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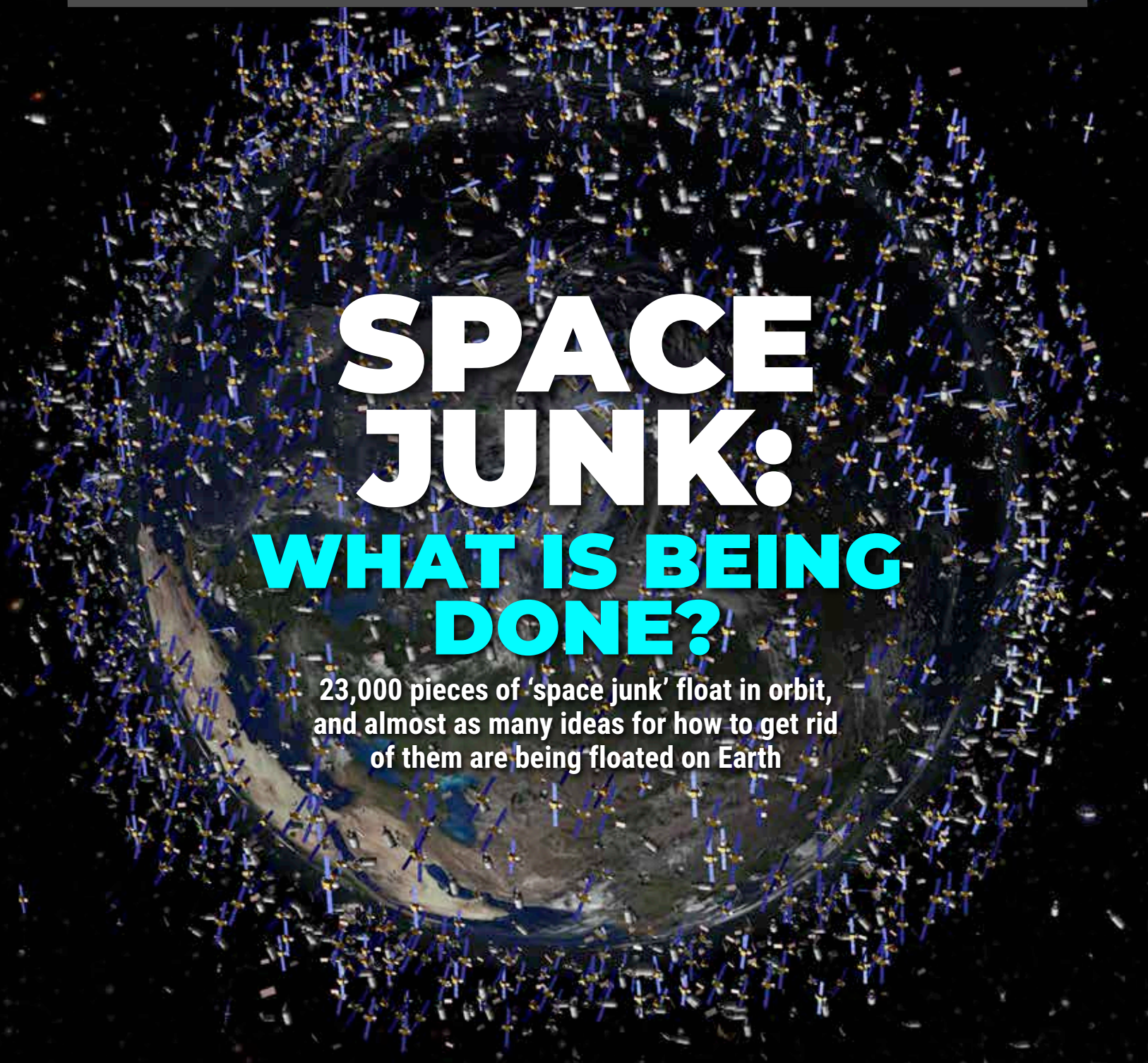
RNI NO. MAHENG/2013/48866 ■ VOLUME 09 ■ ISSUE 08 ■ MARCH 2022 ■ PRICE ₹100 ■ TOTAL PAGES: 52



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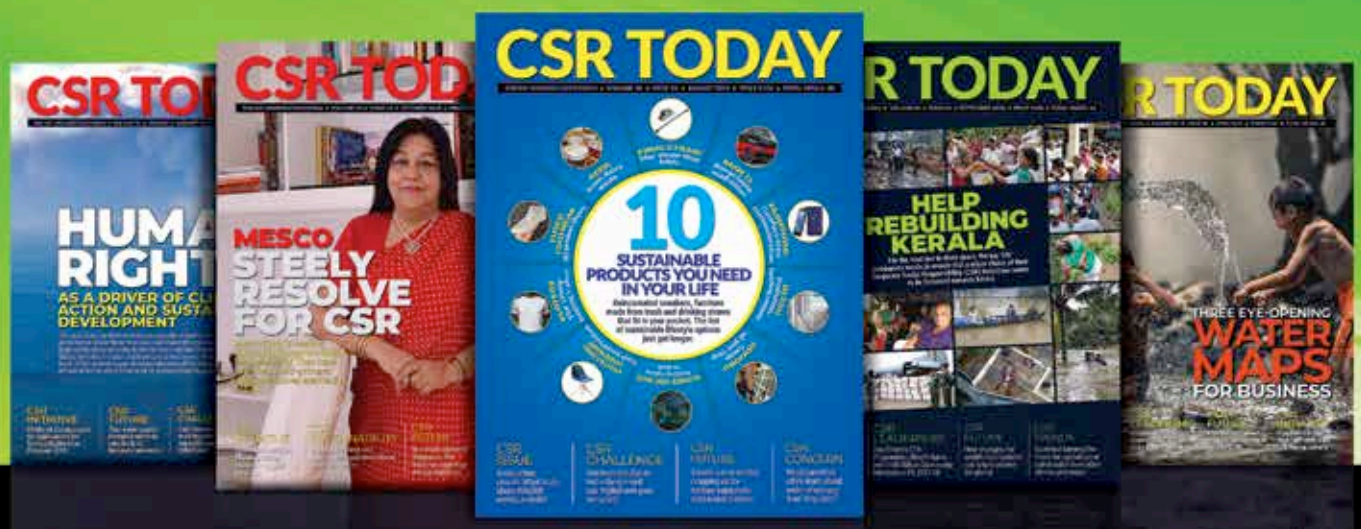

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Invasive species prevention 'could save trillions'

Invasive species are a threat to biodiversity, can cause degradation of ecosystems and, in some regions, threaten the lives and livelihoods of people affected, according to a study.

Rajesh Tiwari
Publisher
rt@iccsr.org

> "The bottom line is that we are spending far too little to care for nature by preventing species invasions, and we are paying trillions of dollars in damages as a result."

The cost of damage caused by invasive species around the world, including to agriculture, fisheries, and forestry, is at least 10 times that of preventing or controlling them, an international study suggests.

The research, published in Science of the Total Environment earlier this month, highlights the huge economic burden of invasive species and says their prevention could save trillions of US dollars.

Invasive species are non-native species that often harm the new environment they populate. They are a threat to biodiversity, can cause degradation of ecosystems and, in some regions, threaten the lives and livelihoods of people affected.

Lead researcher Ross Cuthbert, from the School of Biological Sciences at Queen's University Belfast, in Northern Ireland, said: "Once invasive species have established and are spreading, it can be difficult to eradicate them. Delayed control measures often are not only costly, but frequently are unsuccessful in the long-term."

The research team, consisting of scientists from 17 institutions, constructed and used a global database compiling economic costs of invasive species, which enabled comparisons to be made across different scales and contexts.

They found that since 1960 the global management of invasive species has cost at least US$95 billion worldwide, while damage costs have reached at least US$1,131 billion over the same period.

Losses have hit the agriculture and forestry sectors in the form of production declines and infrastructural damage, as well as global healthcare systems through the spreading of diseases, the researchers said.

The team quantified costs according to different management types at a global scale and developed and applied a model to predict the additional costs of management delay, using the available data. Only a fraction of the expenditure on invasive species management went on proactive prevention measures, the study found. Most ($73 billion) was spent on control or eradication measures when damage is already underway.

"By the time we see the impact that invasive species are having on the environment, it is often too late as they have already established and spread widely," said Cuthbert.

"It is difficult to convince decision-makers to invest in something that is not yet a problem, but our research clearly shows the value in taking a preventative approach."

Biological invasions are one of the largest threats to biodiversity, but there has been insufficient investment to reduce rates of invasion and their impacts on ecosystems and economies, he added.

The researchers found that developing countries in particular are investing little in the management of biological invasions.

According to CABI, the parent organisation of *SciDev.Net* which works to address environmental challenges such as invasive species, millions of the world's most vulnerable people face problems with invasive weeds, insects, plant diseases and animals.

Lee Hannah, a senior scientist at Conservation International's Betty and Gordon Moore Center for Science, in the US, told *SciDev.Net*: "The bottom line is that we are spending far too little to care for nature by preventing species invasions, and we are paying trillions of dollars in damages as a result."

Hannah cited South Africa as an example where the costs of managing invasions have exceeded the alternative costs of prevention. He said the country spends more than $25 million each year removing aggressive invasive plants such as the black wattle (Acacia mearnsii) tree, which has a number of harmful environmental impacts.

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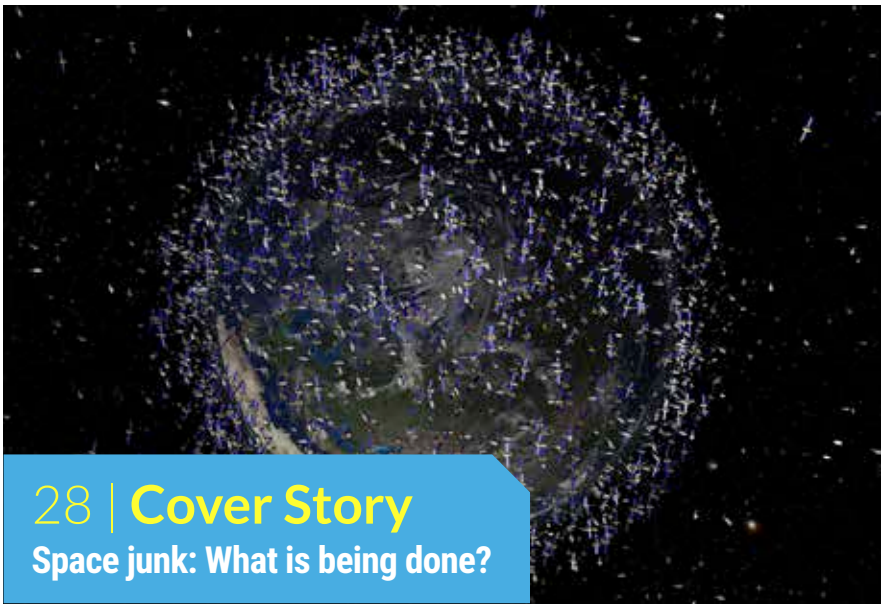

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CSR TODAY
MARCH 2022 | VOL. 09 | ISSUE 08

PRINTER AND PUBLISHER: Rajesh Tiwari

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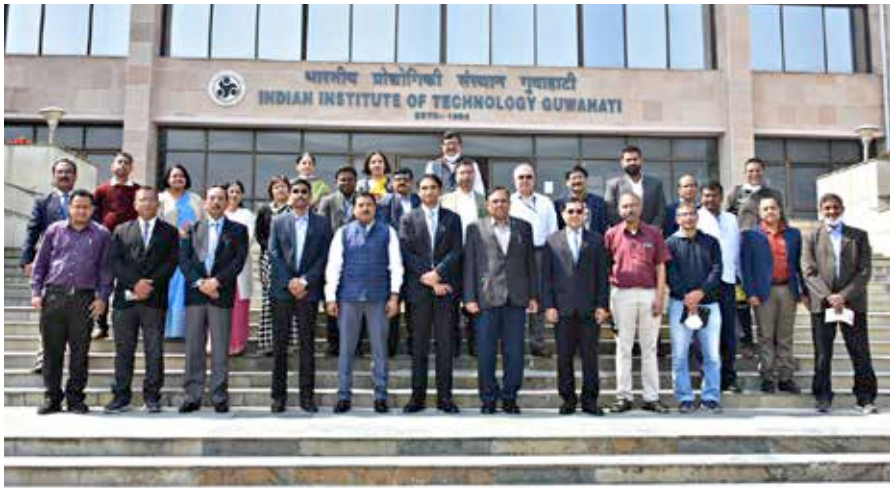
Printed, Published and Edited by Rajesh Tiwari on behalf of Indian Centre For Corporate Social Resposibility, Printed at The Pack-Age, 196-I, Katrak Compound, J.S.S. Road, Gaiwadi, Girgaon, Mumbai - 400 004 and Published from Indian Centre For Corporate Social Resposibility, 106/A, Nirman Kendra, Plot No.3, Dr. E. Morses Road, Mahalaxmi Estate, Mahalaxmi, Mumbai 400 011.
Editor: Rajesh Tiwari

IIT Guwahati and Government of Assam collaborates to augment the development of the region



The Indian Institute of Technology Guwahati and officials from various departments of the Assam Government had an elaborate meeting to prepare the future course of action and collaborate in various fields related to the development of the region.

The government delegation comprising officials from various departments such as Mines and Minerals, Industry, Commerce, Public Enterprises, and Transport (includes inland waterways) was led by Dr. K. K. Dwivedi, IAS, Principal Secretary to the Government of Assam. The team from IIT Guwahati was led by Prof. T. G. Sitharam, Director IIT Guwahati. The focused discussion areas were:

Opening of a Mining Department at IIT Guwahati: This initiative is expected to help to train young students and involve seasoned professionals in developing ways and means in the form of research and technical guidance to harness the abundant natural resources spread across the state of Assam and the northeast.

IIT Guwahati's involvement in organizing the international road safety conclave will be taken up immediately and efforts to enhance road safety across the region will be intensified along with the Ministry of Transport, Government of Assam.

Means and ways to advance tea technology: IIT Guwahati will give impetus to research on the use of tea compounds in various sectors such as medicine, health, and wellness sector. Efforts to highlight the importance of various types of tea and their rich ingredients will be carried out along with the state officials.

Prof. T. G. Sitharam, Director IIT Guwahati has said, “As per the request of the state government, IIT Guwahati will be very glad to contribute mainly in the areas focusing in the exploration of mines & minerals, commerce & entrepreneurship development, involvement of drones in various sectors, transport sector - Inland water transport, water buses, road safety, aspects related to skill development in multiple upcoming sectors and establishing various centres of excellence & state of the art laboratories at the institute.”

Dr. K. K Dwivedi IAS, Principal Secretary to the Government of Assam, Industries Commerce & Public Enterprises Department highlighted the importance of setting up the school of mines at IIT Guwahati and centres of excellence in areas of inland waterways, promoting Assamese traditional jewelry making, innovation in the tea sector, skill training leading to startups and adopting newer technology for enhancing road safety.

The government of Assam has sought IIT Guwahati's collaboration and support in the proposed plan to set up Assam Skill University. Under the purview of the engineering department, a research and development facility is proposed to be accommodated in multiple aspects to look after inland water transport (marine engine design, designing of vessels, and its repairing and servicing hub).

CSR INDIA UNITED

RPG Foundation & National Health Mission expand the "Fever Clinics" initiative to boost health care accessibility in semi urban and rural Maharashtra

RPG Foundation, the CSR arm of RPG Group has installed 100 Fever Clinics in Maharashtra. This first-of-its-kind initiative, undertaken with the support of RPG Group in collaboration with the National Health Mission (Maharashtra) and the Public Health Department, Government of Maharashtra, aims to provide people in villages with easy access to basic healthcare.

This initiative has shown tremendous positive results, with enhanced COVID-19 testing and treatment of respiratory illnesses in rural Maharashtra. Encouraged by the successful implementation of the first 100 clinics, NHM and RPGF have decided to continue the collaboration and set up another 100 clinics.

Maharashtra has around 43,665 villages, which shelter 12.5 crore people as per the latest census report of 2011 across 36 districts. There are 13,802 healthcare facilities. This means there is 1 facility available for 9,055 people, and the closest facility is normally quite a distance away from the village. RPG's Fever Clinic with the aim to address this concern has started putting up Fever Clinics in villages and cities like Thane in Maharashtra since July 2021.

Portable Clinics aim to bring down the massive gap in the doctor to patient ratios in rural areas of the state

Encouraged by the on-ground impact demonstrated by the first 100 Fever Clinics, RPGF is setting up a 100 more clinics across Rural Maharashtra

These portable clinics have been set up at the district, sub-district and rural levels to make them conveniently accessible. This move has helped in reducing mortality rates due to timely treatment. It has also helped diagnose and treat respiratory disorders significantly during the peak of the pandemic.

Radha Goenka, Director, RPG Foundation said, "One of the major goals of this initiative is to support the government's plan to provide enhanced healthcare in rural areas with all the infrastructural amenities that healthcare professionals need to perform their duties. We are very proud of our success in opening a 100 Fever Clinics and intend to keep the momentum going. Everyone has a right to quality healthcare and our initiative is just one step in this direction."

Shri Ramaswami N, Mission Director, Maharashtra said, "RPG Foundation in association with the National Health Mission, Maharashtra has created a huge impact in COVID-19 patient management. With due regard their noble intentions and relentless support, we have been able to set up effective and fully functional portable clinics in our rural hospitals. Embarking together on a common mission along with RPG's vision to reform and provide the best medical facilities to rural people has made this association an encouraging endeavour. We look forward to joining hands with RPG Foundation on more such initiatives and work together towards building a better future for our people."

Since the start of this initiative, the clinics have served over 3 lakh patients from remote villages in Maharashtra. The clinics are well-equipped porta cabins made from GI Sheets and include an examination bed, a medical storage cabinet, 2 tables, a washbasin, a sample collection area (used for covid testing too), a sanitiser stand, an extra stack of chairs, and curtains to compartmentalise it as necessary. In addition, it also includes an out-patient department to provide consultation services after diagnosis. Each clinic is manned by one doctor and a medical attendant from the NHM. NHM also ensures that the clinic is operational from 9am to 5pm on all working days, token systems are put into application to reduce waiting time, and use of protective gear such as masks, gloves and face shields.

RPG Foundation has engaged an independent agency for the evaluation of the project. The results of the study will help in effective management and expansion of the initiative. The Foundation aims to convene a meet with all stakeholders to discuss the way forward.

IIT Guwahati launches Master's programme in Liberal Arts

The Indian Institute of Technology Guwahati is launching a Master's programme in Liberal Arts. It will be offered by the Department of Humanities and Social Sciences, IIT Guwahati from the academic year 2022-2023. The first batch of 30 students will be admitted from the upcoming July 2022 semester based on specific admission criteria to be announced soon.

The programme aims to offer cross-disciplinary and multidisciplinary training to students and hone their ability to think critically and creatively about social, political, and aesthetic issues that concern our world today and would align with the NEP2020. By engaging in meaningful cross-disciplinary and multidisciplinary conversations, students will learn to make informed judgments and choices, while also remaining aware of their ethical implications.

The challenges faced by humanity and the planet today require a holistic approach, lateral thinking abilities, and non-traditional problem-solving skills in the future citizens of the world. The programme will help students to be creative with the skill sets they acquire and to address real-life problems. The programme will also offer opportunities for interested learners to engage with digital technology and methodology, think critically about technological paradigms, and apply digital tools in critical humanities research in praxis-based projects.

Speaking about the launch of this degree program, Prof. T. G. Sitharam, Director IIT Guwahati emphasized that the main motive of this liberal arts program is to promote a multi-disciplinary approach in all aspects of higher education so that the youth are exposed to critical thinking, analytical reasoning, encourage creativity, multi-lingual and traditional knowledge while they prepare for complex and wide-ranging jobs.

The courses have been prudently designed keeping in mind the new developments in academia such as thinking across disciplines and including Liberal Arts philosophy in enhancing life skills. The range of courses comprising cores and electives is geared towards the orientation of Liberal Arts concepts like Geo- Spatial Analytics, Digital Humanities, International Relations, and Diplomacy, Study of vernacular literature and languages, Area Studies, etc. Self-learning projects in each semester will be the unique highlight of these academic project work. This will inculcate leadership qualities in students and make them front runners and policymakers of the future.

The course on Master's in Liberal Arts programme will be crucial in securing a place for the institute in the liberal arts higher education map.

Jaro Education announces "I Wish to Make a Difference" an education initiative to support over 1000 underprivileged children

Jaro Education, an executive education focused edtech company, announced an education initiative – 'I Wish to Make a Difference' as part of its annual CSR activity. The company will partner with over a hundred orphanages across India to support the academic needs of more than a thousand children. The company will fund the tuition fee and other education-related expenditures for these children.

The initiative was kick-started by collaborating with Sneha Sadan, a Mumbai-based Orphanage. As part of the initiative, Jaro Education will also provide Smart TVs in each orphanage with an annual subscription of Toppscholars, an AI-based smart learning app for K-12 students, which will help in strengthening the academic performance of these students.

Speaking about the CSR initiative, Ranjita Raman, Chief Executive Officer at Jaro Education, said, "As an organisation, we strongly believe in giving back to society. We want to empower underprivileged students by supporting their educational journey. Jaro Education aims to reinforce and uplift the downtrodden and underprivileged by helping them seek high quality and tech-driven education. The education initiative 'I Wish to Make a Difference' will be the needle-mover towards shaping India's $5 trillion economy dream. Jaro Education will continue to stay firmly committed, accountable and lend a helping hand to those in need."

Raman further added, "Even employees at Jaro have provided extra efforts to go above and beyond their duty; generously donating a certain amount to make the world a better place".

SPACE JUNK: WHAT IS BEING DONE?

23,000 pieces of 'space junk' float in orbit, and almost as many ideas for how to get rid of them are being floated on Earth, writes **Alice Gorman**

From the European Space Agency - an artist's illustration of the huge numbers of satellites and space debris in orbit today.
Image: HopefulinNJ/flickr

The US Vanguard 1 satellite and the rocket stage that delivered it to orbit in 1958 are pieces of cultural heritage. They date from a time when humans first attained the capability of reaching beyond our home planet to the stars. They also have the dubious honour of being the first 'space junk'.

NASA estimates there are around 27,000 human-made objects larger than 10 centimetres that can be classified as space junk – that is, they do not have a useful purpose, either now or in the foreseeable future. These include old satellites, rocket bodies, and fragments of exploded or decaying spacecraft. The smaller bits, down to dust grain-size, number in the millions.

The problem is that collisions between this high-speed trash create more space junk. The worst-case scenario is known as Kessler Syndrome, an unstoppable cascade of collisions which could make parts of Earth orbit unusable.

It's an increasingly pressing situation as private corporations like SpaceX are slated to launch up to 100,000 new satellites by the end of the decade. Anti-satellite missiles, like the one tested by Russia in 2021, can add hundreds to thousands of new debris pieces in one event.

One of the big problems is we don't know enough about where, what and how much space junk there is. This means we don't always know when a piece of space junk is about to collide with something, or how far we really are from Kessler Syndrome. This is a problem firstly, of observation and tracking, and secondly, of modelling and simulation of this highly complex data.

Lots of 'blind spots' are yet to be covered, like the tiny fragments and dust, and the higher orbits which are difficult to see from Earth's surface. Adding new instruments and techniques for observing space junk will address this.

For example, LeoLabs built a new space radar in New Zealand in 2019, picking up some of the blind spots in the Pacific region. HEO Robotics is developing observing capabilities in Earth orbit which can monitor the condition of spacecraft.

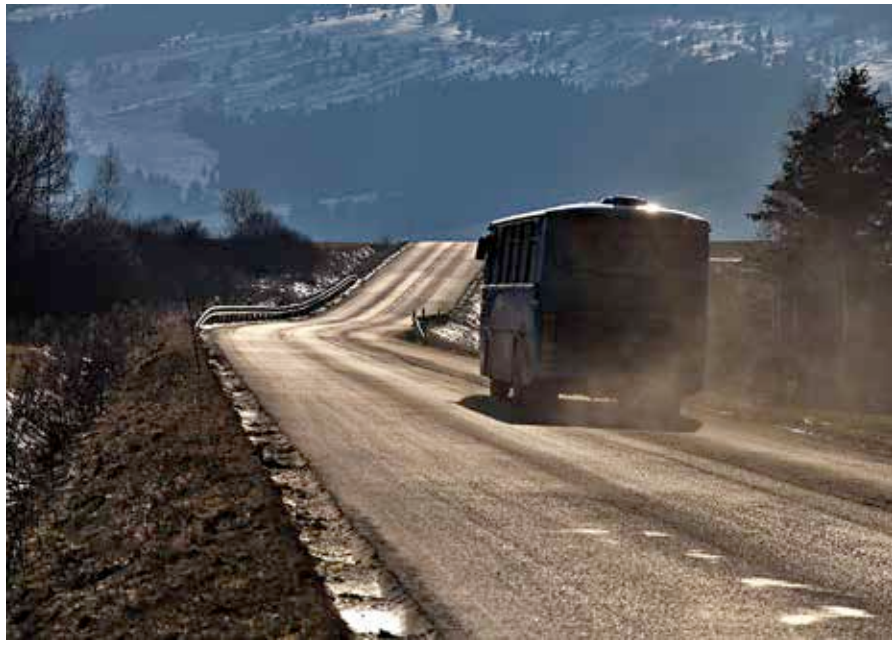
An increasingly popular approach is space traffic management. This aims to use space more efficiently and sustainably by coordinating and sharing information, such as that needed to avoid collisions, at the international and agency level.

International cooperation, of course, is an essential part of the solution. The Interagency Space Debris Coordination Committee (IADC) facilitates cooperation in space debris research, and monitors the progress of ongoing cooperative activities. The IADC recommends each mission has a debris mitigation management plan.

The UN – through the Office of Outer Space Affairs and the Committee on the Peaceful Uses of Outer Space – is also a key international

Going net-zero: Mind the data gap

As companies in the Asia Pacific aim for net zero emissions, they may be stymied by data gaps such as a lack of emissions data from their suppliers. Here's what they can do to overcome such obstacles.



The road to net-zero features numerous challenges for businesses, the first one being how companies use data to measure their carbon footprint. *Image: Jack/Flickr*

Companies across Asia Pacific are racing to decarbonise as consumers and investors scrutinise the carbon footprint of the corporate world.

Environmental non-profit organisation CDP noted that over 3,000 firms from 21 countries in the region disclosed their sustainability performance, risks, opportunities, strategies and targets to it in 2020, an increase of almost 20 per cent in a year.

About 70 per cent of those businesses had emissions reduction targets, and were carrying out initiatives such as setting an internal price on carbon, researching and developing low-carbon products, and allocating a dedicated budget for energy-efficiency measures.

Still, CDP highlighted gaps. "Despite increased reporting on direct operations, emissions data from supply chains remains elusive," it said, adding that such information is crucial as firms' supply chain emissions are, on average, 11.4 times as high as their operational emissions.

To accomplish net-zero emissions, businesses should follow six steps, said Michael Salvatico, head of Asia Pacific environmental, social and governance (ESG); business development at market intelligence firm S&P Global's sustainability intelligence group, Sustainable1.

They should quantify the emissions from their entire value chain, including operations, supply chains and investment portfolios, to determine their baseline for reduction plans and targets.

"Our data shows that for most business activities, the largest proportion of the carbon footprint is concealed in supply chains or in the product use and disposal phase; on average 85 per cent of carbon emissions are concealed in supply chain business activities," he said.

Companies should also track whether the firms in their supply chains and investment portfolios are decarbonising in line with the Paris Agreement's goals, and analyse their future risk scenarios and potential transition pathways to net zero emissions. The Paris Agreement, signed in 2015, set out to limit global warming to 1.5 degrees Celsius above pre-industrial levels before the end of the centure.

After that, they should set meaningful science-based emissions reduction targets, report their progress in a way that aligns with best practice standards, such as the Task Force on Climate-related Financial Disclosures' (TCFD) recommendations, and aim for net zero

Deep ocean carbon drawdown not an easy climate fix

The deep ocean can be used for carbon dioxide removal from our atmosphere. Here are the opportunities, risks and constraints, writes **Phil Williamson**

Relicanthus sp.— a new species from a new order of Cnidaria collected at 4,100 meters in the Clarion-Clipperton Fracture Zone (CCZ) that lives on sponge stalks attached to nodules. *Image courtesy of Craig Smith and Diva Amon, ABYSSLINE Project/NOAA.*

The ocean and climate are inextricably linked. More than 90 per cent of the extra heat from global warming has gone into the deep blue sea, with associated climate-driven changes reducing the productivity of fisheries and threatening more than 600 million people through sea-level rise. Yet the ocean offers opportunities: it could also be a source of solutions rather than just a victim of climate change.

One possibility is increasing the ocean's uptake of carbon dioxide (CO2) from the atmosphere and storing it in the deep. Doing so on a large scale would help deliver the net zero goal of the Paris Climate Change Agreement. But considerations beyond just the financial commitments of research and development, costed at US$2.5 billion, will need to be taken into account.

Either biology or chemistry could be used to remove carbon dioxide from the atmosphere to store it in the ocean. The most straightforward approach is a 'nature-based solution', restoring the natural functions and processes already provided by our environment. Protecting marine ecosystems by ending overfishing and other conservation actions can reinstate the role of top predators in marine food webs, particularly those of the deep ocean — found in depths beyond 200 metres. The resulting increase in the abundance of larger organisms, such as fish and whales would transfer organic carbon from surface waters to deeper layers through faeces and deadfall, slowing the return of that carbon to the atmosphere.

The need to end overfishing through improved ocean protection is internationally recognised by UN Sustainable Development Goal 14, and associated targets of the Convention for Biological Diversity (CBD) and the World Parks Congress. The main problem in using this approach for climate mitigation is that the additional carbon removed from the atmosphere on a long-term basis is likely to be relatively small. The removal also cannot be easily attributable to any single country. Whilst ocean ecosystem restoration is undoubtedly worthwhile for the many non-climatic benefits it can provide, signatories of the Paris Climate Change Agreement are required to communicate their emission reduction strategies and quantify their national contributions.

In theory, much greater CO2 drawdown is possible if the growth of marine phytoplankton (microscopic floating algae) can be increased by ocean fertilisation, for parts of the ocean where dissolved nutrients in seawater are in short supply. Directly adding relatively small amounts of biologically-available iron, or larger amounts of nitrogen and phosphorus, would stimulate phytoplankton blooms, converting inorganic carbon dioxide to plant biomass. Pumping up nutrient- rich water from the deep using underwater pipes, referred to as artificial upwelling, could also be used to achieve the same effect.

These ideas were first suggested in the early 1990s, and have been investigated by patch-scale field experiments and modelling studies, however, many key issues remain unresolved. These include: whether fisheries might benefit or suffer if ocean productivity is increased in this way; whether there might be other damaging side effects; for example, reducing productivity elsewhere, potentially many thousands of kilometres away (linked by ocean circulation patterns) and the uncertain rate of return of CO2 to the atmosphere over the next 50-100 years.

Concerns that there might be damaging side effects resulted in a non-binding moratorium on ocean fertilisation in 2008, followed

Beekeeper Chitra Bhan Khatri examines a bee colony in his apiary in Dang, Nepal. *Image: Thomson Reuters Foundation/Pramod Acharya*

Nepal's blossoming honey industry crushed by wild weather

Heavy rains and long droughts are robbing bees of food and killing the insects, drying up Nepal's supply of the sticky stuff.

In the 15 years Chitra Bhan Khatri has been keeping bees in west Nepal, he never had trouble providing food for his insects — until last year, when unseasonally heavy rain left his honeybees hungry. Five days of torrential rainfall in Dang district in October sent temperatures plummeting, killing the bright yellow blooms of the mustard plants Khatri grows to provide nectar and pollen for his 300 colonies of European honeybees.

Then, when he took his bees to graze on nectar from chiuri (butter) trees in a nearby forest, the rain had knocked all the flowers off their branches, he said.

As he walked through his apiary inspecting his hives with their empty honeycombs, the 44-year-old beekeeper said he used to extract more than 40 kg (88 pounds) of honey per hive each year. But in 2021, his insects produced less than half of that.

Previously, Khatri had always been able to move his hives to another part of the region to feed — but last year there was almost no pollen or nectar to be found anywhere. "My 500,000-rupee ($4,220) investment has all gone in vain," he said. "Honey is my sole source of income. I don't know how I can cover my household expenses."

Heavy rain, prolonged drought and harsher winters have thrown off flowering seasons and destroyed blossoms across Nepal over the past decade, decimating the country's honey supply.

In 2020, Nepal's beekeepers produced about 50 per cent less honey than three years earlier — and the warming climate is a big reason for the drop, said Shiva Prasad Sharma, a beekeeper and president of the Federation of Nepal Beekeepers (FNBK). National honey yield data for 2021 is not yet

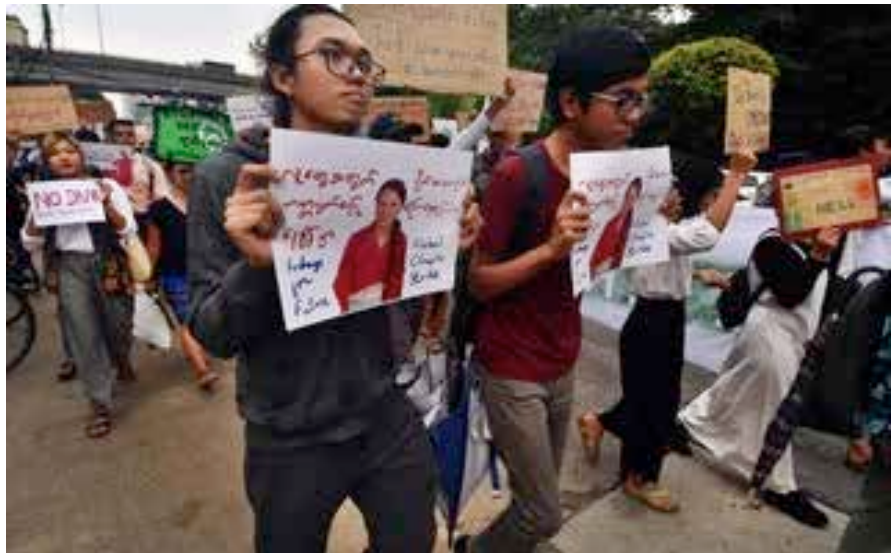
WILL GREEN PARTIES RISE IN SOUTHEAST ASIA?

Greens often prosper in federal systems, in countries with service-based economies, and in situations where environmental issues are part of mainstream political debates. Southeast Asia may eventually see the rise of its own green movement, states Michael Schaper

2022 will see several interesting contests taking place in Southeast Asia's democracies. A general ballot – for the Presidency and congress – will be held in The Philippines in early May, while Malaysia and Thailand face the prospect of early polls as political instability and uncertainty roil both nations.

Yet one thing is likely to be absent in the region: a major green political party.

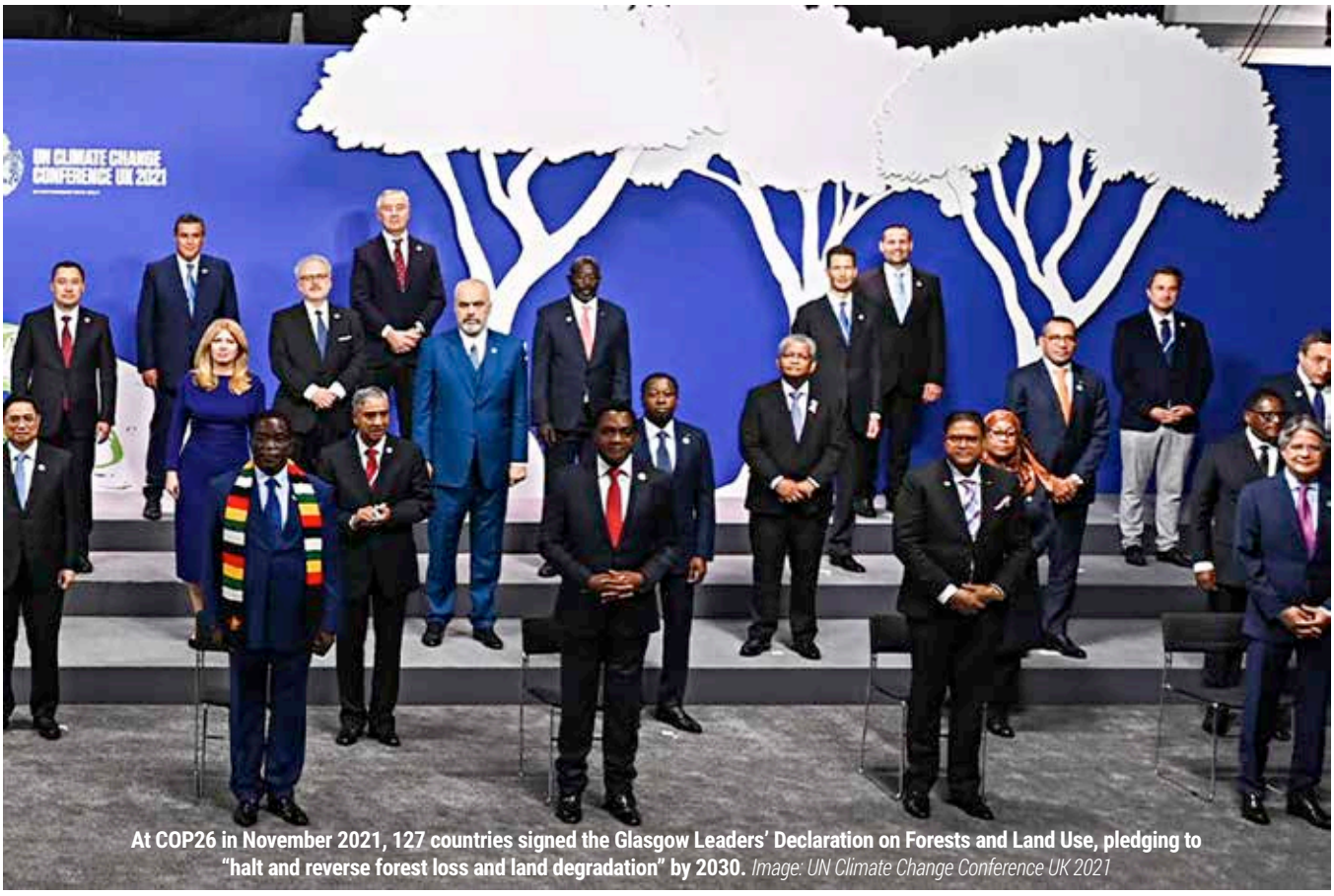
It is a curious anomaly, because organised environmental parties have become increasingly important in political systems around the rest of the globe. Since the first overtly green candidates began standing for office in the early 1970s in Australia, New Zealand, Switzerland and Germany, they have now spread into most democracies. Today, they can also be found in local, state or provincial, and national legislatures in countries — and electoral systems — as diverse as France, Finland, Rwanda, Colombia, Mexico, Brazil, the United Kingdom, Canada, Vanuatu, the European Parliament, and the United States.



Young demonstrators taking part in a climate strike in Yangon in 2019. *Image: Steve Tickner / Frontier*

Many Greens Members of Parliament (MPs) have held ministerial offices and some have even served as prime minister. As the Council on Foreign Relations noted last year, green politics is now reshaping much of the global political system.

In other parts of Asia, greens have played significant political roles over several decades. In 1990, Green MPs in Mongolia formed part of that country's first post-communist governing coalition. Taiwan's greens currently hold several local government seats, and have previously



At COP26 in November 2021, 127 countries signed the Glasgow Leaders' Declaration on Forests and Land Use, pledging to "halt and reverse forest loss and land degradation" by 2030. *Image: UN Climate Change Conference UK 2021*

7 TRENDS THAT WILL SHAPE SUSTAINABILITY IN 2022

In the coming year, we should expect to see stricter laws to expose 'greenwashers' and rising demand for clear disclosure and reporting standards, writes **Hannah Alcoseba Fernandez**

The prolonged coronavirus pandemic continued to force seismic shifts in public policy and company behaviour. It brought about important fixes in the financial system and altered how businesses reacted to the impacts of climate change.

Before this year's COP26 climate conference in Glasgow, more than 1,000 companies had committed to adopt science-based targets to reduce emissions in

The ten juvenile, captive-bred Asian giant tortoises are fitted with radio transmitters at the Turtle Conservation Center in Bhawal National Park prior to their release.
Image: Kowshikur Rahman / CCA

WILD RELEASE SIGNALS RETURN OF GIANT FOREST TORTOISES TO BANGLADESH HILLS