a facility for thermal process validation of canned food and low moisture processed food operations in Sri Lanka.	
13	Development of a plant based fungicide formulation to control anthracnose disease of mango and papaya.	
14	Pharmacognostical, chemical characterization and selected bioactive properties of Canarium zeylanicum and development of value added products.	
15	Development of new value-added health products incorporating underutilized bioactive medicinal plants to address life style diseases in Sri Lanka	
16	Development of lubricant products from local graphite.	

17	Design of production process equipment and wastewater treatment plant for Graphene production process.	
18	Quality Assurance and risk assessment in commercially available cosmetics products in Sri Lanka.	
19	Study the distribution and quantification of microplastics and the accompanied pollutant assemblages in the aquatic environments in Sri Lanka	
20	Study on microbiological physicochemical characteristics and mycotoxin contamination in commonly consumed edible oils in Sri Lanka.	
21	Assessment of claims on intense accumulation of heavy metals;Hg in Puttalam lagoon followed by potential health implications and industrial contributions.	
22	Rapid determination of virgin coconut oil authenticity and quality with -phase II.	
23	Development and characterization of a certified reference material for nutrients, micronutrients and heavy metals from Sri Lankan traditional rice varieties for method validation and QA/QC activities.	
24	Modification of MTS Clay Water Filter to Suppress harmful bacteria activity and other contaminants including fluoride and heavy metals in drinking water	
25	Further development of red clay based superior quality cookware	
26	A Low-cost electrode modified by controlled synthesis of nanofiber network of homo/copolymer of aniline and pyrrole on graphite-clay composite substrate for super capacitor applications	
27	Demand driven automotive rechargeable cost efficient battery manufacturing technology for SME startups	
28	Preparation of Composite Membrane for Reverse Osmosis Plant	
29	Designing and fabrication of a Water Ionizer	

30	Application of an integrated solution for	
	laboratory wastewater treatment in Sri Lanka	
	Evaluation of anti-adipogenesis and glucose	
31	uptake enhancement potentials of purified herbal	
	Extracts against 315 L 1, mouse autpocyte cens	
	activity	
	Development of low cost adulteration detection	
32	kits for Ayurvedic & food industries	
33	Development of user friendly non-destructive,	
	high tech portable IR device to authenticate	
	and geolagging Sri Lankan bee noney	
34	Development of an in-house PCR based	
	method for detection of plant-based	
	adulterants in Sri Lankan spice Turmeric	
	sinensis L. Kruntze)	
35	Traceability study of organic residual	
	opportunity assessment and dilating dairy	
	product testing facilities at ITI	
26	Wtarion food modurate containing non	
30	vegetarian food products containing non- synthetic additives processed using less	
	preferred local vegetables	
27		
37	Utilization of selected underutilized and	
	formulate healthy and novel food products and	
	food ingredients aiming local and international	
	market	
38	Development of milk – grain functional	
	beverages and food supplements	
20	Establishment of inactivation kinetics for	
39	notentially harmful microorganisms associated	
	with thermal processing of king coconut water	
	and coconut milk	
40	Study on the environmental fate of Glyphosate	
-	and its major metabolite	
	Aminomethylphosponic acid (AMPA) in soil,	
	sediment and water sources in wet zone of Sri Lanka	
	Lanka	

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	Development of a technical guideline to facilitate appropriate disposal of wastewater in the industries those are facing the limitation of meeting 1 : 8 dilution in the receiving waters	
42	Extraction and formation of Titanium alloys from Rutile with cost effective methods than conventional methods	
43	Determination of microplastic contamination of edible salts in Sri Lankan market & identification and quantification of the heavy metals associated	
44	AI based elephant detection & HEC mitigation platform	
45	Development of Infra-Red Thermometer calibration system	
46	Development of Measuring Tape Calibration System	
47	ISO 17025: 2017 Accreditation for the testing parameters of the Petroleum and Lubricant Testing Laboratory	
48	Enhancement of lubricant properties with nano materials incorporation	
49	Development of novel juice extraction techniques for high quality extracts from underutilized agro-based commodities, extract based fermented/powder products and direct targeting and inactivation of food pathogens using nano-biosensing	
50	Formulating meat analogues and plant-based meat products using plant proteins and mycoproteins	
51	Waste to energy-fabrication and development of cost effective briquettes from leftover food waste using organic garden waste as additives	

52	Development of automated system for stopwatch calibration	
53	Development of a Nano based strip for rapid detection of viral diseases	
54	Quality assessment of dried fish in local market.	
	Institute of Policy Studies o	f Sri Lanka
1	Livelihoods Insurance from Elephants (LIFE) in Sri Lanka" (Commercial Insurance for Farmers for Human Wildlife Conflict by Elephants)	Report
2	Climate Mitigation Action Support Project (CMASP)	Report
_	Updating the National Environmental Policy 2004 of Sri Lanka	Report
	Formulation of the National Cooling Policy of Sri Lanka (NCP)	Report
4		
5	Revising the Overarching Agricultural Policy in Sri Lanka	Report
6	Identifying Tobacco Value Chain in Sri Lanka	Report
7	Dialogue Series -Agricultural Value Chains Linkages to Improved Food Systems in Sri Lanka	Report
8	National Value Chain Development, Tracebility and Marketing	Report
9	Policy Research Capacity and Influence (PRCI) - To Analyse the Agricultural Trade Flows	Report
10	IPS Tobacco Control Programme – Election Strategy Work	Report
11	Communication and Policy Influencing - Tobacco Control Projects (Phase II)	Report
12	Repositioning Employment Social Protection in the Private Sector in Sri Lanka	Report

13	Strengthening Fiscal Policies and Regulations to Promote Healthy Diets in Sri Lanka	Report
14	IPS Tobacco Control Programme – Indirect Promotion of Tobacco in the Media	Report
15	Driving Health Progress During Disease, Demographic, Domestic Finance and Donor Transitions (the "4Ds") in Sri Lanka	Report
16	Tobacco Free Zones: A Pathway to Tobacco Free Sri Lanka	Report
17	Non-state Actors in Education in Sri Lanka: A Country Study	Report
18	4IR and Future of Work: A First Attempt at Exploring the Socio-Demographic Cohorts of the Workforce Affected by the 4IR in Sri Lanka	Report
19	Policy Research on Agricultural Labour Markets - Chapter on Opportunities and Challenges for Sri Lankan Agriculture in 4IR Era	Report
20	Work from Home Policy - Who Benefits, Who is Left Out: Evidence from Sri Lanka	Report
21	IPS-KIVU Tobacco Control Extension Program - Identify Targets for Policy Influence Which Can Affect Tobacco Consumption	Report
22	Political Economy Analysis - Tobacco Reform Issues: KIIs	Report
23	Improve Data and Knowledge for Strategic Planning, Efficiency Improvement and Prioritization of Health Finance	Report
24	Abhisheka and Single Stick Ban in Sri Lanka	Report
25	IPS Tobacco Control Programme – Impact Analysis of Tobacco Tax Increases Using I- O Tables	Report

26	Global Competitiveness Report 2020	Survey Data
27	Estimating the Size of the Illicit Cigarette Market in Sri Lanka	Proposal
28	Tobacco Taxation Work for NATA Sub- committee	Proposal
29	Global Competitiveness Report 2021	Survey Data
30	China's Belt and Road Initiative (BRI): State of Play and a Survey of Stakeholder Perceptions in Sri Lanka	Report
31	Doing Good Index 2022	Report
32	Assessing the Particiapation Of Global South Researchers in The Economic Development Policy Agenda-SETTING	Report
33	State of the Economy 2021	Report
34	Palm Oil Industry in Sri Lanka: An Economic Analysis	Report
35	The Effects of Import Controls on Sri Lanka's Export and the Economy	Report
36	Impact of GSP+ Withdrawal on Sri Lanka's Exports	Report
37	South Asia Development and Cooperation Report	Report
38	Recruitment Business Processes	Report
39	The Double Burden and Gender Barriers: A Causal Analysis of a Policy on Female Labour Migration from Sri Lanka	Report
40	Migration and Development Country Assessment to Identify Current National Goals and Priorities to Mainstream Migration into	Report

	Development Strategies of Sri Lanka	
41	Student Migration - Analysis of Student Migration from Sri Lanka	Report
42	Towards a Developed Urban Transportation System: Lessons for Sri Lanka	Report
43	Comprehensive Mapping and Assessment of Reintegration Measures in South Asian Colombo Process Member States (Afghanistan, Bangladesh, India, Nepal, Pakistan and Sri Lanka)	Report
44	Country Assessment of the Linkages between Climate Change, Environmental Degradation, and Migration in Sri Lanka	Report
45	Protecting Migrants' Rights and Promoting Decent Work with the South Asia Centre for Labour Mobility and Migrants (SALAM)	Report
46	Regional Project Development Support for the South Asia Subregional Economic Cooperation Operational Plan, 2016-2025	Report
47	Enhancing ADB's Support for Social Protection to Achieve the Sustainable Development Goals - Social Protection (Sri Lanka)	Report
48	Comprehensive Landscape Mapping of Current Social Protection Systems in Sri Lanka	Report
49	Covid 19 Household Impact Survey	Report
50	The New Face of Hunger: Call for Proposals for Evidence-based Policy Responses for the COVID-19 Crisis	Report
51	Demand for Private Tutoring during COVID- 19: An Initial Scoping Exercise for Sri Lanka	Report
52	Recovery of the Apparels Sectors of Bangladesh and Sri Lanka from the COVID- 19 Crisis: Is a Value Chain based Solution Possible?	Report

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53	from COVID-19	Report
54	Impact of the COVID-19 Pandemic on Economic, Social and Environmental Pillars of SDGs in Sri Lanka	Report
55	Impact of COVID19 on Recent Migrant Workers and their Families in Sri Lanka	Report
56	Artificial Intelligence Framework for Threat Assessment and Containment for COVID-19 and Future Epidemics while Mitigating the Socioeconomic Impact to Women, Children, and Underprivileged Groups	Report
57	Social Protection Expenditure Review and Documentation of the Government's COVID- 19 Social Protection Response (National Consultant)	Report
58	COVID-19 Low Income Household Survey Analysis	Survey Data
	Irrigation Departm	nent
1	Major tanks in Hambantota area	Database and report
	National Aquatic Resource Research a	nd Development Agency
1	Application of biofloc technology (BFT) to tilapia fingerling production using different carbon sources.	Technological innovation for high stocking density culture with minimum water exchange
2	Improving mangrove crab (Scylla serrata) aquaculture through better feed and health management with special reference to popularize the use of formulated feed for crab farming.	Technology developed for formulation of crab feed.

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	Development of culture techniques and	Introduce nontraditional
4	identification of culture grounds for pearl	aquaculture to fisher communities.
	oyster resources in North & East coasts regard	Diversification of cultured aquatic
	to regain the pearl industry in Sri Lanka.	organism species in mariculture
		industry in Sri Lanka
	Preliminary study on cultivating local	Provided technical support with
	Aretemia spp. as a collaborative project with	regular monitoring Artemia village
	Palatupana Saltern, Lanka Salt Limited,	programs
_	Hambantota.	
5		
-	Development of Breeding Technology on	Live feed culturing was started for the
6	High Value exotic Ornamental Fish	feeding of brood stock.
	Science and Technology application for the	Supply quality brooders of seven
	improvement, quality enhances to boost the	endemic fishes for ornamental fish
7	export-oriented endemic ornamental fish	breeders/exporters
	industry of Sri Lanka and conservation of rare	
	IISII species.	Davalanad protocol for
	the selected equation learning and production of	Approprieton Species mass
	A quatic plants for the community and In vitro	production and this will enhance
	propagation of Kappaphucusalvar azii	the export earnings.
8	propagation of Kappaphucusatval azh	
	Study the effect of different hydroponic	Efforts to find the most productive
9	culture techniques for the growth	and less water consuming culture
,	performances of aquatic plants in aquaponic	techniques for commercial
	recirculation systems	cultivation
	Development of culture techniques and study	Introducing low cost quality feed for
10	the growth performances of Tubifex worm, in	brooders and fish larvae.
	different organic media	
	Investigation of Grass Carp	Enhance the Grass carp production
	(Ctenopharyngodo n idella) breeding	and control the unwanted aquatic
11	procedure to find out the reason for low	weeds in the reservoirs.
	hatchability	
	Estimation of carrying capacity of perennial	Enhance the production of perennial
12	reservoirs for net cage culture of fry to	reservoirs.
	tingerling stage of commonly cultured food	
	Tisn species in Sri Lanka.	
10	Fromoung community based oyster culture in	Increased aquaculture production
13	iviannar area.	increase the commercial bivalve
		increase household increase and ich
		opportunities especially for women
	Enhancements of community base seaweed	Estimation must be need to
	culture- through the appropriate seed bank and	sustainable management and
1 /	assessment of their ecological importance	effective utilization
14	(Carbon sequestration and habitats	encentre utilization.
	improvement).	
	<u>.</u>	

15	Disease monitoring, prevention and monitoring water quality conditions for health management in shrimp aquaculture industry in Sri Lanka.	Safe guard the sustainability of shrimp aquaculture in Sri Lanka
16	Surveillance of disease prevalence in aquaculture with special reference to ornamental fish, Mud Crab (Scylla serrata) and Giant Fresh water Prawn (Macrobrachium rosenbergii) in selected areas of Sri Lanka.	Surveillance of disease prevalence in aquaculture surely minimizes the huge losses for the farmers.
17	Establishment of Epidemiology unit at National Aquatic Resources Research and Development Agency (NARA) and Establishment of a PCR laboratory facility for shrimp aquaculture research at Pambala and shrimp disease monitoring unit at Baththuluoya, Chilaw.	Provide rapid and better aquaculture health extension services through conducting applied research, quarantine, surveillance and bio- security programs.
18	Feasibility study on pond culture of Asian Seabass (Lates calcarifer (Bloch)) with cost effective formulated feed (Kalpitiya)	Identified of trash fish: NARA formulated feed ration for proper growth of pond cultured sea bass. Feeding of 50% of trash fish + 50% formulated feed seems to be economically viable as well as for expected weight gain.
19	Development of ornamental fish feed and ornamental fish culture at Panapitiya RRC	Developed ornamental fish feed formulas Economical ornamental fish feeds for ornamental fish farmers Quality ornamental fish brooders and other ornamental fish stages for ornamental fish farmers.
20	Enhancements of community base seaweed culture through the appropriate seed bank and assessment of their ecological important.(Carbon sequestration and habitats improvement)	Management measures based on community. Increased alternatives
21	Strategies to increase survival of Macrobrachiumro senbergii stock in culture based fisheries in two selected reservoirs in Hambantota district, Sri Lanka.	Prohibit the usage of monofilament nets within Rekawa and Kalametiya lagoons for the sustainable fishery
22	Assessment of fisheries & aquaculture potential in floodplain ecosystem of Nilwala river basin in Sri Lanka (2019-2020) Community based ornamental aquatic plant propagation and production in selected abandoned lands in MataraDistric	Aquaculre development project Calculate aqucilure potential Introduction of ornamental aquatic plant culture as a cottage industry, Alternative income
23	Monitoring and assessment of small pelagic fishery resources`	Scientific recommendatio ns for formulation of management and development plans/ policies for fishery resources

24	Monitoring and assessment of large pelagic fishery resources	Scientific recommendations for formulation of management and development plans/ policies for fishery resources
25	Study of some biological and fisheries aspects of selected edible finfish species in the demersal fishery in the South-eastern coast of Sri Lanka	Due to the Covid-19 pandemic situation in the country, all the objectives of the project could not be achieved. But based Ongoing on the findings of the study conducted during the rest of the year, necessary information was provided for for the proposed management plan for the demersal fishery in South-eastern coast of Sri Lanka, which will be formulated in collaboration with the Government of Norway under the Norway-Sri Lanka bilateral project.
26	Biological and fisheries aspects and population characteristics of data poor Anchovy fishery in West Coast, Sri Lanka.	Scientific recommendations to complete d ensure sustainable management of the anchovy fisheries in
27	Study of biology, fisheries and population structure of common shark species of Sri Lanka and the status of shark fin trade.	Due to the COVID 19 pandemic situation of the country all data collection could not be completed. But report is preparing with the recommendation s to DFAR for revising the NPOA sharks
28	Sea urchin fishery development in Sri Lanka.	Since fishery resources are in overexploitation level new export oriented fishery can be established with careful management practices and reports were submitted to implement the regulation for sea urchin exploitation to DFAR
29	Assessment of ecosystem health using bio indicators associated with nutrient enrichment and sedimentation on some targeted coral reefs in Sri Lanka	The present status of BRMS is needed for marine tourism development and management for reef-based activities. Since Kalpitiya area is identified as a key tourism potential area, these information is vital for economic development.
30	Strengthening marine fisheries data collection in Sri Lanka	Best scientific evidence and information for the formulation of management and development plans/ policies for fishery resources
31	Fisheries independent surveys in the coastal areas in Sri Lanka	Fish abundance estimation, plankton estimation in west and southern coasts of Sri Lanka using NARA R/V Samudrika

32	DNA barcoding of marine fish species found around Sri Lanka.	When commercially important fish species (eg. Fish species that are exported) need to be identified, these DNA barcodes can be used.
33	Enhancement of quality of fish handled in multiday boats and fish sold in markets, monitoring the safety of shellfish and antimicrobial resistance in the aquatic environment	Facilitation of the multiday fishing boat modification process was completed and the designing of the existing boat modification was completed by NERDC
		Impact assessment of fish quality (chemical, microbiological and sensory) before and after the boat modification Antibiotic Sensitivity Test (AST) was performed on 153 E. coli isolates from water (n= 93) and shrimp (n=60) samples collected from shrimp farms associated with North Western Province, Sri Lanka
34	Control and assessment of risk associated with isolated histamine forming bacteria from the yellowfin tuna industry in Sri Lanka	Cross contamination points in the fish supply chain were identified
35	Aquatic products, process development and popularization • Maldive fish production • Fish burger production	Conducting awareness programs for Maldive fish and dried fish producers (250) in the Dondra, Dickwella and Kottegoda areas of the Southern Province of Sri Lanka Field inspection and Environmental impact assessment of working sites of selected 46 applicants. Preparation and submission of major proposal for Agriculture Sector
		Modernization Project- Value Chain Development Programme. Finalizing and submitting the individual files of selected applicants
	Development of value-added products using aquatic Resources	The development of seaweed incorporated biscuits suitable for commercialization
36	Contamination and biogenum plation of Heavy	
37	metals PAH and pesticide residues in fish during postharvest handling and landing stage of fishery in selected harbors inland reservoirs and lagoons in Sri Lanka	fish from Chilaw, Negombo and Rekawa lagoons
38	Application of Bio Nanotechnology in Value Addition to Aquatic Resources: Preliminary study on analysis of bioactive compounds from selective marine sponges (Marine fauna) and seaweeds (Marine flora)	Basic chemical groups of bioactive compounds (Terpenoids, Flavonoids, Steroids, Glycosides, Phlobatannins, Proteins) were identifie

39	Development of an artificial bait for yellow fin Tuna longline fishery	Suitable artificial bait for Sri Lanka
40	Study of flotsam associated fishery in offshore to Introduce management strategies for sustainable fishery	50% of skipjack tuna are immature & under size fish and 100% of yellowfin tuna are immature & undersize, which was caught ring net fishing, thus continuing of ring net fishing activities in present conditions will be a severe issue in Sri Lanka fisheries in near future. The targeted species; Indian scads, and trigger fish are matured. But rainbow runners are immature and it varies from 80-100 %.
41	Development of Fish aggregating devices to enhance the marine habitat, enhance the coastal fishery and for eco-tourism activities	
42	Development of Coastal Water Quality Index (WQI) for Southern Beaches: A road to the Blue Flag Certification	Water quality index for the selected beaches
43	Study on marine litter and microplastic abundance in the sediments, fish & other aquatic species in the coastal area of Sri Lanka	Overview of the micro plastic contamination in different species, sediments, etc. Provide recommendation s to relevant government authorities minimize the contamination of micro plastic in aquatic ecosystems
44	Nutrient dynamics and agrochemical impact to inland fish and aquatic resources in Walawe River Basin	Overview of the WRB
45	Study on current status of water pollution levels in Daduru Oya river basin in Sri Lanka basin for Environmental Pollution Assessment	Study on current status of water pollution levels in Daduru Oya river basin in Sri Lanka basin for Environmental Pollution impacts of above pollution sources on the health of the fresh water quality and biodiversity. In addition, these research findings will help to Findings to improve aquatic health and conservation strategies and help to management of the aquatic resources. Also, it helps for betterment of the fresh water fishery industry and contributes to economic development of the country improve human health.
46	Assessment of Environmental Pollution Impacts of coastal fishery at selected landing sites in Southern Province, Sri Lanka.	Overview of fishery discards in the Galle Fishery District Incorporation of ecosystem approach

		to fisheries.
47	Identification of most appropriate freshwater fish species as a biological indicator for Environmental pollution assessment in Kelani River basin Sri Lanka	NARA annual report containing all the research findings is submitted to the Ministry of Fisheries and the Parliament of Sri Lanka.
48	incidents such asOil Spills, algal blooms and fish kills (Emergency studies)	Reports
49	Assessment of Pollution Status of Selected Fishery Harbours in the Western and Southern Province of Sri Lanka.	Identified the status of water safety and quality of Fishery Harbours in Southern province.
50	Developing the Environmental Studies Division - Laboratory for the Laboratory Accreditation	Institutional strengthening in service quality researches by laboratory accreditation.
51	Xpress Pearl Damage Assessment	Assessment of damage happened to the environment due to Xpress Pearl ship incident
52	Assessment of socio-economic adaptations taken by fishers on climate change scenarios	Developed vulnerability map of Sri Lanka to show the spatial distribution of risk of climate change. Policy Recommendations to mitigate risks and strengthening of data on climate change
53	Value Chain Analysis of Export-Oriented Marine Fin Fish in Sri Lanka	Mapped the value chain of export- oriented fin fish in Sri Lanka. Recommended measures in improving value chain performances
54	Assessment of Socio-economic status and Benefit cost of farming systems of Penaeusmonodon and Litopenaeusvannameiin Sri Lanka	Developed a sustainable farming model. Recommended measures for economically feasible shrimp farming practices.
55	The Fisheries Information Centre (FIC) of NARA	Increased availability of fisheries information for all stakeholders and general public
56	Climate change impact on Ocean Environment	Technical information for the policy planning for climate change impact to the oceanic environment.
57	Geological and geophysical investigations in continental shelf of southwestern and eastern coast of Sri Lanka	Polity planning and coastal development (sad mining)
58	Hydrodynamic studies for sustainable management of lagoons	Confirmation of Natural flow which affecting by natural or anthropogenic activities and continues water budget estimation
59	Coastal and Stability Protection Measures: The Sand Engine Nourishment: A Solution to Beach Erosion Management of Marawila	Met-Ocean data report for Dikkovita harbor areas for LNG/Oil & Gas project- Hayleys Energy Services, Sri

	Beach in Sri Lanka.	Lanka
60	Re-establishing the offshore oceanographic survey capability	Fabricated some spare part using locally available materials.
61	Monsoonal influence on the dispersion of microplastics and marine debris in sub-surface marine waters around Sri Lanka (phase – i)	Technical information for the policy planning of coastal environmental protection.
62	Ocean status forecasting and oceanographic data base	Sri Lanka is vulnerable for the sea level rise, Climate change impact.
63	National Charting program i.Bathymetric data acquisition for Nautical chart Mannar Island ii.Project on an assessment of tidal asymmetry around the Sri Lankan coast line.Establishment of automatic tide gauges at Amaduwa,Patanan gala,Kirigalbay,O kanda and Panama.	Nautical chart of mannar Island Tidal data at Amaduwa,Pata nangala,Kirigal bay,Okanda and Panama
64	Establishment of database and online data processing unit for crowd sourced bathymetry parallel with the Seabed 2030 global mapping project of General Bathymetric Chart of the Oceans (GEBCO), Nippon Foundation. Updated the database with the collected crowed sourced bathymetry within the EEZ of Sri Lanka	Updating database and the bathymetric model using Crowd sourced bathymetry
	National Building Research	Organization
1	Strengthening the prediction power of landslide hazard zonation maps by incorporating zone based rainfall threshold through infiltration modelling	To develop a deterministic method for landslide prediction and prepare susceptibility and hazard map considering initiation and runout
2	Utilization of textile waste in development of fiber reinforced paving block applicable for outdoor sports surfaces	Fiber reinforced paving block
3	Determination of regional and local thresholds for Sri Lanka	Rainfall thresholds development based on catchment scale
4	Assessment of Indoor Air Quality in Urban Residencies and Use of Plants to Improve the Air Quality	Study the indoor air quality and its impact on residents in domestic buildings in urban areas and assess the effectiveness of ventilation conditions of domestic buildings in urban areas to comply with the indoor air quality guidelines

5	Study on the monetary impact on planned Head office Overhead due to Contract Prolongation	To minimize the loss of head office overhead due to contract prolongation
6	Retrofitting of community centre at Makaldeniya estate for Meeriyabedda landslide victims	To retrofitter and improve the Makaldeniya Estate Community Center
7	Building of hazard resilient model house in Polonnaruwa	To showcase and promote resilient construction practices and technologies that can serve as an example for the local community
8	Hazard identification structural assessment of damaged houses situated in the Hingurakoda DSD and provide recommendations for resilient house construction	Improving the structural integrity of houses to withstand and mitigate potential hazards more effectively
	National Engineering Research & I	Development Centre
1	Development of a farmer level, cost effective cold storage system for extending shelf life of locally grown fruits and vegetables (Phase II) V	Prototype cold room for extending shelf life of vegetables
2	Development of a vegetable dryer with capacity of 25kg providing better quality dried product	Prototype innovative radial flow vegetable dryer
3	Development of machineries required for manufacturing organic fertilizer	A engine mounted or motor operated shredder / cutter (medium scale) A tractor mounted shredder/c utter (large scale) A tractor mounted compost turner Refrigeration and improved storing facility for multiday fishing boats for improving quality of fish
4	Maldives fish dryer for fishing communities	A dryer constructed at a fishing site to produce high quality Maldives fish suitable for fishing community
5	Implementation of fuel wood chips feeding system phase 2	Installed fuel wood chips feeding system at a tea factory Application of wood chips in place of wood logs to generate heat in tea drying in tea industry for improved combustion efficiency and saving of fuel wood.
6	Field testing of Smart Parking Monitoring System	A smart vehicle park monitoring system installed at a public place for demonstration.
7	Public transport bus electronic information system for passengers	A smart vehicle park monitoring system installed at a public place for demonstration.
8	Development of lightweight wall block system for cost effective construction industry	Technology of development of cost effective light weight wall construction block

9	Design and fabrication of Automated wall painting device	An auto mated wall painting devise to be used in construction industry
10	Semi-automated tea making and vending machine with adjustable sugar levels	A proto- type Semi automated tea making and vending machine with adjustable sugar levels
11	Preparation of Roofing sheet using of Cellulose Fibers extracted from corn Plant Residues	Process of Preparation of Roofing sheet using of Cellulose Fibers extracted from corn Plant Residues
12	Development of Non plastered smooth finished full wall system for cost effective construction Industry	Technology of construction of light weight wall using form concrete and cement mixture
13	Smart Agricultural Sprayer	Smart Agricultural Sprayer to monitor the application of fertilizer in tea industry
14	Early Detection system for Landslides and structural stress	Development of an extensometer for detection of earth quake
15	Remote data acquisition and monitoring system for a vegetable cooler in the rural area	Technology for emote data acquisition and monitoring system for a vegetable cooler in the rural area
16	Development of Coir extracting machine	A safe feeding system for feeding coconut husk in to traditional coir extracting machine
17	Design and development of dryer for coir pith drying	Locally designed and fabricated rotary dryer foe drying coir pith
18	Design, fabrication installation a pilot plant for bio char reactor for compost residue	A pro- totype bio char producing system from compost residue installed at Karadiyana compost site.
19	ICU Access control system with disinfectant sensing	Technology of ICU Access control system with disinfectant sensing
20	Development of Oxygen Concentrator	Locally fabricated oxygen concentration system to be used in hospitals.
	National Institute of Fundan	nental Studies
1	Earth Resources and Renewable Energy	
2	Environmental Science Research Programme	
3	Evolution, Ecology & Environmental Biology	

4	Plant & Environmental Sciences	
5	Plant Taxonomy & Conservation	
6	Primate Biology	
7	Condensed Matter Physics & Solid-State Chemistry	
8	Energy & Advanced Material Chemistry	
9	Material Processing & Device Fabrication	
10	Nanotechnology & Advanced Materials	
11	Microbial Biotechnology	
12	Microbiology & Soil Ecosystems	
13	Rhizobium Project	
14	Molecular Microbiology & Human Diseases	
15	Food Chemistry	
16	Natural Products	
17	Nutritional Biochemistry	
18	Quantum Physics & Applied Electronics	
	National Institute of Postharve	st Management
1	Mitigating rice stickiness to enhance consumer preference through accelerated aging of fresh paddy.	Quality improved parboiled rice
		127

2	Investigation of nutritional and medicinal properties of value added products from sour soup (<i>Annona muricata</i>).	Developed value added products
3	Development and performance evaluation of washing equipment for carrot (Daucus <i>corotaL</i>) combined with ozone treatment.	Fabricated washing equipment
4	Enhancement of quality characteristics in dehydrated fruits by optimizing process parameters of dehydrating technologies.	Quality improved dehydrated products
5	Study on present status of postharvest practices & loss assessment of selected agricultural food crops	Identification of current postharvest losses in selected fruits and vegetables
6	Economic analysis at different postharvest stages and farmers willingness to store of selected economically important food grains	Identification of storage need and the requirements
7	Design and development of monkey and rat repellent device	Fabricated equipment
8	Reduction of postharvest losses of <i>Allium</i> <i>cepa L. aggregatum</i> group by improved postharvest technologies	Reduction of losses during curing and storage
9	Potential of substituting wheat flour by jackfruit and breadfruit flour in food products and evaluating their functional properties and sensorial attributes	Versatile products
10	Effect of carbohydrate profile and gluten content for the replacement of wheat flour with <i>Dioscorea alata</i> (raja ala)	Developed products
11	Survey on rice mills and other food grinding mills	Data base development
12	Design and Development of a process line for groundnut oil extraction	Production mechanism for quality oil production
13	Development of a science based protocol for postharvest handing of Avocado	Handling protocol for avocado
14	Design and Development of process line for extraction of cashew nut shell oil in Sri Lanka.	
15	Effect of different fruit covers on postharvest quality of mango and guava.	
16	Development and quality evaluation of osmotically dehydrated fruit pieces.	

17	Development of organic rice based dairy free drinks.	
18	The effects of different fruit covers on postharvest quality of guava	
19	Quality improvement of selected fruit varieties by using freeze drying technology	
20	Development of Moringa enriched tomato based soup cube	
21	Identification of suitable low temperature storage condition for green chilli and condition in treatments before retailing	
22	Artificial ripening of mango using solar evaporative cooling technology	
23	Improving the postharvest quality of banana(using the Cavendish banana variety)	
24	Development of probiotic frozen yoghurt by incorporating soursop	
25	Development of avocado based supplement	
20	National Plant Quarantin	ne Services
	Morphological characterization of	
1	Streptomyces spp associated with imported seed potatoes in Sri Lanka and their molecular detection	
2	Exploration of the efficacy of different seed treatment methods for grow out test in detection of viable seeds in export oriented coirbased products	To shorten the time required for grow out test done for export coir products
3	Investigation on the presence of <i>Xylella</i> <i>fastidiosa</i> ; quarantine pathogen in potential host plants in Sri Lanka	To confirm that the Xylella fastidiosa is absent in Sri Lanka
4	Identification and characterization of causal agent of soft rot in Aglaonema spp. by biochemical and molecular means and introduction of suitable control measures	To identify the causal organism of soft rot in <i>Aglonema</i> spp. To characterize the causal organism with biochemical means To characterize the causal organism with molecular means
National Science Foundation		
1	Industrial fruit waste derived ingredients for commercial food production	Create a food company to help for the socio-economic development of the country
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2	In vitro and in vivo screening of newly introduced forages for sustainable intensification of dairy production in the context of climate change	Socio-economic development of the country Knowledge creation and knowledge enhancement
3	Investigation on biological control measures for white root disease of rubber to improve integrated disease management strategies	
4	Development of in-country ethephon formulations to promote low- cost harvesting systems for rubber plantations in Sri Lanka	
5	Bacteriophage-mediated biocontrol of soft rot in carrots (<i>Dacus carota</i>) caused by <i>Pectobacterium</i> spp. in Sri Lanka	
6	Effect of virgin coconut oil and selected edible oils on the intestinal absorption of chlorogenic acid: an <i>in vivo</i> and <i>in vitro</i> study	
7	Photon upconversion as a tool to harvest infrared radiation for direct illumination in the dark and to fabricate dye-sensitized solar cells to generate electricity under illumination as well as in the dark	
8	Design and synthesis of novel pullulan and chitosan-based nano-polyplexes for gene therapy	
9	<i>In vitro</i> evaluation of biocompatibility and antimicrobial properties of Hydroxyapatite Nanoparticles and their composites derived from naturally occurring Sri Lankan minerals for biomedical and water purification applications	
10	Development of effective sunscreen formulations from Sri Lankan medicinal plants	
11	Chemistry and bioactivity of endophytic fungi from four popular condiment plants <i>Curcuma</i> <i>longa</i> , <i>Myristica fragrans</i> , <i>Syzygium</i> <i>aromaticum</i> and <i>Zingiber officinale</i> used in indigenous system of medicine in Sri Lanka: Possible applications in health and agriculture	
12	Synthesis of colloidal quantum dots for infra- red photo detection and solar cells	

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13	Computational studies on inhibition of epigenetic modifications of cancer codes	
14	Development of highly efficient and environmentally stable perovskite solar cells and perovskite solar panels by industrially viable methods for power generation	
15	Building a 3D air pollution model for the city of Kandy: a platform to evaluate health outcome	
16	Evaluation of anti- <i>Candida</i> activity of selected medicinal plants in Sri Lanka against oral candidiasis in cancer patients	
17	Studies on mycobacteriosis in freshwater ornamental fish: Identification of risk factors, and clinic pathological features and development of rapid diagnostic technique	
18	Transgenic reconstitution of RNA interference pathway in <i>Pichia pastoris</i> yeast model system	
19	Tick borne spotted fever group rickettsioses in the Central province: type of pathogens, vertebrate reservoir host community composition and tick species involved in circulation and maintenance of pathogens	
20	Optimization of bead-based SELEX for selection of apartmers and evaluation of a novel real time PCR based approach for monitoring SELEX	
21	Genetic Dissection of polyethylene degradation ability of <i>Perenniporia</i> sp isolated from decaying hard woods in Sri Lanka	
22	Investigation of alternative stabilizer for soil and develop low cost, eco-friendly load bearing walling material	
23	Optical injection locking and characterization for direct modulation in optical communication	
24	Novel materials for secondary sodium-ion batteries and proton exchange membrane fuel cells	
25	Optimization of donor acceptor materials for fabrication of efficient solar cells	

26	Novel nanoparticle (M=Ti/V/CdS/CdTe)- graphene based material for lithium ion batteries and solar cells	
27	Development of carbon-based nanomaterial for counter electrodes in dye sensitized solar cells	
28	Development of novel predictive based Smart Distribution Management System (S-DMS) to maximize the rooftop PV absorption capacity of last mile networks	
29	Optimization of biorefinery processes for conversion of rice straw extracted cellulose to platform chemicals	
30	Design, Development and Modelling of a Thermo- Acoustic generator for low grade heat recovery	
31	Diversity, distribution and habitat type of arboreal tiger beetles (Coleoptera Cicindelidae) of Sri Lanka	
32	Micro-fauna and micro-flora diversity in mosquito breeding habitats and their effects on mosquito larvae	
33	Distribution of terrestrial gastropod pests, their seasonal abundance and degree of damage to crops in agricultural lands in Nuwara-Eliya	
34	Systematics and phylogenetic relationships of Murine rodents of Sri Lanka	
35	Studies on ecology of <i>Typha angustifolia</i> , its current and potential uses to develop a community-based management strategy to control its invasion in the Man & Biosphere (MAB) wetland reserve at Bundala	
36	Taxonomic study of the Sri Lankan species, belonging to Family <i>Elaeocarpaceae</i>	
37	In-vitro assessment of insulin sensitization and anti-adipogenic effects of selected antidiabetic plant extracts	
38	Identify the natural history, clinical manifestation, mortality and morbidity of CKD-u patients with two controlled groups.	
39	Establishment of Molecular Biomarkers Based Detection Tools for Early Screening of Human Papillomavirus (HPV) Infection and Association of HPV in Pathophysiology of Cervical Cancer in Sri Lankan Women	

40	A study to evaluate the effect of clinical pharmacy interventions on management outcomes in Chronic Kidney Disease of uncertain etiology patients undergoing hemodialysis in Sri Lanka	
41	Identifying colorectal cancer specific autoantibodies and their role in diagnosis, prognosis and prediction of colorectal cancer	
42	Dengue transmission intervention using lure-based adult suction traps and gravid <i>Aedes</i> traps (GAT): A cluster randomized trial approach in Jaffna municipal area.	
43	Establishment of a center of excellence and a research hub on Diabetes and NCD epidemiology and a national research program on diabetes and non-communicable diseases epidemiology	
43	Development of tools for Screening and Treating Diabetes and related foot Complications Through Biomedical Engineering Innovations.	
44	Innovative tools and strategies for surveillance and control of dengue: 2017 - 2020	
45	Development of an early warning system, a risk map and a prediction model for dengue and establishment of roles of asymptomatic carriers and brackish water derived mosquitoes in dengue transmission in Jaffna District	
46	Study of Risk factors affecting Transmission of Dengue in the District of Gampaha	
47	Developing an effective epidemiological surveillance system for dengue in Southern Province of Sri Lanka.	
48	Proactive Dengue Management System (ProDMS)	
49	Identification of the true burden and associated complications of dengue and related viral infections in Sri Lanka and finding long lasting solutions, through in depth understanding of the pathogenesis for development of therapeutic targets.	
50	Strengthening the Cancer Information Systems in the Ministry of Health [Hospital Information System (HIS); electronic Morbidity and Mortality System (eIMMR); National Cancer Registry (NCR)]	
51	Sri Lankan Inherited Cancer Biobank (SLICBB) & Sri Lankan Inherited Cancer Genetic Variation Database (SLICGVDb)	

52	Biomarker Discovery in Haematology- Myelodysplastic Syndromes	
53	Novel Biomarkers of Breast Cancer in Pre and Post-Menopausal Women Predictive of Therapeutic and Prognostic value	
54	Identification of new cancer biomarkers and validating existing biomarkers for the Sri Lankan setting and identification and development of anti- cancer compound libraries	
55	Nationwide surveillance, quantify burden of NCDs, development of case definition and biomarkers for CKDu	
56	An exploratory study on environmental, genetic and dietary determinants of chronic kidney disease of uncertain aetiology based on postmortem tissue analysis	
57	Immunomodulation associated with CKDu progression, of Sri Lanka	
58	Risk Analysis if the Landslides at Morawaka Kanda Area in Matara District	
59	Comparative Analysis of Climate-Resilient Biodiversity of Home garden ecosystems in different Agro-ecological Regions of Sri Lanka	
60	Assessment of Spatial Impacts of Climate Change on Geographic, Economic and Social Vulnerability on the Plantation Sector in Sri Lanka	
61	Understanding the long term influence of Indian Ocean Warm Pool and Indian Ocean Dipole on the monsoon variability of Sri Lanka	
62	Quantification of the response of tropical rain forests of Sri Lanka to varying atmospheric temperature for prediction of the impact of future climate change on their carbon balance and biodiversity	
63	Assessment of vulnerabilities and challenges on Quality of Life (QoL) of national ageing population due to climate change risks	
64	Development of <i>in-vitro</i> protocol for mass production of micro rhizomes of Turmeric (<i>Curcuma longa L.</i>)	
65	A research study to identify suitable location for onion production promotion through true seeds in the potential areas of North province of Sri Lanka	

66	Development of Innovative Shelter Hospital Buildings for Infectious Diseases	
67	Development of an Electronic Detection system for rapid diagnosis of COVID-19 caused by SARS-CoV-2	
68	Enrichment mechanisms of CKDu-risk factors in groundwaters, their uptake pathways and potential remedies	
69	Assessment of aquifer quality in relation to chronic kidney disease with unknown aetiology in dry zone of Sri Lanka through an integrated approach using isotopes and water chemistry	
70	Membrane fouling mechanism and control of high-pressure membrane processes (NF/RO) and electrodialysis (ED) purifying groundwater with DOM and high hardness in CKDu affected areas of Sri Lanka	
71	Genetic characterization of drug resistant Mycobacterium tuberculosis isolates from Sri Lankan and Pakistani TB patients and identification of associated biomarkers	
72	Preparation of cost-effective synthetic skin grafts for the treatment of burns and chronic ulcer wounds: bioactivity directed investigation of angiogenic and cell-migration potentials of plant extracts	
73	Novel urinary biomarkers for early detection of Chronic Kidney Disease of Unknown Aetiology (CKDu) in Sri Lanka	
	Natural Resources Manager	nent Centre
1	AFACI-Development of the Soil Atlas of Asia and National Soil Information Systems	Atlas and Soil Information System
2	Land Degradation Assessment in Kandy, Badulla & Nuwara Eliya through LADA approach	Draft database structure for main land use classes and sub-classes was developed
3	Classification and mapping of agro-ecosystems and Land Use Systems (LUS) in Sri Lanka	
4	Present Status and Future Directions on Adoption of Soil Test-Based Fertilizer Recommendations in Sri Lanka	Research
5	Identification of sources and transport of agro- contaminants in hilly agricultural watersheds in the declared conservation area in Sri Lanka	Research

6	Study of Decomposition and Nutrient Release Patterns of Different Organic Manures	Research
7	Improving Land and Water Productivity of water scarce sloping lands in Mid/Up Country Intermediate Zone through efficient gravity pipe irrigation systems	Research
8	Assessment of Atmospheric Nitrogen Pollution Sources, Impacts on Environmental Sustainability, Human Health and Remedial Measures in Three Unique Pollution Regions in Sri Lanka	
9	Seasonal and monthly agro-met advisories	Seasonal and monthly agro-met advisories
10	Issuing weather-based SMS alerts as a decision- making tool for crop management under sudden unexpected weather changes	Short-term weather reports
11	Effect of Indian Ocean Dipole (IOD) events on inter-seasonal variability of rainfall in the Intermediate Zone of Sri Lanka	Researches
12	Combined effect of EI-Nino southern oscillation (ENSO) & Indian Ocean Dipole (IOD) events on the rainfall regime of Sri Lanka	Researches
13	Variation of the rainfall pattern in the big onion growing areas	Researches
	Office of the Registrar of	Pesticides
1	Determination of residue behavior of some insecticides on maize	Pre harvest intervals established for pesticides
2	Development / Validation of test methodologies andidentification of toxicity status of twenty selected commonly used insecticides on local honey bee (Apis cerena) to ensure pollinator safety	Pesticides toxicity data base for Apiscerana (local honey bee)
	Palmyrah Research Ir	astitute
1	Study on production of Palmyra health drink powder using spray drying technique	Publication
2	Development of Biodegradable edible film from Palmyrah tuber starch	Publication
3	Green Synthesis of Zn Nanoparticle (ZnO NPs) using Palmyrah Resource and Evaluation of Its Antimicrobial Property	Publication

4	Formulation of a natural liquid soap enriched with carotenoids from Palmyrah fruit pulp and rock salt	Publication
5	A study on the antioxidant activity of Palmyrah based cosmetic products	Publication
6	Formulation of polyherbal cough syrup	Publication
	Plant Genetic Resources	s Center
1	study the storage behavior of selected crop species (chili, brinjal and okra) under hermetic conditions for long term conservation in seed Gene bank	
2	Molecular and morphological characterization of selected traditional rice varieties towards identification of accessions responsible for resistance to Brown plant-hopper	
3	Genetic diversity assessment and evaluation of selected crop wild relatives in Sri Lanka for crop improvement	
	Plant Protection Ser	vices
1	Strengthening the plant protection activities through monitoring and timely management of major pests out breaks including Brown Plant Hopper (PPH), Fall armyworm (FAW) and invasive weed species island wide	Ensuring rapid and effective diagnosis and management systems for pests, diseases and weeds
	Rice Research and Developm	nent Institute
1	Closing rice yield gap (CORIGAP)	Land consolidation, facilitate for mechanization and increase productivity
2	Selection and dissemination of elite salt tolerant rice varieties (AFACI)	Select salt tolerance varieties
3	Clarification of near canopy environment and spikelet sterility of rice	Study the spikelet sterility of rice varieties
4	Efficient water use and management in paddy fields	Technology for efficient water use
5	NARP project on "Improvement of root characteristics of rice varieties along with the new plant type adaptable to LCWZ 2020-2023	To develop high yielding new rice varieties with good root structure

6	Rice variety selection for LCWZ through farmer participatory	Select desirable rice varieties for LCWZ
7	Integrated weed management approach in DSR	Integrated Weed mgt package
8	Novel Phosphorus bio-fertilizer on seed production of rice	To reduce the Phosphorus fertilizer usage in rice cultivation
9	Brown leaf spot and grain discoloration of rice	Identification of resistant & susceptible sources and management of the disease.
10	Productivity improvement of rice through maximizing K and water	Productivity improvement
11	Study the Morpho-physiological characteristics to enhance the yield	Development of new rice varieties with high yield
12	Long term effect of single application of Biochar	
13	Novel breeding tool to develop Gall midge resistance rice	To develop GM resistant rice lines
14	Germplasm study on drought tolerant of rice	To select drought tolerant rice lines/varieties
15	Development of reliable screening technique for Fe toxicity tolerance	To develop reliable screening technique for Fe toxicity tolerance
	Rubber Research Ins	stitute
1	Breeding Selection and Evaluation of new Genotypes using Conventional and Molecular Breeding Strategies	 Adding 50 new widning the gene pool with superior Add minimum genotypes to the evaluation Process Conservation the breeding pool for future use Strengthen the breeding pool
2	Improvement of nursery and propagation techniques, field establishment and immature upkeep	Reduction of cost of production, Productivity improvement
3	Intercropping diverse crop species with rubber for land productivity improvement and additional income generation	Land productivity improvement and additional income

4	Testing of different tapping systems for better bark management and productivity improvement	Productivity improvement
5	crop protection and microbiological aspects to improve the sustainability of rubber plantations.	Successful disease management
6	Studies on the New Leaf Disease	Correct disease diagnosis and Successful disease management
7	Evaluate the effectiveness of environmental friendly agro-management practices for enhancing fertility in rubber soils	Enhance plant growth
8	Introduction of new fertilizer mixtures for nontraditional rubber growing areas	Enhance soil fertility and plant growth
9	Effect of nutrient management on the Pestalotiopsis disease in rubber	Enhanced plant growth
10	Establishment of site specific management zones under traditional rubber plantations for variable rate fertilizer (VRF) application via geo-spatial and geo-statistical approaches	Enhance soil fertility and plant growth
11	Evaluation of the Effect of micro nutrient and Silicon for growth performance of rubber nursery plants	Enhanced rubber nursery plant growth
12	Issuing certification for land suitability, site specific fertilizer applications and analyzing fertilizer samples	Optimize fertility usage efficiency
13	Research, development and commercial introduction of low intensity harvesting strategies	Sustainable harvesting stratergies
14	Research and development on biochemical and physiological aspects to improve the sustainability of rubber farming	Productivity improvement
15	Expansion of rubber cultivation to nontraditional areas	Issuance of recommendations for drier climates
16	Improving the reliability of interpretations of research projects through appropriate statistical	Reliable recommendations through appropriate statistical methodologies (Experimentations, Analysis & Interpretation)
17	Analysis on Socio-economic implications & sustainability issues of rubber cultivation and different	Provision of policy directives for rubber products manufactures
18	Establishment of accredited laboratory and enhancement of testing facilities for rubber industry in Sri Lanka	Introduce new test methods request from the industry Training programmes on laboratory testing

	Seed Certification Service		
1	Studying seed longevity of Spinach (Basella alba L.) under ambient and low temperature storage conditions	Information on lifespan of the seeds that can be used for planting purposes	
2	Determination of most suitable pod range for the seed yield and quality of Okra	Seed quality enhancement through upgrading the seed production technology of Okra	
3	Studying the possibility of using the pods of side branches of the okra plant to produce seeds	Recommendation to seed producers on possibility of using the pods of side branches	
	Sri Lanka Atomic Energ	gy Board	
1	J020214 Advancing Maintenance, Repair and Calibration of Radiation detection equipment	Development of Personal Radiation Detectors with networked operation and alarm integration	
2	RAS 7028 Enhancing Regional Capabilities for Marine Radioactivity Monitoring and Assessment of the Potential Impact of Radioactive Releases from Nuclear Facilities in Asia pacific Marine Ecosystems	Determination radioactivity level (both natural and anthropogenic) in Sea water and Sediments	
3	RAS 7037 Enhancing Wetland Management and Sustainable Conservation Planning	Stable isotope applications for Trophic level discrimination for aquatic fish species	
4	Pilot project on Geochemical Approach on Verification of the Origin of 'Ceylon Tea'	Development of Ceylon Tae origin verification model	
5	IAEA CRP 21090- Developing a screening method to detect palm oil adulteration in coconut oil using FTIR technique	Developed methodology for the screening of adulterated coconut oil with palm oil using FTIR-ATR	
6	IAEA RAS 5087, Promoting irradiation by EB and X-Ray technology to enhance food safety, security and trade	Knowledgeable decision on establishment of EB/X –Ray irradiator	
7	IAEA/RCA Project -RAS/7/035: Enhancing Regional Capability for the Effective Management of Ground water Resources using Isotopic techniques	Natural and anthropogenic pollutants/ contaminants identified in the shallow coastal aquifer system from Colombo- Negombo comprehensive report on groundwater dynamics quality and contaminants of CN aquifer system outcome policy document	
	Sri Lanka Institute of Nanotech	nology (Pvt)Ltd	
1	Development of sensor platform	New sensor material	
2	Development of nanocomponent site 1	New composite material	

	Development of nanocomponent site 2	New composite material
3		
	Development of filter material	New filter material
4		
5	Development of an additive for latex foam	New additive material
	Sugarcane Research II	nstitute
1	Enrichment of Saccharumgermplasm through local expeditions/importation and quarantine	Enrichment of germplasm
2	Conservation of Saccharumgermplasm	Enrichment of germplasm
3	Hybridization for 2021 series for commercial attributes and true seed processing	Selection of sugarcane varieties for commercial cultivation
4	Seed sowing and establishment of seeding nursery	
5	Varietal evaluation – stage 1,2, and 3	
6	Preliminary evaluation of sugarcane varieties	
7	Multiplication of sugarcane varieties	
8	Evaluation of sugarcane varieties at Uda Walawe	
9	Evaluation of sugarcane varieties in different sugarcane growing areas in Sri Lanka	
10	Clonal selection of 200 sugarcane families of SL 2018 series through family evaluation	
11	Evaluation of genetic variability of Saccharumofficinarum through in vitro mutagenesis in callus culture technique	Evaluation of eliminate unfavorable features from promising varieties
12	Gene expression studies related to the sugar content and maturity of variety SL 96 128	Develop a protocol to identify maturity patterns easily

13	Detection of transmission of WLD phytoplasma through true-seeds in inter and intra-specific hybrids	Identification of systemic disease transmission through true seeds
. 14	Characterization of Sofficenarum using molecular and cytological methods	
15	Evaluation new sugarcane varieties of 2003 series for maturity patterns	Identification of maturity pattern 2003 series for maturity patterns
16	Investigation of follow management practices in sugarcane faming in the dry zone of Sri Lanka	Recommendation for follow management practices
17	Testing new herbicides identified for weed control in sugarcane in 2021	Identification of new weedicides
18	Investigation of effect of polythene mulching for weed controlling in sugarcane	Identification of that polythene mulching improve tiller ting capacity
19	Analysis of agro-meteorological conditions of major sugarcane growing areas in Sri Lanka 2021	Collection and providing agro meteorological data to relevant parties and department of meteorology
20	Assessment of soil water balance and water productivity in rain-fed sugarcane in Sri Lanka	Establishment of crop coefficient curves for sugarcane grown in Sri Lanka
21	Production of seed cane and expansion of sugarcane cultivation for small scale processing industries in Kilinochchi.	Providing of quality seed cane to sugarcane growers
22	Development of organo–mineral fertilizer for sugarcane by using low-cost sugarcane industry by products	Increasing fertilizer use efficiency and reduce wastage
23	Revision of Fertilizer recommendations for Sevanagala, Pelwatte ,Siyambalanduwa and Hingurana.	Increase productivity and profitability of sugarcane
24	Evaluation of response of the sugarcane variety SL 96 128 for N K and Zn on its cane yield and quality parameters	Increase productivity and profitability of sugarcane
25	Evaluation of the suitability of compound fertilizers for sugarcane cultivation in Sri Lanka	Provide useful information on using compound fertilizer in sugarcane
26	Analyses of soil, plant and sugar samples for other divisions of SRI and sugar companies	Provide analytical facilities for research divisions and sugar industry.
27	Development of IPM package to manage sugarcane pests in Sri Lanka (CP/01/21)	Incorporating novel strategies to the IPM packages of moth borers and WLD vector.

Veterinary Research Institute		
40	Maintenance and upgrading SRI web site	Improve the sugar industry and its technology and research related awareness of the country
39	Provide IT needs of the research conducted by SRI	Improve the quality of the research conducted by SRI
38	Development of appropriate protocol for detection of smut reaction of sugarcane varieties	Accurate detection smut reaction of the varieties
37	Support design conduct and data analysis of research	Improve the quality of the research conducted by SRI
36	Economic assessments of sugarcane cultivation and sugar production in Sri Lanka for year 2020	Introduce policies and measures for the sugarcane industry development
35	Economic assessments of new sugarcane technologies	Minimize cost of production of sugarcane and sugar production continuous
34	Introduction and /or development of appropriate machinery for sugarcane	Making available appropriate machinery for sugarcane
33	Design construction and/or modification of hotwater treatment plants	Making available modified hotwater treatment plant
32	Determining optimum conditions for efficient juice clarification process at local sugar factories	Making available knowledge and technologies for sugar production
31	Development of sugarcane based value added products	Making available knowledge and technologies for sugarcane based value added products
30	Testing sugarcane vairieties for jiggery production	Improving the quality of sugarcane jaggery and syrup
29	Evaluation of the potential of using sugar factory and distillery wastes for the production of a carrier medium for phosphate solubilizing microorganism and the production of bio fertilizer	Production of biofertilizer for sugarcane cultivation
	sugarcane diseases in Sri Lanka (CP/02/21)	eco-friendly disease management of strategies to manage the major sugarcane diseases in the industries Introducing a sustainable, economical eco-friendly disease management of strategies to manage the major sugarcane diseases in the industries
28	Development of IDM package to manage	Introducing a sustainable economical

1	Development of field screening test for antibiotic residues in milk.	Field screening test for antibiotic residues
2	Introduction of serological vaccine matching technique to assess ability of cross protection of locally produced FMD vaccine against field	Confirmation of FMD vaccine
	isolates. Determination of quinolone resistance in E. coli	Submit recommendations to the
3	isolated in Commercial broilers.	DAPH
4	Detection of pathogenesis, phenotypic and genotypic characterization of Eimeria species in Sri Lankan poultry	Submit recommendations to the DAPH
5	Characterization of fowl adenoviruses associated with inclusion Body Hepatitis in chickens in Sri Lanka	Submit recommendations to the DAPH
6	Evaluation of agronomic characters and nutritive values of Napier Hybrid fodder varieties of CO5 and Sampoorna in different harvesting intervals in Yala and Maha seasons.	Submit recommendations to the DAPH
7	Occurrence of Ethanol unstable milk and its relation with physico-chemical characteristics of milk	Submit recommendations to the DAPH
8	Detection of carcinogenic and mutagenic nutrofuran metabolites in animal products.	Establishment of the test
9	Relationship among bacterial counts and somatic cell counts and factors influencing their variation in cow, buffalo and goat milk in four provinces.	Submit recommendations to the DAPH
10	Microbial molecular profiling to determine origin and transmission of Bovine mastitis	Establishment of the test
11	Examine the efficacy of selected probiotics and phytobiotics to replace antibiotics in poultry feed	Submit recommendations to the DAPH
12	Investigation of potential of hybrid fodder and legume varieties as cattle feed	Submit recommendations to the DAPH
13	Development of multiplex PCR to detect causative bacteria of bovine mastitis	Establishment of the test

14	Characterization of bacterial strains for new control strategies in bovine mastitis	Establishment of the test
15	Cattle genotyping for offspring and parent identification	Submit recommendations to the DAPH
16	Investigation of Aflatoxin in cow milk and trace back to feed aflatoxin concentrations	Submit recommendations to the DAPH
17	Establishment of baseline Fatty acid profile of dairy cows under different management systems	Submit recommendations to the DAPH
18	Prevalence of extended spectrum beta lactamase producing Klebsiella in dairy products in central and north western provinces of Sri Lanka	Submit recommendations to the DAPH
19	Correlation of unstable nonacid milk (UNAM) with milk mineral composition, urine pH and body condition score in selected farms in Kandy district	Submit recommendations to the DAPH

Annexure 04: New Products Developed

Arthur C. Clarke Institute for Modern Technologies			
1	Alarmwear-Handheld/LED Strip device with mobile		
2	Temperature Monitoring/Controlling System for Poly tunnel		
3	Real-time river water level information system (IoT product)		
4	Quad copters for Sri Lanka Navy (Special Boat Squadron)		
Coc	onut Research Institute		
1	Edible film		
Dep	artment of Census & Statistics		
1	Android applications		
Dep	artment of Export Agriculture		
1	Mosquito repellent stick using cinnamon and citronella		
Field	d Crops Research and Development Institute		
1	Crop improvement-Chilli-WORLDVEG' germplasm and local inbred line		
2	Crop improvement-Chilli- local hybrid MICHHY 01,		
3	Two high yielding onion varieties were released		
4	Ten numbers of germplasm exploration and crossings with local and exotic lines		
Hor	ticultural Crop Research & Development Institute		
1	Nutrient enriched orange flesh sweet potato noodles		
2	Production of ice-cream, a novel product enriched with β -carotene using Orange fleshed sweet		
NT . 4	potato powder		
1 NAU	Manufacturing fiber reinforced paying block		
	Wanufacturing fiber reinforced paving block		
	Cour cour loof too rule frozen up surt		
1 2	Sour soup lear tea, puip, frozen yogun		
2	Vegetable washer		
3 	Value addition of pumpling color bioquite, coup mig. flour		
4	Value addition of pumpkin: cake, biscuits, soup mix, flour		
Э	2020		
Nati	onal Research Council		
1	CVD 20-09		
	Development and quality evaluation of the immune booster food formulation as a nutrient		
2	$\frac{19}{CVD} = 20-24$		
2	Proof of principle for development of an antigen detection rapid diagnostic test for the diagnosis		
	of SARS-COV2 infections		
3	A 3 ¹ / ₂ month age rice line AERON 9-3 suitable for rainfed cultivation was completed all adaptability testing in farmer fields and will be nominated to Variety Release in 2021		
Nati	National Science Foundation		
1	Develop a combination of sensor detection system to overcome the technical and non- technical problems encountered during Truck Trailor operations in a road		
2	Fabrication and scaling up of an industrial reactor for the purification of waste oil-water of the service stations		

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3	Production of a coconut de-husking machine
4	Produce bio fertilizer using microbial inoculant
5	Developed low-cost particle filter analyzer for face masks
Palı	nyrah Research Institute
1	Liquid soap
2	Cough syrup
Plaı	nt Protection Service
1	FAWLIGEN
Rice	e Research and Development Institute
1	Produced breeder seeds of about 30 rice varieties and foundation seeds of several rice varieties
2	Efficient agricultural water use and management enhancement in Paddy fields in Sri Lanka
Ruł	ber Research Institute
1	Registration of two native bio pesticides
2	Rubber compounds and base products
Sug	arcane Research Institute
	Introduction of sugarcane jaggery and syrup for Kilinochchi local market by Anavillunthan
1	processing unit
2	Developed database of the sugarcane farming related machinery manufacturers and updated with
	Asia pacific region.
3	Designing and fabrication of two-wheel tractor mounted fertilizer applicator.
4	Development of a fertilizer metering mechanism to apply organic fertilizer pellets made by SRI.
5	Fabricated equipment need for the production of bio char on a laboratory scale.
6	Attending to install of new automated HWP at Ethimale Plantation (Pvt) Ltd as a collaborative
	project.
7	Designing and fabrication of tipping bucket device for run off measurement.
8	Identified SL 07 5931, SL 07 3570 and SL 07 3530 varieties from SL 2007 series for quality jaggery production.
9	Designing of new Jaggery pan to increase production capacity and be suitable with proposed
-	agitation system for Jaggery production unit at Sugarcane Research Institute, Uda Walawe.
Tea	Research Institute of Sri Lanka
1	Spicy Tea Sauce and Method of Preparation

Annexure 05: New Processes		
Cocon	ut Research Institute	
1	Value added jaggery making process	
Depart	ment of Census & Statistics	
1	Development of android applications for e-census and surveys	
Depart	ment of Export Agriculture	
1	Compound fertilizer recommendation for cinnamon	
Fruit F	Research and Development Institute	
1	Six promising pineapple hybrids were selected for further evaluation	
Hortic	ultural Crop Research & Development Institute	
1	Carrot Seed Production	
Nation	al Building Research Organization	
1	Polyester spandex embedded masonry product with shock absorption with water infiltration features	
Nation	al Engineering Research & Development Centre	
1	Preparation of Roofing sheet using of Cellulose Fibers extracted from corn Plant Residues	
Nation	al Institute of Postharvest Management	
1	Oil processing	
2	Paddy parboiling	
Nation	al Science Foundation	
1	Synthesis materials such as gloves, cables, etc. using Sri Lankan dolomite and testing the unique properties	
2	Introduce most effective and efficient colour and clarity enhancement methods such as oiling, waxing, epi axial coating for semi- precious gem mineral	
3	Fabrication of low-cost Polyethylene water treatment plant	
4	Develop a decision support service enhancement through a web portal for agri- food supply chain	
Rubbe	r Research Institute	
1	Graphene oxide was synthesized successfully using graphite as intermediate material	
2	Skim rubber of rubber which is a byproduct of lower quality generated at the Centrifuged manufacturing industry was used to prepare value added thermoplastic natural rubber via melt mixing	
Sugar	cane Research Institute	
1	Incorporation of 29 imported sugarcane varieties (20 varieties from Vietnam and 9 varieties from China) to the sugarcane germplasm and seedlings generated from 25 crosses imported from China for selection program.	
2	Ex-situ conservation of 1,659 sugarcane accessions in duplicate plots at Sugarcane Breeding Station at Enselwatte, Deniyaya, and maintaining the breeder's seed garden with 45 commercial and near-commercial varieties at the Sugarcane Research Institute, Uda Walawe.	

3	Performing 1,025 crosses using field lantern and solution crossing techniques. These crosses are directional for sugar and cane yield improvement and disease resistance (smut, leaf scald and white leaf diseases). Processing of true seeds of these crosses are in
	progress.
4	Multiplication of 27 promising varieties from 2002 series and 27 promising varieties from 2003 series for large scale evaluation at Lanka Sugar Company (Pvt) Ltd, Pelwatta, Gal Oya Plantation (Pvt) Ltd, Ethimale Plantation (Pvt) Ltd and Lanka Sugar Company (Pvt) Ltd, Sevanagala.
5	Multiplication of promising varieties for large-scale evaluation at Uda Walawe; 54 from 2004 series and 25 from 2005 series.
6	Conducting final step evaluation prior to the large-scale evaluation; 23 from SL 2006 series, 24 from SL 2007 series, 22 from SL 2008 series, 22 from SL 2009 series and 58 from SL 2010/2011 series.
7	Evaluating foreign varieties at Lanka Sugar Company (Pvt) Ltd – Sevanagala and Pelwatta, Gal Oya plantation (Pvt) Ltd – Higurana and Ethimale Plantation (Pvt) Ltd – Siyambalanduwa.
8	Maintained the plant crop of the research trial at Sevanagala under rain-fed and irrigated conditions to identify the effect of Urea and Sulphate of Ammonia fertilizers for sugarcane cultivation.
9	Successful laboratory rearing protocols were developed for two predators Euborellia spp (Earwig) Micarspis discolor (Lady bird beetle)
10	Established a platform for drone image analysis using open source software and conducted a preliminary investigation at SRI farm with RGB and Multispectral images.
11	Developed a basic level computer program to collect data from a sensor or human control app and store that data in clouds then that data could be queried when necessary.
12	Conducting preliminary studies to develop sugarcane jaggery incorporated chocolate and muffin.
Tea Re	search Institute of Sri Lanka
1	formulating talc-based Trichoderma asperellum (Tric 33) wettable powder, method of
	preparation and method of application for tea disease management and plant growth enhancement
	Mathematical model-based control system for trough withering of tea
2	
Veterin	ary Research Institute
1	Field screening test for antibiotic residues in milk
2	Detection of carcinogenic and mutagenic nitrofuran metabolites in animal feed
3	Detection of quinolone resistance in E.coli in broiler chicken
4	Multiplex PCR to detect causative bacteria of bovine mastitis

5	Cattle genotyping for offspring and parent identification

Annexure 06: New Technology Developed

Department of Census & Statistics		
1	CS-Pro based android applications	
Fruit R	esearch and Development Institute	
1	Sour sop (Annona) can be successfully grafted in to wel Annona rootstock as in situ condition.	
2	Vegetable cowpea cultivated in between pineapple rows and incorporates in to soil at 45 days after planting (after first harvest of cowpea) can be used as integrated plant nutrient management practice for gaining quality fruits.	
3	Soil application of dolomite at flower initiation with the rate of 15kg /plant reduced yellow sap disorder of mangosteen	
4	Combination of Gibberellic acid (GA3) and Naphthalene Acetic Acid (NAA) could induce parthenocarpic fruits in Annona muricata (Soursop)	
5	Pineapple crown could be used as alternative propagules for commercial cultivation with foliar fertilizer. Crown size did not affect fruit size & quality .Two weeks after planting foliar fertilizer spray up to two months period and follow the DOA recommendation.	
Horticu	Iltural Crop Research & Development Institute (HORDI)	
2	Bio-pesticide- Trichoderma-liquid Farmer acceptance programmes were conducted to familiarized the new IPM technology introduced to control of okra pod borer, brinjal shoot and pod borer and cabbage caterpillars using special moth repellant yellow bulb (570 – 590 nm wavelength)	
3	Individual plant covering with polypropylene spunbond nets was evaluated for three seasons including large scale research field trial	
4	Technology for pumpkin incorporated fruit leather	
5	Application of nonthermal technologies for fruit and vegetable combined cloudy mixed juice processing.	
	Hand sanitizer filing machine	
Nationa	al Building Research Organization	
l Nationa	Casting of Green Masonry Products	
National Engineering Research & Development Centre		
1	fruits and vegetables	
2	Light weight full wall system for construction industry	
3	Remote data acquisition and monitoring system for a vegetable cooler in the rural area	
4 5	25 kg capacity radial flow vegetable dryer Public transport bus electronic information system for passengers	
6	Fuel wood chips feeding system for tea drying	
7	Smart vehicle Parking Monitoring System	
8	Lightweight wall block system for cost effective construction industry	
9	ICU Access control system with disinfectant sensing	
National Institute of Postharvest Management		
1	Dehydration technology	
2 Nations	Introduction of vegetable wasning technology in large scale	
1	export potential of mango var. TomEJC and their management	

2	PPP 18-07: A composition and method of seepage control using fibrous material		
National Science Foundation			
1	A fermentation chamber was developed (Controllable temperature and pressure		
2	Develop an IoT based automation system for cultivating up-country vegetables in low- country areas in medium scale poly-tunnels		
Office (of the Registrar of Pesticides		
1	Pre harvest intervals in maize for 5 pesticides		
Plant P	Protection Services		
1	Fall army worm management using virus		
Rubbe	r Research Institute		
1	Development of two rubber intercropping models		
Sugarc	ane Research Institute		
1	Identification of effective new herbicides, Saflufenacil 68 g/L + Dimethanamide P 600 g/L EC to control weeds in sugarcane at pre-emergent stage.		
2	Identifying that polythene mulching in plant crop of sugarcane produces similar yield compared to chemical and manual weeding under rain-fed conditions.		
3	Identification of the pattern of maturity with crop age of 2003 series varieties i.e. SL 03 336, SL 03 341, SL 03 425, SL 03 442, SL 03 762, SL 03 983, SL 03 1025, SL 03 1077, SL 03 1134, SL 03 5428, SL 03 5441 and SL 03 5445 with different times of planting within the year.		
4	Identification of early maturing new variety SL 03 983 that matured at 10-11 months age and its sugar content reduces after 10-11 months.		
5	Formulated a site-specific fertilizer recommendation model for sugarcane-growing soils under four soil categories based on soil Phosphorous and Potassium concentrations.		
б	Formulated a classification key for sugarcane-growing soils at Sevanagala based on Potassium buffering capacity.		
7	Identified the pattern of adsorption to concentration relationship of soil Phosphorous in sugarcane-growing soils at Sevanagala.		
8	Identified the soil micronutrients status (i.e. Fe, Mn, Zn and Cu) of sugarcane-growing soils at Sevanagala.		
9	Production of suitable combinations of Organo-mineral fertilizer pellets and establishment of a research trial to evaluate their performance on sugarcane cultivation.		
10	Introduction of a soil microbial inoculum for Sevanagala compost preparation		
11	Efficacy of Chlorantraniliprole 0.4%G (w/w) was studied and with the results of plant crop stage it was identified that, Chlorantraniliprole 0.4% (w/w) as an effective chemical for controlling sugarcane moth borers.		
12	Incorporating two management strategies to integrated vector management (IVM)		
13	Intercropping mustard with sugarcane can minimize the secondary transmission of the WLD with no significant differences among mustard integrated and control plots for brix, weight and water shoots, SB and INB populations, soil microbial populations and parasitoid populations		
14	Most effective seed-cane treatment for controlling the primary transmission of major sugarcane diseases was identified. Treatment combinations with 36 and 48 hours cold soak treatment followed by 54 C for 50 min hot water treatment significantly reduce the disease		

	incidence of leaf scald disease, white leaf disease and recorded good germination, yield parameters
15	Screening of 102 varieties in SL 2013 series have been completed and identified 29 highly resistant, 18 resistant genotypes for smut disease and 60 highly resistant, 20 resistant genotypes for leaf scald disease.
16	Finding of biochemical indices namely total phenolic contents in leaves and morphological namely hardness of the bud, Foliage Inclination Angle (FIA) and the number of scale leaves as candidate indirect markers for smut disease resistance in sugarcane. Use of these characters for identification of smut resistance in the varietal selection programs has a significant potential value for early identification of smut resistance in sugarcane.
17	Secondary transmission of the WLD can manage by increasing spacing between two planting rows. Minimum vector populations recorded with 1.5 m and 2 m spacing compared to 1.37 m, with no significant differences among 3 spacing for yield, brix and water shoots, SB and INB populations
18	Recommendation were provided to manage pest and diseases at the requirements a. Pelwatta : Pokkah-boeng disease and termite b. Hingurana : Unknown disease c. Ethimale : Pokkah-boeng Sevanagala: Shoot borer, mite and leaf scald disease
19	Attended to upgrade the electric system, water circulating system and heating unit of existing hot-water treatment plant (HWP) at Lanka Sugar Company Limited (LSCL), Pelwatte.
20	Conducting large mill test at Ethimale Plantation (Pvt) Ltd, sugar factory for analyzing the variety performances of SL 96 128 variety at the factory level.
21	Designing of semi-automated agitation system with 3 degrees of rotation and VFD speed controlling mechanism for Jaggery production unit at Sugarcane Research Institute, Uda Walawe.
22	Analyzed post-harvest deterioration of SL 96 128 and SL 98 2524 varieties based on months of February and July.
23	Updating the costs and returns of sugarcane cultivation based on the prices of the year 2021.
24	Estimating the commercial value of a tonne of sugarcane at Sevanagala, Pelwatte and Gal- Oya sugar industries during the year 2020
25	Analyze the factors affecting quantity of sugar imports and retail price of sugar in Sri Lanka and found that the real sugar import tax and local sugar production quantity significantly affect the quantity of sugar importation and global market sugar price, exchange rate and real import tax significantly influence the local market real sugar price.
26	Estimating the cost of installation of delta trap for insect collection using Indian and Netherland pheromones at Uda Walawe research farm as Rs. 117360/ha and Rs. 44400/ha for using Netherland and Indian pheromones respectively.
Veterin	ary Research Institute
1	Microbial molecular profiling to determine origin and transmission of Bovine mastitis
2	Probiotic phytobiotic mix as an alternative to antibiotic growth promoters in animal feeds to provide to the needy farmers after assuring their performance
3	Multiplex PCR for cattle pathogens
4	DNA profiling with Microsatellite markers

Annexure 07: Liaison Officers Details

No	Institution	Liaison Officer	Designation
1	Arthur C. Clarke Institute for	Mr. Shiran Welikala	Head of the Technology
	Modern Technologies		Transfer Division
	(ACCIMT)		
2	Bandaranaike Memorial	Dr.G.K.P Madhawa	Medical Officer ETU
	Ayurvedic Research Institute		(Orthopedics)
	(BMARI)		
3	Central Environmental	Dr. R.A.C.H. Wijayasinghe	Director
	Authority (CEA)		Planning & Monitoring
4	Centre for Defence Research	Commander (V) DSC	Chief Coordinator, Radio
	and Development (CDRD)	Dissanayake	& Electronics Wing
5	Coconut Research Institute	Mrs. K.V.N.N. Jayalath	Head (Cover-up
	(CRI)		duties)/Agricultural
			Economics & Agribusiness
6	Department of Conque &	Mr. C. A. K. N. L. Abourotno	Statistician
0	Statistics (DCS)	Mr. G.A.K.N.J. Adeyratile	Statistician
7	Department of Export	Mrs. Damayanthi	Director (Special
	Agriculture (DEA)	Samarasinghe	Research)
8	Department of Irrigation (DI)	Eng.(Ms.)	Director of Irrigation
		I.S.Wickramasinghe	(Research support, Process
			Improvement & Training)
9	Department of Measurement	Ms. J S M Silva	Deputy Director
	Units Standards & Services		
10	(DMUSS)		Diversion (Teacharatean
10	Department of National Potenia Cordena (DNPC)	Dr. A. M.A.S Attanayake	Transfer & Research)
11	Earm Machanization Research	Eng Srimohonon Siyolingom	Machanical Engineer
11	Centre (FMRC)	Eng. Shinonanan Sivanngani	Mechanical Engineer
12	Field Crops Research &	Dr. T. Karunainathan	Deputy Director
12	Development Institute		(Research)
	(FCRDI)		(itesearen)
13	Forest Department	Mr. W. D. P Gomaz	Assistant Conservator of
			Forests (Research)
14	Fruit Research and	Ms. A.J. Warusawitharana	Deputy Director
	Development Institute (FRDI)		(Research)
15	Gem & Jewellery Research and	Ms. M.K.C. Jayamali	Research Officer/Geologist
	Training Institute (GJRTI)		
16	Hector Kobbekaduwa Agrarian	Ms. L.A.K.CDahanayaka	Assistant
	Research and Training Institute		Registrar(Programme)
	(HARTI)		
17	Horticultural Crop Research &	Ms Chathurika Ranaweera	Information and
	Development Institute		Communication Officer
L	(HORDI)		
18	Industrial Technology Institute	Ms. Indira Gallage	Library Assistant
	(ITI)		
19	Institute of Policy Studies of	Ms. Dilani Hirimuthugodage	Research Economist
	Sri Lanka (IPS)		Officer

20	National Aquaculture Development Authority (NAQDA)	Mr. Manoj Somarathna	Assistant Director (Planning, Monitoring & Evaluataion)
21	National Aquatic Resources Research and Development Agency (NARA)	Mr. Indika Weligamage	Scientist, National Institute of Oceanography and Marine Sciences of NARA
22	National Building Research Organization (NBRO)	Mr. V.K. Anuruddha	Scientist
23	National Engineering Research & Development Centre (NERDC)	Eng. E A N K Edirisinghe	Act. Deputy Director (R&D)
24	National Institute of Fundamental studies (NIFS)	Ms. K. I.K. Samarakoon	Stenographer Grade I
25	National Institute of Postharvest Management (NIPM)	Mrs. Dr. R.M.N.A Wijewardana	Principal Research Officer
26	National Plant Quarantine Services (NPQS)	Ms. M.H.A.D.Subhashini	Assistant Director of Agriculture (Research)
27	National Research Council (NRC)	Ms. Nadeeka Dissanayake	Scientific / Research Officer
28	National Science Foundation (NSF)	Ms. Dilushi Munasinghe	Scientific Officer
29	Natural Resources Management Centre (NRMC)	Ms. Gayanthi Rahubaddhe	Development Officer (II)
30	Palmyrah Research Institute (PRI)	Mrs. Subajini Mahilrajan	Research Officer
31	Plant Genetic Resource Centre (PGRC)	Mrs. A.N. Abeykoon	Program Assistant
32	Plant Protection Services (PPS)	Mrs. W.M.D.K.Wijerathnayake	Deputy Director (Plant Protection)
33	Registrar of Pesticide Office (RPO)	Ms. Jeevani Marasinghe	Principal Agriculture Scientist (Toxicology)
34	Rice Research & Development Institute (RRDI)	Dr. (Mrs.) NPS De Silva	Principal Agriculture Scientist (Plant breeding- Rice)
35	Rubber Research Institute of Sri Lanka	Mr. Shanaka Dilhan Ratnayake	Biometrician
36	Seed Certification Services (SCS)	Ms. K.K.S.D. Pradeepika	Deputy Director
37	Sri Lanka Accreditation Board for Conformity Assessment (SLAB)	Ms. Chanditha Ediriweera	Deputy Director (Accreditation)
38	Sri Lanka Atomic Energy Board (SLAEB)	Mr. R.M. N. Priyanga Rathnavake	Deputy Director- Promotions
39	Sri Lanka Council for Agricultural Research Policy (SLCARP)	DR. S M P Chandra Padmini	Deputy Director (Research Management)
40	Sri Lanka Institute of Nanotechnology (SLINTEC)	Dr. Chanaka Sadaruwan	Research Scientist

41	Sri Lanka Inventors	Mr. W. I. C. Senaka Kumara	Administrative Officer
42	Sri Lanka Standards Institute (SLSI)	Mrs. Gayani Manchanayaka	Deputy Director
43	Sugarcane Research Institute (SRI)	Ms. B.D. Sandya Kumari Ariyawansha	Senior Research Officer - Economics, Biometry and Information Technology Division
44	Sustainable Development Council of Sri Lanka (SDCSL)	S.L. Hewawaduge	Assistant Director
45	Tea Research Institute (TRI)	Dr. (Mrs.) H. W. Shyamalie	Head, Agricultural Economics Division
46	Veterinary Research Institute (VRI)	Dr.(Ms.)S.S.Iddamaldeniya	Deputy Director (Acting)- Research

Annexure 08 – S&T Institutes (Not responded to the S&T survey)

1.	Department of Meteorology (DM)
2.	Disaster Management Centre (DMC)
3.	Geological Survey & Mines Bureau (GSMB)
4.	Medical Research Institute (MRI)
5.	National Agriculture Information & Communication Centre (NAICC)
6.	National Food Promotion Board (NFPB)
7.	Sri Lanka Sustainable Energy Authority (SLSEA)

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