INDIGENOUS CRYOGENIC ENGINE MUST BE DEVELOPED FAST

With the launch of GSAT-10 assisted by the Araine-5 rocket from French Guyana, ISRO completed its 101st mission on 29 September 2012. This geosynchronous satellite is the heaviest of all the satellites launched by ISRO, weighing 3,400 kilograms. Prior to this, ISRO completed its hundredth mission on 9 September 2012 with the help of PSLV-C21– the launch of the French satellite Spot-6 weighing 712 kilograms and the Japanese microsatellite Proiteres weighing 15 kilograms.

The Polar Satellite Launch Vehicle (PSLV), considered to be the workhorse of ISRO, comes in three versions. Besides the standard version, the CA (core alone) and XL (extra large) versions of PSLV have also been developed by ISRO. While the standard and the XL variants of PSLV have six strap-on booster motors, no such motors exist in the CA variant. Besides, the CA variant has 400 kilograms less propellant as compared to the standard version. PSLV (XL) has 12 tonnes of propellant in its six strap-on motors as against the standard version that has only 9 tonnes.

In the hundredth mission of ISRO that took place on 9 September 2012, PSLV (CA) was used on its eighth mission. The standard version of PSLV has been used in eleven missions, including its first mission on 20 September 1993 that failed. PSLV (XL) has so far been used in three missions: the Chandrayan-1 mission on 22 October 2008, the launch of GSAT-12 on 15 July 2011, and more recently, the launch of RISAT-1 on 22 April 2012. Thus, PSLV has been used in a total of 22 missions including its first failed mission in 1993. It has launched 27 Indian and 28 foreign satellites, making a total of 55 satellites in all.

The recent launch of geosynchronous satellite GSAT-10 from French Guyana has cost the exchequer a whooping amount of 750

DRYING MOTHERS

It is well known that mother's milk strengthens the child's immunity and provides her with proper nutrition necessary for the growth and development of various organs. It is also believed to have a slowing effect on the process of aging in the later stage of life thereby ensuring longevity.

Doctors insist on breast-feeding until the child is at least six months old. However, the results of a survey conducted by an NGO in Mumbai paints a very gloomy picture for the future of breast-feeding. The survey finds that the potentiality of the mothers to breast-feed is declining in our country, irrespective of their educational, social and economic status.

The reasons are said to be as much physiological as psychological. Gynaecologists believe that mothers go "dry" suddenly after receiving shocking news or when subjected to serious physical and mental stress because such circumstances cause hormonal imbalance in their body, thereby affecting milk secretion. However, the situation improves if their babies are allowed to suckle regularly.

Today, with many urban women working, it is not possible for them to stay with their children for longer hours and to breast feed them at frequent intervals. Besides, they also face a lot of physical and mental stress at their workplaces. Such mothers very often go "dry "or produce less milk. Even in rural areas this is becoming true, as the struggle for existence becomes harder as economic as well as social security declines, and women are subjected to stressful conditions as their urban cousins. Besides, extensive use of birth control pills and certain other medicines, drinking and smoking also have deleterious effects.

Recently, it has been revealed that mother's milk contains pollutant residues like insecticides (e.g. DDT and BHC), heavy metals (e.g. lead and mercury) along with toxins like nicotine, caffeine, alcohol as well as various medicines in proportions much above the prescribed safety limits. At some places mother's milk has been found to contain more insecticides than even cow's milk. Most of these substances are fat-soluble, which explains their persistence in breast milk.

Some time back the WHO had conducted a study on breast-feeding in a number of developed and developing countries, in which the lactating mothers were divided into four groups depending on their socioeconomic status. The results suggested that except for those belonging to the economically weakest section who were highly malnourished, breast feeding capabilities of others were apparently equal. Rather, the lower and middle-income group mothers, who regularly breastfeed their children, have an edge.

The study also revealed that the protein content of the milk of the mothers producing less milk was the highest, which could make up the deficiency partially. For example, while the economically sound mothers of Hungary and Sweden, producing relatively more milk, had 1.35 grams of protein per liter, the poor mothers of Zaire who produced less milk had 2.2 grams. However, the milk of the former was richer in fat (50 grams/litres) than the latter (40g/ litres), but both had almost the same calorie content.

Under such circumstances, not only it is the duty of the family, but also that of the government to ensure minimum nutrition to the lactating mothers. With an elementary idea about nutrition one can plan to meet the requirement by picking and choosing proper food items available locally and cheaply. Moreover, lactating women should also be kept free from undue physical and mental stress. Regular breast feeding of babies is essential to the optimum development of the child.

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AN "IRREGULAR MIND" WINS THE ABEL PRIZE

Endre Szemeredi is the latest recipient of the Abel Prize. Named after the great Norwegian mathematician Niels Henrik Abel, the prize is jointly instituted by the Niels Henrik Abel Memorial Fund and the Norwegian Academy of Science and Letters.

Endre Szemeredi belongs to the Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences, Budapest and Department of Computer Science, Rutgers, The State University of New Jersey, USA. He has been awarded for "his fundamental contributions to discrete mathematics and theoretical computer science, and in recognition of the profound and lasting impact of these contributions on additive number theory and ergodic theory".

Discrete mathematics involves the study of structures like graphs, sequences,

crores. Evidently, this launch has raised one pertinent question, namely, why should we not fast equip the Geosynchronous Satellite Launch Vehicle (GSLV) with the indigenous cryogenic engine? Of course, the development of Mark-II and Mark-III cryogenic engines is already going on in the country. While Mark-II has a lifting capacity of 2,500 kilograms, the Mark-III engine can launch payloads weighing 4,000-5,000 kilograms in the geosynchronous Transfer Orbit (GTO) and payloads weighing 10,000 kilograms in the Low Earth Orbit (LEO). A Mark-II engine was even deployed in the sixth flight of GSLV-D3 on 15 April 2012 to launch the GSAT-4 satellite weighing 2,200 kilograms. However, as the engine did not ignite this mission failed.

The test flying of Mark-III took place recently in 2012. There are plans of using GSLV-Mark III in the Indian manned mission to Moon after Chandrayan-2, which is likely to be launched using Mark-II engine in 2014. The launch of GSAT-6 satellite to take place some time in 2013 may also use Mark-II engine. However, ISRO must fast track the development of both these cryogenic engines. In the present scenario, there is hardly any option left. With only one Mark-I (c) engine left out of a total of seven cryogenic engines that we received from Russia, ISRO has to complete the development of cryogenic engines at a faster pace.

It is necessary to become self-reliant in the field of space technology; otherwise, we would have to depend on foreign satellites for launching our INSAT/GSAT types of satellites. Faster development of cryogenic engines is also necessary on another count. At present, the INSAT/GSAT system has 168 transponders. There is a gross shortage of transponders due to which ISRO has been compelled to lease 95 transponders from foreign countries. Although GSAT-10 has added 30 transponders to the present fleet, there is still a dearth of transponders. Therefore, to augment the fleet of transponders also we need to launch the INSAT/GSAT types of satellites with the help of Indian cryogenic engines. We cannot be complacent in the matter.

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permutations and geometric configurations. Its mathematics forms the foundation of theoretical computer science and information theory. The combinatorics of discrete structures is also a major component of many areas of pure mathematics, including number theory, probability, algebra, geometry and analysis.

Szemeredi has revolutionized discrete mathematics by introducing indigenous and novel techniques and by solving many fundamental problems. His research revealed the deep connection of fields like additive number theory, ergodic theory, theoretical computer science and incidence geometry with combinatorics and brought it to the center-stage of mathematics.

Endre Szemeredi was born on the 21August 1940 in Budapest, the capital of Hungary. His parents wanted him to be a doctor. Therefore, he joined a medical college but soon left it. Thereafter, he studied pure science and obtained his Master degree in 1965 from Eotvos Lorand University, Budapest and PhD Degree in 1970 from Moscow State University. His exceptional mathematical talent was evident from the very student days when he was studying in Budapest.

It is said about Hardy that his greatest discovery was Ramanujan. The same can be said about Paul Erdos, the Hungarian mathematician who discovered Szemeredi. Again like Ramanujan, he also went a long way in enriching mathematics by contributing several fundamental theorems of tremendous importance that laid the foundations for new directions to future research in the field. Szemeredi has published more than 200 original research papers.

In 1975, Endre Szemeredi first attracted the international community of mathematicians with his solution to the famous Erdos-Turan conjecture. He showed that in any set of integers with positive density, there are arbitrarily long arithmetic progressions. That was a surprise, because, earlier even the case of progressions of length three or four required substantial efforts, by Klaus Roth and by Szemeredi himself.

Szemeredi's proof was a masterpiece of combinatorial reasoning. A key step in the proof, now known as the Szemeredi Regularity Lemma, a structural classification of large graphs, has become a central tool of both graph theory and theoretical computer science. Szemeredi Regularity Lemma has led to the solution of major problems in property testing and giving rise to the theory of graph limits.

In 2010, the 70th birthday of Szemeredi was celebrated at Budapest, through a conference organized by the Alfred Renyi Institute of Mathematics and the Janos Bolyai Mathematical Society. Prior to it, a book depicting Szemeredi's life and work was published titled "An Irregular Mind". In it, the contributors have unequivocally agreed that he has an irregular mind, quite different from most mathematicians, which has made his way of thinking unique and vision extraordinary.

Endre Szemeredi received the 2012 Abel Prize from His Majesty King Harald

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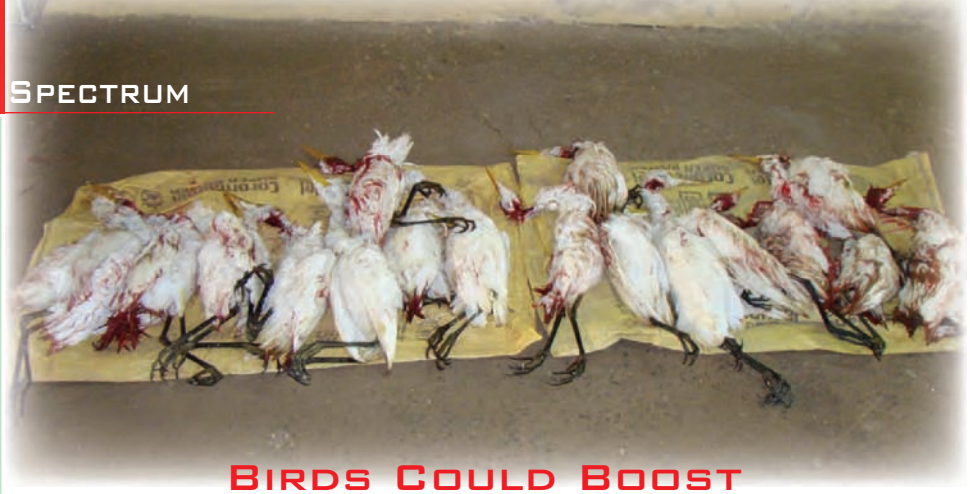

Cattle egrets killed by shotgun and ready for the market

Birds Could Boost Agricultural Prospects

Although India's growing population is expected to require additional food grain of about 2 million tonne per year, recent reports reveal that production losses through insect pests, diseases and weeds have shown an increasing trend over the years. Annual crop losses due to insect pests and diseases alone are estimated to be 18% of the agricultural output. During 1983, the losses due to insect pests were estimated around Rs 6,000 crores, which increased to Rs 20,000 crores in 1993 and to 29,000 crores in 1996. Obviously, controlling the insect pest in agriculture is a major concern.

However, researchers have expressed concerns about the safety of the increasingly used pesticides and recommended finding an effective alternative such as bio pesticide and biocontrol.

It is a sad irony that the importance of birds in Indian agriculture sector is poorly studied till date. In the past, birds were considered a serious threat to standing crops like paddy, corn and gram as well as the stored agriculture products. Invariably all the birds that visit the field are viewed as crop pests or predators. But this is only partially true; astonishingly the damage ratio is negligible as compared to the benefits.

Birds play an economically significant role in agriculture environment by way of controlling weeds by consuming the seeds and preventing further invasion. Moreover, the insects that destroy the agriculture products in all the stages are effectively controlled by the insectivorous birds. Especially during the pest outbreaks, the birds are the only natural and eco-friendly saviours of the crop.

Most studies have disclosed that major proportions of birds (60-80%) that utilize the agriculture land are insectivores and carnivores. Some of these birds are Black Drongo, Pittas, Larks, Swallows, Indian Roller, Common myna, Common hoopoe, Tree pie, Pond heron, Cattle egret, Red Wattled lapwing, Barn owl, Spotted owlet and Kites.

For instance, Cattle egret, mainly feed on the orthopterans (51.1%), isopterans (19.9%), other invertebrates (15.3%) and Acarina (0.4%) and vertebrates (2.0%). All the major preys of Cattle egrets were identified as serious pests in agricultural lands with 88.7% pest status. It is estimated that every 100 prey consumed by Cattle egrets could save 1,58,361.54 hectares of farmland in one season.

The application of pesticide in agriculture land is driving many common birds like Sarus crane and House sparrow to the verge of extinction. Moreover, in recent times farmlands have turned into bird hunting yards. Many people in delta districts have become consummate bird hunters. There is also a very good market for the poached birds in this region. A number of hotels regularly purchase the birds from the poachers, and the birds are available in nearby slaughterhouses and fish markets.

Unfortunately, the hunters target the most beneficial species such as Cattle egrets, Bitterns, Herons, Sandpipers and Storks. The hunting reaches it peak during the rainy season, ploughing periods and weekends. The uncontrolled killing of this species might have a palpable effect on agriculture and might lead to frequent pest outbreaks.

It is high time to adopt a roadmap to stop the brutal killing of birds from agricultural lands for which continuous awareness and monitoring programmes should be conducted. Forest and agriculture departments should join their hands to achieve these objectives.

Trapped Cattle egrets counting their seconds to death

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