

Wednesday, November 13, 2019



Daily News



The Technology Activity Park for the Sri Lanka Planetarium

A technology activity park, established on Sri Lanka Planetarium premises with the objective of imparting scientific knowledge to the children of the nation, was declared open on 2019.11.04 by H.E. the President, Maithreepala Sirisena, with the participation of the Hon. Sujeewa Senasinghe, Minister of Science, Technology & Research. Mr. Chinthaka S. Lokuhetti, Secretary to the Ministry of Science Technology & Research, Mr. Anura Disanayake, Secretary to the Ministry of Environment & Mahaweli Development, and a group of officials participated in this event.

WORLD SCIENCE DAY NOV.10

Contributors towards the promotion and popularization of Science and Technology are **Felicitated in celebration of National Science Day**

Science Film Festival 2019



Photographer -
Dulip Nayanapriya

The Prof. M.T.M. Jiffry Memorial Award for Popularization of Science 2018 was awarded to Prof. Rangika Umesh Halwatura, of the University of Moratuwa. This is a life time achievement award, given to Sri Lankan Citizens for their outstanding contribution throughout their lifetime towards the popularization of science among general public.

The celebration of the "National Science Day" organized by the National Science Foundation was held at the BMICH on 1st of November. Secretary to the Ministry of Science, Technology and Research,

Mr. Chinthaka S. Lokuhetti participated as the chief guest of this event. Chairman of the NSF, Dr A.M. Mubarak, Director General of the NSF, Prof. Ananda Jayawardane, Additional Director of NSF, Dr Thamara Dias and many other

officials and guests were present at the event. The theme of the National Science Day programme was "Sustainable Use of Earth Resources". The winners of the school Science Research Projects Competitions and the winners of Inter School Science Society Competitions such as Science Drama, Songs, Viridu, Science Essays, Digital Story Telling and Virtual Bridge Designing were felicitated at the programme. Similarly, the School Science Societies which obtained the highest star ranking, teachers who have promoted science among school community and scientists were also felicitated for promoting science. The special feature of this year's event had been the first ever felicitation accorded to a media professional in Sri Lanka for popularization of science.

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The Ministry of Science Technology and Research celebrates the National Science Day to coincide with the World Science Day falling on the 10th of November each year. With a view to popularizing Science & Technology, the Ministry is co-organizing a science film festival with German Cultural center from the year 2017 onwards through Vidatha Resource Centers Island wide. Science films will be screened for school children, university students & General public in celebration of the National Science Day for the duration of one month's time. The theme of the science film festival 2019 is "climate change and the Environment"



Non-Intrusive Load Monitoring for Flexible Demand Estimation and Management

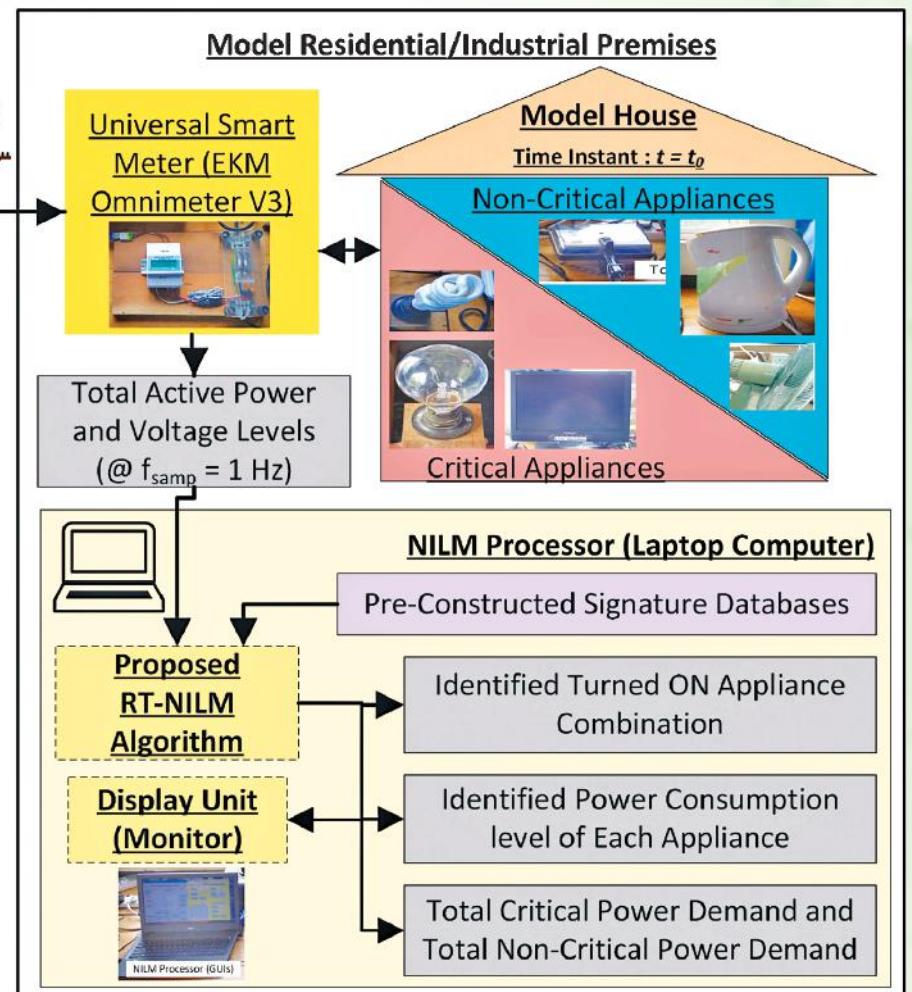
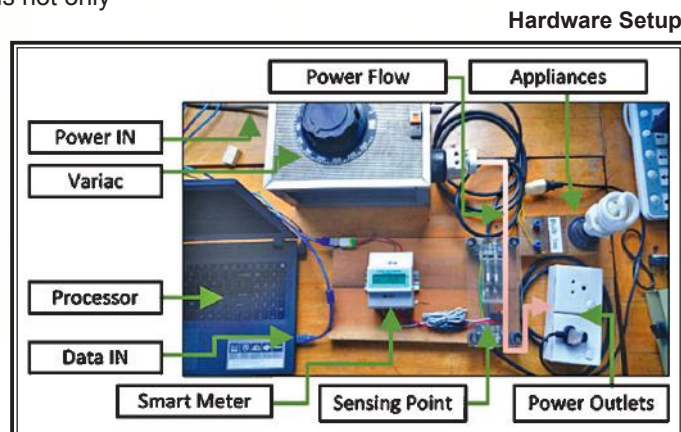
This research project proposes a novel methodology to accurately identify combinations of turned ON appliances in a consumer premises utilizing single active power measurement collected at a low sampling rate. This enables the estimation of flexible load that can be shifted/controlled per resident/industrial user at a given time.

The outcomes of this research will aid the utilities to manage the network such that demand can follow the generation while increasing the efficiency and reliability of power networks. This operational philosophy helps the addition of renewable energy sources thus reducing the dependency on imported fossil fuel. This not only prevents the reduction of our foreign currency reserves but also increases the socio-economic sustainability.

The algorithms developed has the proven ability to function as a standalone system providing the user and the utility with the details of appliance usage in a customer premises in real-time and it also possesses the ability of further advancement

into a tool of predication, demand side management, and distributed renewable generation management. As the system is at a complete state, and a patent is pending there is high possibility of developing it as a commercially viable application.

This study was completed with the financial support provided by the National Science Foundation Sri Lanka under the Research Grant No: RG/2016/EA & ICT/01.



Contact details:

Dr G M R I Godaliyadda

Dept. of Electrical and Electronic Eng.

Faculty of Engineering - University of Peradeniya, Peradeniya

Tel: +94-81-2393431

E-mail: roshangodd@ee.pdn.ac.lk



Acknowledgement



NATIONAL
SCIENCE
FOUNDATION



Department of Electrical and
Electronic Engineering
University of Peradeniya
Deep Vision, Bright Future



Can green tea miraculously cut down your weight???

The tea plant is scientifically known as *Camellia sinensis*.

There are many varieties of tea which are known as white tea, green tea, black tea. Though it all comes from the tea leaf, the make is different, which gives its unique features. It is a common practice to use green tea for weight loss. But green tea alone can not make you slim.

Controlling the calory balance is essential. If the number of calories we take in to our body exceeds the burning amount of calories, the excess causes weight gain.

Green tea is known for its own flavonoid called caffeine and catechin. The caffeine content in green tea

is lower than tea and coffee. Catechine in green tea is a natural phenol that is known as Epigallocate chingallate (EGCG). Green tea also contains vitamin B, folate and Magnesium. Green tea speeds up metabolism and breaks down excess fat through catechin. These ingredients help in fat burning when exercise is carried out. Controlling blood cholesterol and fighting with cancer cells too are significant features of these compounds.

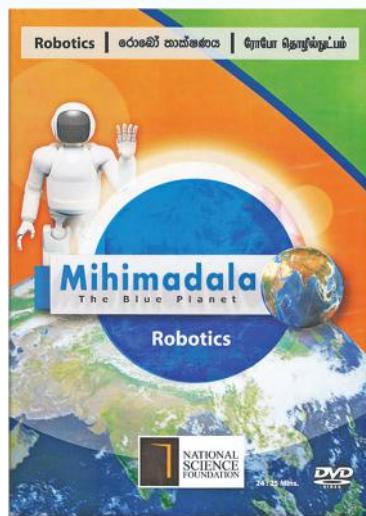
Solely drinking green tea will not help you in weight loss, your dietary control and physical exercises are a must to achieve your target. Do remember that green tea only helps to accelerate the bodies metabolism.



Pabasari Arundathi Koliyabandara
Science Researcher
University of Sri Jayawardanapura

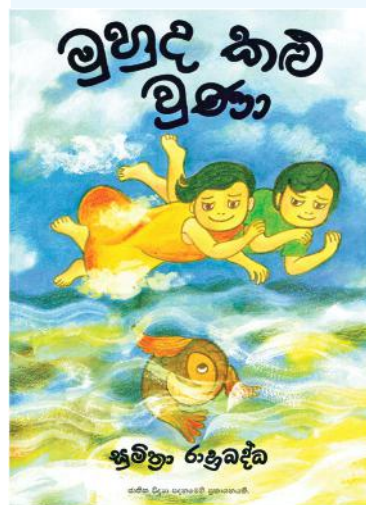
Science Awareness and Scientific Literacy

Science is the foundation of technological advancement which come as a form of knowledge accessible to all. In other words, to become an active and responsible person it is necessary to have good knowledge, understanding, ability for critical analysis of problems faced in day to day life. Therefore, having good basic understanding in science is very important for the community. In this, science education plays a very important role to build up a responsible person that has ability to contribute in the most effective way to the economic development of the country and use scientific knowledge in day to day life and have social responsibility on the actions they undertake in their lives. In this context science popularization has high impact on increasing the science literacy in a country. Science literacy is also identified by some authors as



science communication or public communication of science which has been in discussion among scientific community at a great length of time, but still no definite definition agreed up on the term. According to the United States National Center for Education Statistics, "scientific literacy is the knowledge and understanding of scientific concepts and

processes required for personal decision making, participation in civic and cultural affairs, and economic productivity".

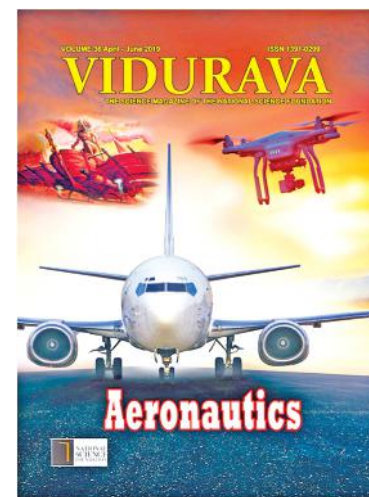


A scientifically literate person is defined as one who has the capacity to:

- Understand, experiment, and reason as well as interpret scientific facts and their meaning.
- Ask, find, or determine answers

to questions derived from curiosity about everyday experiences.

- Describe, explain, and predict natural phenomena.
- Read articles with understanding of science in the popular press and engage in social conversation about the validity of the conclusions.
- Identify scientific issues underlying national and local decisions



and express positions that are scientifically and technologically informed.

• Evaluate the quality of scientific information based on its source and the methods used to generate it.

• Pose and evaluate arguments based on evidence and to apply conclusions from such arguments appropriately.

Many studies conducted on evaluation of scientific knowledge in different countries reported that majority of students do not have knowledge of basic concept of science or its terms. In this instance, it is apparent that science teachers play a significant role in facilitating students' understanding of science, conceptions of scientific inquiry (SI) and the Nature of Science (NOS) and transfer of these knowledge into classroom practices and day to day life.



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Dr PRMP Dilrukshi
Head - Science Popularization Division
NSF

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World Science Day....

NSF conducted several competitions to promote science communication and to make students interested in learning science through aesthetic approach. Accordingly, this years competitions were conducted under the theme "Sustainable use of Earth Resources" and students of NSF school science societies competed at different events for NSF awards. The winners of these competitions are indicated below.

Short Science Drama

- 1st Place** - Nalanda College, Colombo 10
- 2nd Place** - Weeraparakrama Secondary School, Yatawatta, Matale
- 3rd Place** - Kalyani Maha Vidyalaya, Kithulgala

Role-play

- 1st Place** - U.J.C. Akshamal Udugodage, Royal Central College, Polonnaruwa
- 2nd Place** - Umasuthan Thanasri, Manipay Ladies' College, Jaffna
- 3rd Place** - M.K.G.P. Nethsara-



Photographer -
Sulochana Gamage

Jayasooriya, St. Joseph's Balika Vidyalaya, Gampola

Viridu

- 1st Place** - H.B. Tharundi-Rithara & P. Vihanga Sasmika, Naradeniya Central College, Kamburupitiya
- 2nd Place** - R.K.A.R.M.B. Ranawana & P.D.D. Indeewaree, Royal Central College, Polonnaruwa
- 3rd Place** - D.M.A. Chandima Dissanayaka, Alawathugoda National School, Kandy

Song

- 1st Place** - P.D. DuleemaIndeewaree & L.W.P. Thisari Sandasilini, Royal Central College, Polonnaruwa
- 2nd Place** - W.P. Saumya Priyadarshani & R.M. Manoj Subadra, Thambuththegama Central College, Anuradhapura
- 3rd Place** - N.M. Prabashi Vidumini Nishshanka & A.W. Lihini Minoda, Yashodara Devi Balika Vidyalaya, Gampaha

Science Essay

- 1st Place** - W.P. Mayantha Anuhas Wijayarathna, Nalanda College, Colombo 10
- 2nd Place** - M.F. Fathima Fazla, Viharamahadevi Balika Maha Vidyalaya, Badulla
- 3rd Place** - K. Shankarshan,

Skandavarodaya College, Chunnakam

Star Rating - 5 stars (Awarded to most active School Science Societies)

- Swarna Jayanthi Maha Vidyalaya, Kegalle
- Paddiruppu M.M.V, Kalawanchikudy
- Sri Sangamitta Girls' National School, Matale
- Gnanodaya Maha Vidyalaya, Kalutara
- Harischandra National College, Negombo
- Nalanda College, Colombo 10

NSF Award for Teachers in Promoting Science

- Ms. D.P.U.D. Abeysekara, Nalanda College, Colombo 10

Prof. M. T. M. Jiffry Award for Popularization of Science amongst General Public - 2018

Prof. R.U. Halwatura, Faculty of Engineering, University of Moratuwa

NSF Media Award for Popularization of Science amongst General Public 2019

Dr Manoj Prasanna Rathnayake, Assistant Editor, Upali Newspapers

National Science Foundation

According to records, from the early 90's onwards, the North Central provincial community has been facing kidney disease. Although the North Central province has successfully controlled vector borne diseases such as malaria and other diseases, it has not been able to control the kidney disease. Chronic Kidney Disease (CKD) has recently spread through Rajarata as an epidemic. The Ministry of Health spends a large sum of money to treat the patients with chronic kidney disease. Out of the funds allocated by the Ministry of Health for patient care, the largest amount is spent on kidney care which is being increasing yearly. Moreover, we do not have the facilities to treat all patients who need special

metals such as arsenic, cadmium and some even state that it is caused by the consumption of water not suitable for drinking purpose. However, a definitive cause for CKDu problem has not yet been identified. Therefore, it is a timely necessity to be knowledgeable about the prevention of the kidney disease while the experts are looking for remedies. Accordingly, we can prevent chronic kidney disease caused by known and unknown causes. Experts are searching for the causes of the disease and as general public we should be knowledgeable about how to avoid it. With this objective, the National Science Foundation provided financial assistance to publish a booklet on 'How to Avoid

Both kidneys are protected by a layer of fat and muscles on either side of the abdominal cavity of the human body, with a bean shape, and it is about the size of a bundled hand (length, width, thickness 12cm/ 6cm/ 3cm/ weight 120g-150g).

treatment for CKD. The people of Rajarata are perishing day by day because of CKD.

Anuradhapura, the largest district in Sri Lanka, has the highest number of kidney disease patients. At the beginning of 2018, approximately 10,065 kidney patients were undergoing treatments in Anuradhapura district and at the beginning of 2019, the number of patients undergoing treatment in the Polonnaruwa district were 7,467. Chronic Kidney Disease is caused by both known and unknown causes. Different causes are identified every day as being the cause for unidentified chronic kidney disease (Chronic Kidney Disease of unknown origin/CKDu). Some state that it is due to some toxins, some state that this is caused by pesticides or heavy

Kidney Disease', authored by Dr Hema Weerakoon, which was free distributed among general public in North Central Province.

Both kidneys are protected by a layer of fat and muscles on either side of the abdominal cavity of the human body, with a bean shape, and it is about the size of a bundled hand (length, width, thickness-12cm/6cm/3cm/weight 120g-150g).

The kidneys contain more than one million filtration units called nephrons. Blood flowing through the Glomeruli in nephrons undergoes filtration, absorption and secretion processes to form



Acute (short term) kidney diseases

Acute kidney disease is known as the loss of kidney function within a short period of time.

Causes of acute kidney disease

1. Snake bites
2. Wasp bites
3. Leptospirosis
4. Reduction of body fluids (dehydration)
5. Ingestion of certain drugs in high dose

Symptoms of acute kidney disease

1. Decrease urination
2. No urination
3. Body swelling
4. Respiratory difficulties

In addition, there may be other symptoms depending on the cause of acute kidney disease. Acute kidney disease can last for several hours to several days and this condition can be cured with immediate treatment.

The causes and symptoms of chronic kidney disease, the identification and prevention will be discussed in the next issue.



Dr. Hema Weerakoon
Public Health Medical
Officer/PDHS Office, NCP

urine. In this process, waste matter produced in the body including urea, uric acid and creatinine are excreted with urine.

Although human beings have two kidneys, one active kidney is enough for the metabolism.

Kidney Diseases

Kidney disease is known as failure of kidney function. Kidney failure can occur in two stages.

1. Acute kidney disease
2. Chronic kidney disease

Let's get rid of Kidney disease



National Science Foundation, Sri Lanka is proud to unveil the feature packed, new version of its long-standing Science and Technology Management Information System (STMIS) to public. With the introduction of this new system S&T personnel registered in the System will get the opportunity to upgrade their information on their own, thus allowing them to update their achievements in a snap as they earn them. In turn this will ensure that the users who seek information through the STMIS gets the latest information.

STMIS was established at the National Science Foundation in 2004 through Science and Technology Personnel Development Project under the patronage of Asian Development Bank (ADB) by then Ministry of Science and Technology. As mandated by the Science and Technology Development Act, No. 11 of 1994, potential users of the STMIS reach well beyond the scientific community.

For a considerable time, findings in S&T sector have been kept in isolation along with the contributors for such achievements. Information regarding the research

and their findings carried out by the R&D centers and universities in the country usually end up as scholarly publications rather than reaching the public sphere. This has hindered progression of such findings towards fruitful socio-economic ventures contributing to national development. Industrialists and investors who are in search for novel ideas to commercialize or address an existing issue in the country can easily search for such information through the STMIS.

Furthermore, different research groups in their silos have worked on similar themes to produce similar results at the expense of duplication of costly resources. Such groups having common interests could have produced better results while ensuring optimum utilization of resources if they had the knowledge and opportunities for collaboration. Ensuring publicity to such research work and findings, not only benefits the researchers who are engaged in research in the same discipline, but also opens opportunities for multidisciplinary collaborations to draw holistic solutions for a particular issue. With the current technological advancements, such cross-disciplinary collaborations are indispensable to find better solutions in more productive manner. In the above context, STMIS provides ideal platform to promote such collaborations and resource sharing among the scientific community in Sri Lanka.

Sectoral breakdowns in human resources and various other statistics drawn from the STMIS can contribute immensely in policy making for allocation of existing resources as well as for projections and planning for future resources.

The collection of information in the STMIS can benefit the recruiters in head hunting. Features in the new STMIS provide for peer verification of academic accomplishments and career details, making it a reliable source to depend on in sourcing

Get onboard with NSF's all new Science and Technology Management Information System (STMIS)

Leveraging networking in S&T Sector in Sri Lanka

	Address: 406/16/F2, 3rd Lane, Kurubawatta Road, Athurugiriya Address (Work): Department of Engineering Technology, Faculty of Technology, Sabaragamuwa University of Sri Lanka email: markad1@gmail.com Telephone: 0452260081 Telephone: 0767156757 Expertise main: Applied Sciences and Technologies		Last updated: 2019/10/17
	K. Kopyawattage email: kumudupd@gmail.com Telephone: 071 6324988 Expertise main: Agricultural Sciences, K.S.L. Gunawardena		Last updated: 2019/10/10
	Address (Work): Department of IT, University of Sri Jayewardenepura email: research@uap.ac.lk Telephone: +94112881500 Ex 3445 Telephone: +94 77 7316390 Expertise main: Information, Computer Science and Communication Technologies, Social Sciences or S&T Policy or R&D Management,		Last updated: 2019/10/08
	Dr. M. D. Senarath Yapa email: mudtha7@gmail.com Telephone: 077 341 3301		Last updated: 2019/09/27
	T.W.N.K. Perera Address: 219/0, Prime terrace, Malasinghoda road, Holandara - East Address (Work): Department of Microbiology, University of Kelaniya, Dalugama, Kelaniya email: nipunperera129@gmail.com Telephone: 0112156443 Telephone: 0711863108 Expertise main: Biological Sciences		Last updated: 2019/09/26
	Mr. P.M. Wijesinghe Address: No 420/19/T, Mahidarama road, Well pans, Thalawathugoda Address (Work): email: p.m.wijesinghe@broadband.lk		Last updated: 2019/10/01

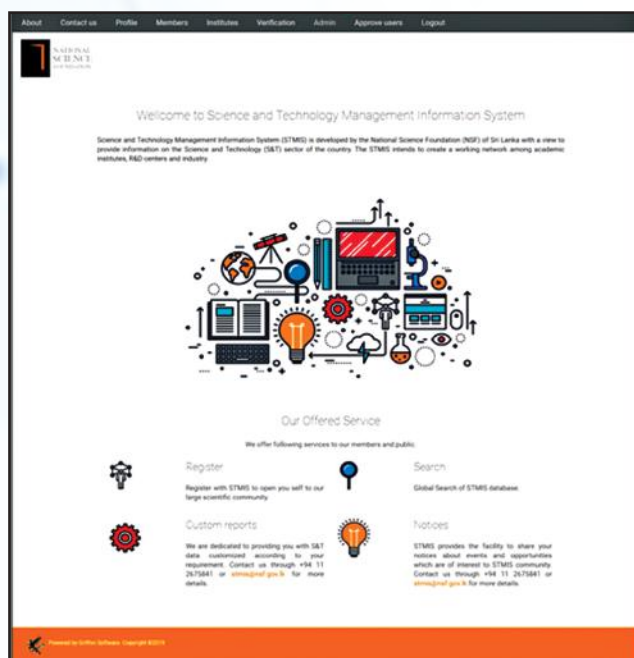
human resource.

While serving as one stop information source on science related expertise in the country, STMIS provide several other facilities. The S&T personnel who are registered with the STMIS are kept abreast with opportunities that are available to them locally and internationally. This include information regarding scientific fora for awareness and capacity building, opportunities for funding and collaboration and career opportunities such as scholarships, fellowships and vacancies. On the other hand, organizers of such events and institutions involved in funding could benefit from the STMIS since it directly routes the message to the beneficiary increasing the responses, subsequently the impact. Throughout the years STMIS has maintained its reputation in provision of information regarding available local expertise for specific purposes. Many requests from various stakeholders have been received and fulfilled which inevitably increased the visibility of the registrants and opportunities they get.

Apart from information regarding S&T personnel, STMIS act as a repository to gain information regarding S&T related institutions in the country. Information regarding various services and trainings provided by them and availability of high-tech research equipment is being added to the System to make it more comprehensive.

STMIS from its inception thrives for gradual progression in serving the needs of its stakeholders by positively working on suggestions made by them. While inviting you to explore the STMIS at <http://stmis.nsf.gov.lk/>, The National Science Foundation highly welcome your suggestions for further advancement of this national asset to better cater your needs in future.

Chamika Dharmasena
Scientific Officer
Science & Technology Policy
Research Division
National Science Foundation



STMIS is

- an online system which contains information regarding S&T resources in the country

STMIS contains information regarding

- Information regarding S&T personnel & their expertise
- Research and publications
- Scientific services and training programmes provided by different institutions
- Availability of advanced scientific equipment

You are eligible

Have a basic degree in science including social sciences
AND
Working in a field related to science and technology

Benefits

- More visibility to your work
- Updates on important events and opportunities in the field
- Be eligible to apply for grants and other services offered by the NSF

Reach us

<http://stmis.nsf.gov.lk/>
stmis@nsf.gov.lk
+94 11 2675841



A Knowledge Economy Needs a Scientifically Literate Society

National Science Foundation (NSF) with the aim of popularizing Science among the general public has organized the 'World Science Day' on November 1. Dr A.M. Mubarak, the Chairman of NSF in an interview with the Daily News discussed the role played by the NSF on improving science communication and public understanding of science in Sri Lanka.

NSF was first established as the National Science Council in 1968 under a Parliament act. It was restructured in 1982 as National Resources Energy and Science Authority (NARESA) and later re-organized as National Science Foundation in 1998.

"If you look at our mandate, NSF's main aim is to initiate, facilitate and support basic and applied scientific research in the country" Dr Mubarak said. By supporting research NSF provides opportunities to young scientists to acquire post-graduate degrees and strengthening the research capacity in the country. Another important role of the NSF is to popularize science amongst the people. A science culture is essential for any country to move towards a knowledge economy and for this to materialize the public understanding of science

has to be improved. Organizing the "World Science Day" is one of the ways to raise the public understanding of science. The main objective of the World Science Day, which is celebrated every year to promote peace and development, is to highlight the important role of science in society and need to engage wider public in debates on emerging and important contemporary issues such as GMOs, Global Warming, and Artificial Intelligence etc.

NSF also popularizes science through media by publishing science magazine 'Viduraava' in all three languages and distributing them widely. "We help to promote science among school children by setting up science societies in schools, conducting science/research competitions, and organizing science exhibitions. In addition, NSF promotes journalists by recognizing those who have excelled in science journalism. All the winners of these competitions were recognized at the World Science Day on 1st November" he said.

Today 'Science Centers' are becoming increasingly recognized and valued as a key component of educational and recreational infrastructure in many countries for inculcating scientific awareness



Dr. A.M. Mubarak
Chairman
National Science
Foundation

and scientific temper. More than 200 million visitors participate in exhibitions and programmes conducted by over 1200 science centers around the world each year.

The proposed National Science Centre in the Homagama Tech City aims to carry out science education through popular science exhibitions, training experiments, special effects film and videos, scientific and cultural exchanges, online science and a technology museum with a view to stimulating creativity and imagination of the public and enhancing scientific literacy among the people of Sri Lanka.

Rajitha Jagodaarachchi
pix - Dushmantha Mayadunne

The National Science Foundation can be identified as the premier institute for promoting science, technology and innovation for economic development and social prosperity of Sri Lanka. Prof. Ananda Jayawardane, Director General of the National Science Foundation, commented to us about some of the current activities being implemented by the institute.

Programmes for the National Science Day

Throughout the year, we have conducted various types of programmes in collaboration with, School Science Societies. For example, we have organized a competition called "school science research project" in Sri Lanka with the objective of generating innovative research using the problems of everyday life, applying science and technology principles as well as creativity to enhance the research skills of the students. It helps children to identify problems and their strengths and we provide them with facilities and advices that they need. Subsequently, the best 10 research projects of this competition and the 10 best innovations selected at Junior Inventor of the Year competition organized by the Institution of Engineers Sri Lanka (IESL) compete at Sri Lanka Science and Engineering Fair (SLSEF). Three national winners of SLSEF are given the opportunity to participate in the International Science and Engineering Fair in the United States. In the past, these competitors have brought glory to Sri Lanka by winning at this global platform indicating that creativity and science and technology application of our kids are no second to any other country.

We also organized national Level competitions like "Viridu", "Drama", Digital Story

Telling and Virtual Bridge Designing related to this year's national science day theme "Sustainable Use of Earth Resources". The winners were honoured at the National Science Day celebrations and they were given the opportunity to present their creations at the event.

The teachers involved in these creations, school science societies which achieved top star ratings, lecturers and professors of the Universities who mentored the winners and a journalist for the very first time were honoured for their contribution to popularizing science.

Promoting Science

We implement a television programme called "Mihimadala" in all three languages. This educates the public on how to use Science for our day to day lives.

Various feature articles from our institute are given to the papers like "Vidya", the official paper supplement of the Ministry and we publish "Vidurawa" science magazine with valuable articles for the benefit of students. We also provide facilities for those who wish to write books on science.

The National Science Foundation spends most of its funds on research. For this purpose, we have several arrangements. University lecturers and scientists who are working in research institutes can apply for research grants. If it is a quality output which is generally beneficial to the public,

We attempt to create innovation and conduct research

based on high end technologies

Prof. Ananda Jayawardane
Director General -
National Science Foundation



which contributes to the economy of the country or solve a problem of the country, or if it increases our knowledge of Science, then we support such applicants. As soon as a successful research is completed, we hope to publicize the outcomes enabling the general public to easily understand it. In addition to these, we are

implementing a project called the matic Research. This can be used to conduct research on prioritized fields. For example, we applied this to food security. It was very successful. In addition, we provided financial assistance to conduct research on water security, disaster management and climate change through this project.

We created a mobile app for farmers. That helps farmersto know whether they can sell their crops in the market, quantities available and where to supply them. If Sri Lankan researchers do not have facilities to carry out their research locally, NSF provides assistance to do their research in foreign universities

The National Science Foundation spends most of its funds on research. For this purpose, we have several arrangements. University lecturers, those who are working in research institutes as well as the general public can apply for research.

or laboratories; We also provide assistance to bring down foreign experts in fields where the expertise is not available in Sri Lanka. If our Scientists want to present their research at a recognized symposium, we support it as well. Not just research, NSF provides technology grants too. We publish a Statistical Hand Book which provides data on Science, Technology Innovations performance and status of Sri Lanka.

NSF also maintains a large database on scientists of the country. A database on the availability of research equipment in various institutes in Sri Lanka is being created. If researchers do not have access to strategic equipment, NSF provides equipment grants to purchase them too after assessing their requirements. Anyone can access science-related information online through National Science Library and Resource Center of the NSF through remote access. National Science Foundation has also signed several agreements with various countries, to carry out a number of collaborative researches in the future.

Scholarships & fellowships

If an individual wishes to obtain a doctorate or a research degree NSF provides competitive scholarships to pursue their studies at a recognized university. Furthermore, we encourage scientists to return to Sri Lanka after obtaining a doctorate in a foreign Country, by financially assisting them through post-doctoral research grants to carry out their research. In some universities, there is a shortage of professors, which it is evident that less number of research is being conducted. But if they want to do research, we have several of ways to get them involved.

NSF takes the leadership in driving nationality relevant research to address critical national issues. For example, We are in the process of coordinating 22 research projects in collaboration with the Health Ministry and relevant universities and institutes through expert researchers on how to reduce diabetes, kidney disease, cancers and dengue in Sri Lanka. Further more, at present NSF provides administrative and coordinating support to the Ministry of Primary Industries and Social Empowerment for research on Cinnamon with the objective of doubling export income by 2020. Some projects address research to produce medication from cinnamon for diseases like diabetes.

Future Plans

Our future direction would be to provide increasing attention to the outputs and outcomes of grants and efforts of the NSF during the entire value chain of our grants from calling applications to translating results to make an impact to the knowledge, society and economy. To this end, NSF's key performance indicators will be derived based on the results rather than the investment. Internal processes and external communications with the stakeholders are expected to be online moving away from the paper-based operations to paperless operations with performance on process efficiency measured based on how efficiently and accurately NSF provides its services. Further, NSF will constantly review its existing programmes for impact and effectiveness and introduce innovative initiatives for greater impact in realizing its vision.

Vindhya Paadukkage
Pix - Saliya Rupasinghe

Continued from page 03

Therefore, it is very important to pay more attention to improve the science education in the country and conduct programmes to improve science literacy in different levels of community in the country. To achieve this, the National Science Foundation (NSF) is conducting various programmes to popularize science and science education in the country. Some of the programmes conducted by this di-

rection are:

1. Popularization of Science through Print/Electronic and Social media
- National Science Foundation publishes Vidurava Science Magazine, four (04) issues per year, targeting school children and general public on different themes of importance. Further, NSF telecasts documentaries on different important scientific themes named as 'Mihimadala' to

educate general public.

2. Popularize science among different strata of general public using various outreach programmes and media such as conducting discussion forums on important issues, public lectures, media discussions etc.
3. Support science popularization activities conducted by other institutions
4. Capacity building for science communication by training media

personnel and scientists for writing on scientific subjects addressing general public

5. Provide proactive support for the establishment of the National Science Center
6. Maintain network of school-sand Universities by establishing NSF Science Societies
7. Establish community-based science societies
8. Conduct science related competitions among school children,

undergraduates and giving opportunity for winners to participate in various international competitions and training programmes etc.

9. Giving recognitions to scientists, media personnel and media institutions who are engaged in science popularization activities.
10. Measure the status of scientific literacy of school community and general public in regular basis
11. facilitating science infrastruc-

ture development in underdeveloped schools

It is a known fact that there is no purpose of learning science unless it benefits to people in their day-to-day life. The key to ensure benefit from learning science is to promote scientific literacy. Therefore, the Science Popularization division of the National Science Foundation is working towards this target to create a healthy and educated nation.

Science Awareness and...



Journal of the National Science Foundation (JNSF)

The National Science Foundation publishes the Journal of the National Science Foundation (JNSF), which is currently the only Sri Lankan journal to be indexed by Clarivate Analytics Science Citation Index Expanded - the globally accepted citation index. The JNSF is aimed at disseminating science and technology findings by publishing latest research outputs of scientists in Sri Lanka and abroad, and publishes manuscripts in the categories of Research Articles, Research Communications, Reviews and Correspondence in all fields of science and technology.

The inaugural issue of Journal of the National Science Council of Sri Lanka (NSC) (predecessor of the NSF) was launched in 1973, covering all aspects of science and technology, with Dr G.C.N. Jayasuriya as the Chairman. At that time two issues of the journal were published annually. The JNSF now publishes four issues per year in March, June, September and December since 1994.

So far, the JNSF has published 47 volumes continuously, contributing immensely to the science and technology developments in Sri Lanka. These 47 volumes, consisting of 146 issues, has disseminated research results through 1,304 articles of various categories, the majority being research articles. Eighty percent (80%) of these articles have been authored by Sri Lankan Scientists, while 11% and 9% of the articles have been authored by foreign authors and Sri Lankan/foreign authors (collaborative research), respectively.

The JNSF is available in print as well as online through <https://jnsfsl.sljol.info>. As of 2019 the JNSF is indexed in the following databases:
Science Citation Index Expanded

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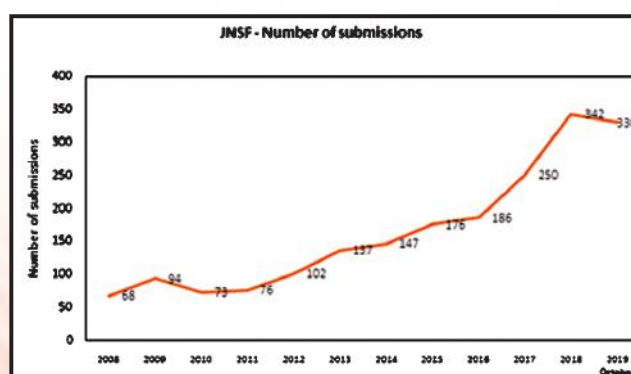
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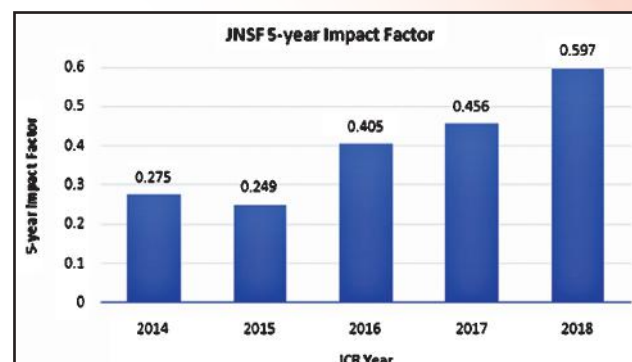
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The JNSF adopts a double-blind peer-review process. Being a multidisciplinary journal, the JNSF is



guided by an Editorial Board consisting of thirteen (13) members and an International Advisory Board of nine (09) members, selected based on their expertise and the contributions made in their respective disciplines.

Since 2013, the JNSF was made open access removing the 06 months' embargo period. As a result of this and being online through the Sri Lanka Journals Online (SLJOL), the submissions received by the Journal has increased exponentially reaching more than 340 submissions in 2018 from both local and



foreign authors, foreign submissions contributing to majority of the submissions. The foreign submissions comprise authors from over 25 countries.

The JNSF initiated processing of manuscripts through the online platform (<https://jnsfsl.sljol.info/>) from 2019. The JNSF has been published online on SLJOL since 2008 and was among the first journals to be included on SLJOL. SLJOL, which was launched in 2008, is a database of journals published in Sri Lanka developed in collaboration with the International Network for the Availability of Scientific Publications (INASP).

Taking a step forward, the JNSF started publishing the abstracts of the articles assigned for an issue in advance of publishing the full articles, to reduce the time taken to disseminate new research findings. The abstracts of June and September 2019 issues were published online soon after editing.

As of 2019 the journal has received an Impact Factor of 0.419, compared to the first impact factor received in 2010, which was 0.134, a clear indication that the JNSF is now being cited by many researchers. It is noteworthy that the 10 highest cited articles that contributed to this Impact Factor is from local authors. In addition, the five-year impact factor was increased to 0.597 in 2018, compared to 0.275 received in 2014.

The strength of the JNSF has always been the highly dedicated Editorial Board and the authors who believe that publishing their research outputs in a local journal like the JNSF is important. The JNSF is focussing on reducing the time taken for the peer-review process to ensure that current research findings are disseminated to the scientific community rapidly.

To publish your work in the Journal of the National Science Foundation, please visit <https://jnsfsl.sljol.info> or contact jnsf@nsf.gov.lk.

Uthpala T. Karunaratne
Senior Scientific Officer
Journal Publication Division
National Science Foundation



Down to earth

Self-compacting in-situ cast Mud-Concrete load-bearing walling system



Figure 2: Assembling the formwork-Process of in-situ cast Mud-Concrete wall construction

Mud-Concrete is a sustainable, novel earth-based walling material which was found by University of Moratuwa through a series of research work in the recent past. It is a mixture of soil, cement and water. The concept of Mud-Concrete is to develop a composite material out of soil which is similar to concrete. Currently, concrete is regarded as a popular and versatile construction material due to its strength and durability and is widely used in the building industry. Concrete is a composite construction material made of cement, sand, metal and water. Here, metal (coarse aggregate) governs the strength, cement acts as the binder and sand (fine aggregate) reduces the porosity and water acts as the reactor to cement. In Mud-Concrete, the intended functions of sand and metal of concrete are replaced by a fraction of the soil. The precise gravel percentage governs the strength of Mud-Concrete. The cement in this concrete is also used as a stabilizer in very low quantities. Most importantly the introduced self-compaction methods become magical solutions to remove the labour intensive construction methods and control the cost, quality and save the time during construction.

In this concept, the initial target is to design an in-situ cast load-bearing wall system through Mud-Concrete. Basically, the research design for load-bearing wall was started from the initial findings of the Mud-Concrete block. Unlike a masonry block, the invention of

in-situ cast load bearing wall system could construct up to three stories without any reinforcement or column-beam structures. In this system, wall segment could lift to 1200mm height and the minimum thickness of the internal wall is 100mm and standard external wall thickness is 150mm. Further,



Figure 1: In-situ cast Mud-Concrete load-bearing wall segment



Figure 3: Proto type in-situ cast Mud-Concrete load-bearing wall models made for laboratory testing

depending on the load, the thickness of the wall could have adjusted, and reinforcement could use to increase carrying capacity of the wall segment. This will further help to lift the wall system up to a higher story. The best mix of Mud-Concrete load-bearing wall consists of minimum 4% of cement, fine < 5% (\leq sieve size 0.425mm), sand 50% (sieve size 0.425mm \leq sand \leq 4.75 mm), and gravel 45% (sieve size 4.75mm \leq gravel \leq 32mm) and optimum water requirement 20% from the dry mix.

This novel in-situ cast technology will result in a series of advantages to the construction industry. In this technology, any type of soil could be improved up to the proposed proportions and easily make it as a 'Well graded soil' which is ready for construction. Same as in the block construction gravel will govern the strength factor. In this system more, strength and stiffness could be achieved than the Mud-Concrete block, because the system was capable enough to expand the usable gravel range as much space provided along the vertical boundaries in Mud-Concrete load-bearing wall system. Due to the self-compacting quality of the mix, there is no need of any compaction/ramming or vibration; mix will self-compact; just need to pour the mix into form work and wall will obtain the strength with mix properties. Gravel particles will remain as it is in the mix because there is no ramming process and that will help not to crush the gravel in soil mixture and not to effect on strength of wall segment. Once the wall casting is completed simultaneously, the total building also gets completed. Thus, the novel technology will cater to the current demand for easy and quick construction technologies.

Further, this system provides flexibility of adding electrical wiring and plumbing within the system due to no compaction; because of self-compaction, the structure has the provision of reinforcing it with timber or steel as desired. Reinforcement could use to increase carrying capacity of the wall segment further and use it in multi-storey building construction. The drying shrinkage of Mud-Concrete wall is 0.25% in 7 days curing periods and it is almost below the

maximum standards allowed for earth wall. This system is capable to cater for different architectural requirement, maintaining its quality and flexibility. Wall thickness could adjust according to the architectural and structural requirements by simply adjusting the gap between the mould plates of formwork. Non-plastered smooth walling surface could achieve with high water content used in the workable mix. A variety of textural and colour finishes in a single wall could achieve through careful selection of raw materials.

This in-situ cast walling system ensures thermal resistance. The mud-concrete wall performs as a thermal mass; ensure structural cooling effect; because in this technology excessive water amount is used in preparing the workable mix. Then the porosity of the structure will increase. So, this wall could ensure its hygroscopic quality and then it would capable enough to release or absorb moisture in response to changing microclimate around the building. Therefore, this walling system will contribute to enhance health and performance and will have an ability to contribute to the passive environmental performance of the

building. Thus, all these qualities confirmed the simplicity of the technology and the easy construction which is a high demand in the current construction world.

Self-compacting in-situ cast load-bearing Mud-Concrete walling system is a sustainable, low cost and speed construction technique which is mainly developed by local materials which could easily adapt to the local context and this novel walling system was patented under Sri Lankan property act No.36 of 2003 (Patent Number: 18762/ International patent classification: E04C1/00).

This research has been carried out with the financial support of the grant RG/2015/EA & ICT /02 from National Science Foundation (NSF), Sri Lanka.



Prof. Rangika Halwatura and Dr. Rizna Arooz
Department of Civil Engineering
Faculty of Engineering
University of Moratuwa

At the Science Day Awards.....



The NSF Media Award for 2019 is awarded to; Dr Manoj Prasanna Rathnayake (Assistant Editor Upali Newspapers PVT LTD), For the significant contribution made in the field of science.



Certificate of Commendation of this category was given to Dr S.S.R. Samarakoon, University of Colombo for his significant contribution made in the field of science.

Lightning Myths and Facts

Scientists believe lightning might have helped mankind in discovery of fire, a major milestone in the history around a million years ago. Even before that right from the appearance of first humans on earth, man should have been observing it, yet unable to understand its mysterious origin and dreadful power of destruction. Early people thought lightning is supernatural since they could not explain it; worshipping thunder gods has been a part of many civilizations around the world. Ancient Greek philosophers including Anaximander and Aristotle had asserted many theories, persisted for a long time, were all proven to be wrong later in the 18th Century with the discovery of electrical nature of lightning by US scientist Benjamin Franklin in his most famous 'kite experiment'. Now we are well aware that it results from exchange of electrical charges between clouds and ground although the scientific theories on the exact origin still evolves.

Tropical climate and weather conditions owing to geographic location of Sri Lanka near the equator somewhat intensify the frequency of lightning activities in the island. Usually it becomes a hot topic among people after an accident or equipment failure generally during inter-monsoon thunderstorms apart from when cursing their rivals. Today's article is a myth-buster with a taste of interesting facts.

Where to take shelter?

Thanks for the awareness campaigns on media, most people are familiar with basics of personal safety measures during lightning, and still there are certain misconceptions. In order to avoid open grounds, being under a tree or any tall structure one may think it is safe from a direct lightning strike. But there is a high chance of danger from side flashes or step potential if that tree/structure is struck by lightning. In reality, many lightning related casualties and deaths are reported because of being near or underneath trees. It is advised to keep the two feet as close as possible, touching each other, to avoid the dangers of step potential. Open, small temporary shelters are not safe during lightning; especially metal tents can greatly increase the personal safety risks. Lying on the ground is not a safe option since harmful ground currents originated from lightning strikes in the vicinity could flow through the body.

The people inside open vehicles like safari jeeps, motorbikes, boats can be struck by lightning. The best thing is to go to a safer place; closed large building or a fully closed vehicle when there is no building. Being inside a



An inch wide lightning bolt looks so thick because of brightness of light produced

house is safe as long as you do not touch earthed metal structures and do not use telephone and other electric equipment with attached wires. It is important to remember to be away from the doors and windows. Therefore, always remember to follow lightning personal safety instructions during a thunderstorm and educate others. The famous 30-30 rule states to get to a safe place within 30 seconds you hear a thunder nearby and don't come out for 30 minutes after the thunderstorm. Lightning is dangerous; it is about your life and lives of your loved one. When thunder roars go indoors..!

Is it always fatal?

Interestingly, the odds of getting struck by lightning are much higher than winning a lottery jackpot. The statistics show the related mortality rate to be around 20% of victims, yet the survivors may sustain long term injuries. The persons injured by lightning does not carry any electrical charge, hence it is ok to touch them to give first aid and further treatments.

Mobile phones vs landline telephones

Everyone knows it is not safe to use landline telephones during lightning even indoors, since the



Lightning might have assisted humans in discovery of fire

wires can carry harmful voltage impulses. There is no scientific evidence yet to claim that mobile phones detached from cables attract lightning. But even the mobile phones one should never use them with charging cables and wired headphones.

Do rubber tyres of vehicles provide protection?

It is a wrong belief that the insulation of rubber tyres prevents lightning striking the vehicle. In fact, the mere rubber tyre is no match for the 'mighty weapon of the God', especially under

wet conditions. Vehicles of all sorts get struck, ranging from land vehicles, boats and even aero planes or rockets are not exceptions. But the interesting part is the metal body of the vehicle, being an electrical conductor will protect people inside by creating an equipotential environment called a 'Faraday Cage'. Even inside the vehicle one should not touch any metal part connected to the vehicle body.

Is it the height only?

Yes, the height matters, but lightning current usually takes the electrically least resistive path which can be a short object. Tall, isolated structures and objects can get struck by lightning many times. The Empire State building in New York gets struck on average 25 times a year. There is a very strange report of a US park Ranger claimed to be have struck by lightning few times in his lifetime.

Protecting Equipment

Surge Protective Devices are designed to protect electronic equipment from lightning induced voltage transients in power, telecommunication or data lines albeit there is no device which can guarantee 100% protection. The best option would be to unplug the electronic equipment during thunderstorms.

Do towers throw lightning away?

It is a deeply rooted misconception among people that the external structural lightning protection systems especially those of telecommunication towers throw away lightning; in fact they attract it provided their earthing is adequate. The complaints of electronic equipment failure in the vicinity of a new installed telecommunication tower are most likely caused by the rise of ground potential via

a shared power transformer for the base station and the households nearby.

Bolts from the blue

A rare but more powerful type of lightning called 'positive lightning' can strike to a place even 10 kilometers away from the thunderstorm emerging from cloudless clear skies; hence they are referred "Bolts from the blue".

Is it always harmful?

So far stating all the calamities, for that question the answer is a big No, surprisingly for few reasons. Chances are high that it might have assisted early humans, Homo erectus in discovery of fire a million years ago as already mentioned. Nitrogen (N₂) constitutes of more than 70% of the atmosphere and is in gaseous form that cannot be absorbed by trees. Lightning triggers chemical reactions that create nutritious nitrogen compounds absorbable by 'green life', later transferred up the ladder of food chain. So thank you lightning, for the 'proteins'. Moreover, the exchange of electrical charges between clouds and ground help keeping the atmospheric-ground charge equilibrium, essential for the existence of the atmosphere, without it, the life on earth would not sustain for obvious reasons.

Apart from these indirect yet influential benefits, researches are going on to harness the energy of a lightning strike from earth. It seems appealing by first glance knowing the facts like the voltage of several million volts with current up to 100 kilo amperes and around 100 strikes every single second globally on average, but the catch is, it only lasts for a fraction of a second. The energy content of an average lightning strike is said to be sufficient to light a 100 watt bulb for three months. In fact scientists have tried to capture and store the energy using a technique known as 'rocket triggered lightning' where a small size rocket is used to create an electrical path using a long conductor wire from ground to cloud, though yet not fruitful with economically feasible results. The problem being, a huge amount of energy is already lost when it reaches the earth by means of heat, light and sound. Actually, lightning heats its path to temperatures more than 45000°C, five times the surface temperature of the sun.

(Sources - Internet)



Lightning can strike from a clear sky



Even aero planes are no exceptions



Towers do not throw lightning away

Rajith Gihara
Research Engineer
Centre for Lightning
Protection Arthur C Clarke
Institute for Modern
Technologies



Summary of the 1st Place Winning
Science Essay of NSF Inter School
Science Society Competitions

All of the things in the nature
Are interwind with human
For their stupid actions
Now we have to pay
African wildlife Magazine

Sustainable use of land resources

Natural resources are live and life-less complexes and intricate designs that combines bio-ecosystems and associated natural processes. The World Environmental Day has been devoted to minimizing the degradation of terrestrial resources with an intimate relationship with the nature. We should explore a method for consistent use and harmony with the nature, which consists of rivers, streams, fauna, flora, gases, mineral resources etc. and the physical environment created by using science and technology.

The combination of controlling the adverse impacts of the humans on mother nature and the natural resources and development with the green concept is of thrift and eco-friendly simplicity is the pathway to mutual harmony. At the time of stepping towards a sustainable era after the industrial era, the restricted land resources should be utilized in a sustainable manner. If you try to back it up, the balance of the nature and the biosphere would be adversely affected.

If the current consumption and production pattern continues, three new planets would be required to meet the needs of the population of 9.6 billion by 2025 and food production should be increased by 60%. Although 17% of the land area is devoted to agriculture, 1/3 of the food production would be destroyed by disasters and 1/3 would be wasted. According to the United Nations Food and Agriculture Organization, the cost of food waste in developed countries is US\$ 620, while in developing countries it is US\$ 310.

The drinking water percentage of the earth is 0.01%. 57% of the Sri Lankan population waste water. According to the 'Time' magazine, one billion of the world population did not have any access to drinking water in 2002. Because of the floods in France in 1999, 375,000 tons of nitrate was added to the Atlantic Ocean. About 50% of Brazil's drains are discarded into the rivers, and they must transport drinking water to Sao Paulo city from about 100 km. 6.2 million of land area is salinized due to the destruction of trees that absorb groundwater. Humans should protect the water without disposing toxic chemicals, oils and garbage into the water.

At present 86% of the world's energy necessity is supplied by fossil fuels while it would be increased up to 87% by 2025. The fuel consumption in year 2017 was 1.9 million barrels per day. There may be a major energy shortage in 2030. 70%-80% of the mineral resources

are used by the developed countries while 20% are used by other countries. There will be a petroleum and fossil fuel shortage as well as severe environmental pollution in the future. Therefore, use of alternative biofuels as well as renewable energy sources such as tidal waves, wind, sunlight and fuel-efficient instruments would be the solution for sustainable energy use.

We are losing 18 million acres of forests annually. Deforestation erodes 24 billion tons of earth surface. We lost 52% of biodiversity from 1970 to 2010. 80% of the Africans use wood for cooking. There are about 7600 registered timber industries in Brazil. The value of a 'Mahogany' tree is US\$ 30, and it would increase up to US\$ 130,000 when it becomes a finished product. Satellite images show that 2,000 km² of Brazilian forests were destroyed annually during 1995-2000.

Half of the forests in Mexico are destroyed for export, and the Philippines destroy 984 km² of their forests per year. It might take a little time to cut down a tree, but it takes around 60-100 years to grow a mature tree. Deforestation impairs the balance of the environment and the land would become desertified. Therefore, forests should be protected, and trees should be cultivated. Garbage should not be released to the forests. Protected areas should be established. Geological investigations show that hard minerals which face erosion become precious and valuable gems, diamonds, apatite etc., which are abundant in areas such as Ratnapura, Okkampitiya etc.. Mining would lead to landslides, soil erosion and flooding. There were around 6,000 mines in Sri Lanka during the World War season. Mineral sand deposits are located in Pulmudai, Naikawela and Kudiramalai areas in Sri Lanka. The mineral sand deposits in Pulmudai is 4 million tons and covers an area of 10 km long and 100m wide.

Excessive mining will eventually lead to scarcity of this valuable natural resource. Therefore, sand mining in the rivers should be stopped and mining should be formal. Legislative policies on mineral exports must be formulated, public attitudes on land resource conservation should be enhanced and green lifestyle should be built to protect the environment.

Land resources should be sustainably utilized by public awareness on environmental issues, environmental concerns and minimize environmental problems. Environmental sensitivity should be increased.

We have endangered ourselves by harming the environment and land resources. The land value is gradually increasing as land resources are gradually becoming scarce. So, as a tribute to humanity the land resources should be handed over to our next generation. The world must network together to ensure sustainable use of land resources. All of us are committed to protect the land resources consistently.



Check your Science Knowledge

Win
100 valuable
Prizes

Is your science knowledge really up-to-date? If so, read the newspaper and write the answers to the 10 questions given below and send them to us. One hundred winners will receive valuable prizes from the Ministry of Science, Technology and Research.

1. What is the main role of the National Science Foundation?
2. What are the alternatives that can be used for the sustainable use of fuel?
3. What are the advantages of self-compression of mud-concrete?
4. Name the two cases of kidney failure?
5. What are the measures that can be taken to protect household appliances from lightning?
6. What are the benefits of Science Technology Management Information Systems?
7. What are being published through JNSF?
8. How is the strength of mud-concrete controlled?
9. What is the scientific name for tea?
10. Name the publication and the Television documentary program being launched by the National Science Foundation to popularize science, via print / electronic and social media among school children and the general public.

Send your answers to reach the following address on or before 30th November 2019. With your name and personal address. Please mentioned as "Science knowledge" on the upper left corner of the envelop.

Director (Research),
Science and Research Development
Division, Ministry of Science,
Technology and Research,
3rd Floor, Sethsiripaya (Stage 1),
Battaramulla

Answers to the questions which appeared in
October edition and the winners are
mentioned in www.mostr.gov.lk the
official website of the Ministry of
Science Technology and Research

Name :

Address :

Contact no :

Are you interested in scientific writing?

So, here is a great opportunity for you....

Please send your any scientific
article or scientific fiction to the following address.

Please mention as
"Scientific Writing" on the left upper Corner of the envelop.

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Science and Research Development Division,
Ministry of Science, Technology and Research,
3rd Floor, Sethsiripaya (Stage 1), Battaramulla

W.P. Mayantha Anuhas
Wijerathne
Nalanda College,
Colombo 10



National Science Foundation



Strengthening Science Technology & Innovation Potential

Funding Support

Research & Technology	Capacity building	Infrastructure development	Patent support
<ul style="list-style-type: none"> Competitive Research Grant Scheme (CRG) National Thematic Research Programme (NTRP) Special Projects on Health Sciences and Cinnamon International Collaborative Research Technology Development Start-up Businesses Organizing scientific forums 	<ul style="list-style-type: none"> Postgraduate Research Degrees Research Scholarships Postdoctoral Research Scientists 	<ul style="list-style-type: none"> Research Equipment Grants Grants for Spare Parts for Research Equipment 	<ul style="list-style-type: none"> Financial support for IP Protection (local/ PCT) Patent search facilities Consultancy for patent drafting Awareness building

Other Support & Recognition for S & T Excellence

Knowledge creation, dissemination & technology transfer	Value addition to local industrial sector	Recognizing S & T Excellence
<ul style="list-style-type: none"> Seminars & workshops on selected topics Facilitate transfer of locally developed technologies to industry 	<ul style="list-style-type: none"> Special Projects on Cinnamon Industry needs assessment 	<ul style="list-style-type: none"> National Awards for Science & Technology Achievements NSF Research Awards NSF Technology Awards Support Scheme for Supervision of Research Degrees (SUSRED) for supervisors of Postgraduate Degrees TWAS/NSF Young Scientists Award

National Thematic Research Programme (NTRP)

Goals and objectives

- Mission-oriented & based on national needs
- Multidisciplinary & collaborative
- Well defined outputs
- Directly contribute to the economic and social development of the country.
- End-product/output that can be readily implemented as a solution to a prevailing problem/situation

Themes identified

- Food Security
- Climate Change and Natural Disasters
- Water Security
- Ocean and Marine Science

Special Project



Science Education & Popularization Programme (SEPP)



To Whom

Schools and universities
(Only the School Science Societies and University Science Societies which are registered with the NSF are considered for the Scheme)

For what

For organizing

- Science Education Programmes**
 - Improve school science laboratories
 - Establish school science centres
- Science Popularization Programmes**
 - Science days/ Science seminars/ Science competitions/ Science camps / observation camps
 - Publish science magazines and radio programmes

How to apply

Send an application along with the following documents:

- Request letter from the principal/ senior treasurer
- Detailed estimated budget for the programme
- Details for the programme
- Project proposal

Applications should be submitted at least 2 ½ months prior to commencement of the programme

How much will be offered

- Up to Rs. 200,000/- per programme per year per school/ university will be provided for science popularization programmes
- Up to Rs. 1,000,000/- per programme per year per school/ university will be provided for science education programmes

Application guidelines and the form can be downloaded from www.nsf.ac.lk



For more details:

National Science Foundation,
No. 47/5, Maitland Place, Colombo 07
011 - 2696771 (ext. 111)
011 - 2694754
www.nsf.ac.lk

National Science Foundation
47/5, Maitland Place
Colombo 07

Web : www.nsf.gov.lk
Telephone : 011-2696771
Fax : 011-2694754



Advice

Chinthaka S. Lokuhetti

Secretary

Ministry of Science, Technology and Research

H.M.B.C. Herath

Additional Secretary

(Technology & Research Development)

Guidance

P.M. Dharmatilake

Director

(Science and Research Development Division)

Dilrukshi Pathirana

Assistant Director-(Marketing)

(National Engineering Research & Development Centre)

Dr.Kalpa Samarakoon

Senior Scientist

National Science & Technology Commission

K.N.K. Disanayake

Scientific Officer

(National Research Council)

Jayasamara Gunarathne

Asst. Director

(Technical Assessments)

Ishara Sudarshani

Dhammika Rathnayake

Madhuka Subhashini Amarasinghe

Kaushalya Ganegoda

(Science and Research Development Division)

Official Photographs

Dulip Nayanapriya

Ministry Media Unit



LAKE HOUSE

Government Relations Dept.

Government Relations (Lake House)

Telephone - 0112429297
0112429282
077 3493785
Fax - 0112429285
e-mail
graphicsteam@lakehouse.lk