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

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.

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 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 Dissanayake, Secretary to the Ministry of Environment & Mahaweli Development, and a group of officials participated in this event.

Another mission of the Ministry of Science, Technology and Research
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 loads 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 have 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 prediction, 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.

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Acknowledgement
Hardware Setup

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. Catechines in green tea is a natural phenol that is known as Epigallocatechin gallate (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.

Can green tea miraculously cut down your weight???

Pabasari Arundathi Koliyabandara
Science Researcher
University of Sri Jayawardanapura
Science Awareness and Scientific Literacy

Science is the foundation of technological advancement which comes 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. 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 processes required for personal decision making, participation in civic and cultural affairs, and economic productivity.

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 solution agreed upon 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.

Continued from Page 01

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 - Weeraraparakrama Secondary School, Yatalawatta, Matale
3rd Place - Kalyani Maha Vidyalaya, Kithulgala

Role-play

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

Science Essay

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


Jayasooriya, St. Joseph’s Balika Vidyalaya, Gampola

Star Rating – 5 stars (Awarded to most active School Science Societies)
• Swarna Jayanthi Maha Vidyalaya, Kegalle
• Paddiruppu M.M.V, Kala-wanchikud
• Sri Sangamitta Girls’ National School, Matale
• Gnanodaya Maha Vidyalaya, Kalutara
• Harischandra National College, Negombo

NSF Media Award for Popularization of Science amongst General Public - 2019
Dr Manoj Prasanna Rathnayake, Assistant Editor, Upali Newspapers

NSF Award for Teachers in Promoting Science
• Ms. D.P.U.D. Abeysekara, Nalanda College, Colombo 10

NSF Award for Teachers in Promoting Science

Prof. M. T. M. Jifry 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 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 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 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).

Kidney Disease is known as failure of kidney function. Kidney failure can occurred in two stages.
1. Acute kidney disease
2. Chronic kidney disease

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.

Kidney Diseases
Kidney disease is known as failure of kidney function. Kidney failure can occurred in two stages.
1. Acute kidney disease
2. Chronic kidney disease

Let’s get rid of Kidney disease

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

Dr. Hema Weerakoon
Public Health Medical Officer/PDHS Office,NCP
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 the 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 an ideal platform to promote such collaborations and resource sharing among the scientific community in Sri Lanka.

Sectors 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 human resources.

While serving as one stop information source on science related expertise in the country, STMIS provides 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 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.

Get on board with NSF’s all new Science and Technology Management Information System (STMIS)

Leveraging networking in S&T Sector in Sri Lanka

Chamika Dharmasena
Scientific Officer
Science & Technology Policy
Research Division
National Science Foundation
Another important role of the NSF is to support research. NSF provides opportunities for researchers, including students, to participate in research through grants and fellowships. In addition, NSF provides publications and resources on scientific topics such as climate change, energy, and health. NSF is working towards creating a healthy and educated nation.

Future Plans
One of NSF’s main goals is to increase awareness of grants and efforts of the NSF during the entire value chain of our grants from call applications to translating results into impact on the knowledge society and economy. At this end, NSF’s key performance indicators will be measured. Based on the results, necessary actions will be taken to further improve NSF’s impact and effectiveness for the benefit of the nation and global community.

Vinitha Paalukige
Pix - Salya Rupasinghe
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 (SICI) and Clarivate Analytics (SA), Ulrich's, Biological Abstracts, BIOSIS Previews, Zoological Record, AGRICOLA, and EBSCOhost.

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.

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.
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 reagent 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, 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% ≤ sieve size 0.425mm, sand 50% (sieve size 0.425mm ≤ sand ≤4.75 mm), and gravel 45% (sieve size 4.75mm ≤ gravel ≤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-rammed 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.

[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.
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; worshiping 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 sizzling 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 originating 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 fully closed vehicle when there is no building. Being inside a wet conditions. Vehicles of all sorts get struck, ranging from land vehicles, boats and even airdoplanes 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 always harmful? 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 although 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 telecommunications 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 communication tower are most likely caused by the rise of ground potential via direct lightning strike. But there is a high chance of danger from sizzling 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 originating from lightning strikes in the vicinity could flow through the body.

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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 chances. 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 ‘protein’. Moreover, the exchange of electrical charges between clouds and ground helps 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, researchers are going onto 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.

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 insulator 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 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 sizzling 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 originating 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 fully closed vehicle when there is no building. Being inside a
Natural resources are live and lifeless 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 thrill 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. Hu- mans 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 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 1999-2000. 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 are around 6,000 mines in Sri Lanka during the World War season. Mineral sand deposits are located in Pulmudai, Nalawella 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.

All of the things in the nature are interwined with human. For their stupid actions
Now we have to pay
African wildlife Magazine
National Thematic Research Programme (NTRP)

**Goals and objectives**
- Mission-oriented & based on national needs
- Interdisciplinary & collaborative
- Well-defined objectives
- Directly contribute to the economic and social development of the country
- End products/technology that can be readily implemented as a solution to prevailing problems

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

**Special Project**
Research Programme on Health Science

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Science Education & Popularization Programme (SEP)

- **To Whom**
  - Only to the School Science Societies and University Science Societies which are registered with the NSF are considered for the Scheme

- **For applying**
  1. Science Education Programme
     - Degree school science laboratories
     - Enriched science centres
  2. Science Popularization Programme
     - Science days/Science tournaments/Science competitions
     - Science camps / observation camps
     - Publish science magazine and radio programmes

- **How to apply**
  - Send an application along with the following documents:
    - Demand letter from the principal / school management
    - Detailed individual budget for the programme
    - Details for the programme
    - Project proposal
  - Applications should be submitted at least 3 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

- For more details:
  - Telephone: 011-2696771
  - Fax: 011-2694754

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Strengthening Science Technology & Innovation Potential

**Funding Support**
- Research & Technology
  - Competitive Research Grant Scheme (CRG)
  - National Thematic Research Programme (NTRP)
- Special Projects on Health Sciences and Cinnamon
- International Collaborative Research
- Technology Development
- Startup Businesses
- Organising scientific forums

**Other Support & Recognition for S & T Excellence**
- Knowledge creation, dissemination & technology transfer
- Seminars & workshops on selected topics
- Facilitate transfer of locally developed technologies to industry
- Awareness building

**Value addition to local Industrial sector**
- Special Projects on Cinnamon
- Industry needs assessment

**Recognizing S & T Excellence**
- National Awards for Science & Technology Achievements
- NSF Research Awards
- Support Scheme for Supervision of Research Degrees (SSRRD) for supervisors of Postgraduate Degrees
- TWAS/NSF Young Scientists Awards

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