ASIA-PACIFIC

AUSTRALIA

Coral reef restoration

Ocean scientists from The University of Western Australia (UWA) have partnered with global company Mars to optimize the design of a coral reef restoration system which could help accelerate the recovery of damaged reefs while also helping to protect coastlines from storm damage. Originally developed by Mars in 2011, the Mars Assisted Reef Restoration System (MARRS) involves growing coral fragments on large hexagonal-shaped structures coated in coral sand, which develop into larger reef structures over time.

Professor Ryan Lowe, from UWA's Oceans Institute and Oceans Graduate School, said the impacts of global warming and resulting marine heatwaves, tropical cyclones, and poor water quality had all contributed to a substantial decline in coral reefs worldwide. The research team—which includes Master of Professional Engineering student Sonia Westera and PhD student Justin Geldard—evaluated the performance of the MARRS reef stars using a 54-m long wave flume at UWA's Coastal and Offshore Engineering Laboratory, which allows realistic wave conditions to be simulated in a controlled environment.

Mars Marine Program Manager Alicia McArdle said the wave flume was an important part of the partnership, as it enabled the team to further understand the interaction between reef stars, ocean waves, and the coral rubble underneath. "Since 2007, we've been working with leading experts, researchers and communities across Indonesia, Mexico and Australia's Great Barrier Reef to develop a process that is capable of rapidly rebuilding a damaged coral reef," Ms McArdle said. "Our restoration process has been successful in rebuilding coral reefs in Indonesia where coral cover has increased from 10 per cent to more than 60 per cent within just two years."

"Our restoration process has been successful in rebuilding coral reefs in Indonesia where coral cover has increased from 10 per cent to more than 60 per cent within just two years, driving significant increases in fish diversity and biomass." According to Professor Lowe, the future global demand for coral reef restoration is set to increase. "As the focus becomes more on large-scale implementations of coral restorations, there are many more practical and technological challenges that will require engineering solutions," he said.

https://indiaeducationdiary.in

CHINA

High-tech anti-flood efforts

China's inland Henan Province has been severely hit by torrential rains and floods since mid-July. Shortly after the flood occurred, Fengyun-series satellites developed by China Aerospace Science and Technology Corporation (CASC) have been put into use to acquire space-based observation data for real-time situation analysis and subsequent disaster assessment.

FY-4B satellite, inter alia, was activated with the fast-imaging mode in high frequency to incessantly monitor the rainfall patterns and tendencies. In addition, Gaofen-series satellites including GF-3 and GF-6 have also delivered necessary services to the Ministry of Emergency Management and on-site rescue teams in checking the local conditions and adjusting the relief work.

Apart from supply carriage and epidemic disinfestation, unmanned aerial vehicles (UAVs) could also perform in illumination and communication. Damaged by the floods, domestic water and electricity were cut off in many residential zones and the water supply plant of Zhengzhou City was in a burning need to be repaired. The Dolphin-1 surface rescue robot, a smart lifeboat that can bear two or three adults and reach three meters per second with no load, was transported to the deluge-afflicted areas and operated over water by a remote controller, allowing the rescuers to swiftly and accurately stretch out to the victims.

Another type of intelligent equipment – an emergency floating bridge – was installed overnight with miscellaneous shapes to transfer 1,400 people trapped in Xinxiang City. It is one of the most pioneering water-rescue apparatus designed by China State Shipbuilding Corporation Limited (CSSC), and can be utilised to tackle the ever-changing conditions and ensure the resettlement of the affected people, thus it's also known as "the lifesaving bridge."

https://opengovasia.com

Anti-mosquito technique using nuclear technology

Chinese researchers had studied and developed a modern biological technology that can potentially eradicate deadly mosquito-borne diseases using nuclear technology. Their eradication project intends to wiping out specific mosquitoes in different regions and prevent its transmission. The study founded by researchers from the Nuclear Technology Research and Development Center of the China Atomic Energy Authority (CAEA) was commended by International Atomic Energy Agency for its innovation. CAEA was founded in partnership with the Sun Yat-sen University in 2020.

Basically, male mosquitoes are prevented to produce an offspring by removing their reproductive capacity using radiation from nuclear technologies. This way, the event of them repopulating would not be possible even when they mate with wild female mosquitoes. The sterile mosquito technique was proven to have "strong and long-lasting effectiveness, without chemical pollution harm to other animals or drug-resistance in mosquitoes," according to the director of the center, Wu Zhongdao. Wu believes the technique can reduce mosquito-borne disease and its transmission to people, which is considered a global problem. World Health Organization (WHO) estimates 700,000 deaths every year linked to mosquitoes.

The sterile mosquito technique is also built to reduce morbidity, according to Zhang Dongjing, a research fellow of the center. Zhang also went to Johannesburg in 2020 to facilitate and assist the technique to the China's national infectious diseases center. The Sun Yat-sen University in Guangzhou, China also studied sterile mosquitoes in hopes to fight Zika, a virus transmitted primarily by *Aedes* mosquitoes. Their lab

was considered the world's largest mosquito factory which prevents fertilization of eggs. The mosquitoes infected with a strain of *Wolbachia pipientis*, a bacterium that inhibits Zika and other viruses, were then released by the center on Shazai Island to mate with wild females and stop the next generation.

Using the nuclear technology, the university also plans to set up three to four anti-mosquito demonstration sites in the Guangdong-Hong Kong-Macao Greater Bay Area and set up overseas training bases to completely suppress mosquito population.

https://www.natureworldnews.com

INDIA

Agronomy services to empower farmers

Amazon Retail has launched its agronomy services to empower farmers through an initiative that gives them timely advice and enables them to make accurate decisions on actions required for their crops. This includes introducing machine learning technology for better produce and build a robust supply chain infrastructure.

As part of the agronomy service launch, Amazon Retail has built an ecosystem through a combination of Agronomist driven field interventions, and farm management tool to track the impact of interventions. Each enrolled farmer partner is onboarded on the farm management tool to provide timely intervention that farmers need and value. The team of qualified Agronomists offer Agritech expertise to registered farmer partners for better farm yield and improved product quality. Along with it, the Agronomists provide a comprehensive scientific and precise advisory to the farmers.

The program includes proactive and reactive crop plans: Proactive crop plan is based on scientific crop and soil management practices and is aimed to get better yield and quality; Reactive crop plan is an intervention-based initiative where farmers can raise alerts on pests and diseases and get remedial solutions for their farm problems. Currently, 80% of farmers onboarded with us have access to a personalized Crop Plan on their mobile app with an ability to raise reactive crop-related queries and get resolution as and when needed.

The second offering of the Amazon Retail agronomy services is an application interface through machine learning and computer-vision-based algorithms. It simplifies supply chain processes, helps farmers to identify defects (rotting, spots, cuts, mold) in fruits and vegetables, reduces wastage of produce, which in turn will help in ensuring that customers get the best quality of fruits and vegetables.

Amazon Retail is investing to leverage state-of-art technology to build a robust temperature-controlled supply chain infrastructure that reduces shrinkage and provides the freshest quality to customers. Amazon Retail associates use technology to inspect and monitor quality at multiple stages once the produce is sourced from farmers and dispatched to the processing centers. The fresh produce (fruits and vegetables) are then sorted, graded, and packed in different sizes at the processing centers and dispatched to Amazon Fresh fulfillment centers located closer to customers. The fulfillment centers operate with 4 separate temperature zones (ambient, tropical, chilled, and frozen) to maintain the quality and freshness of produce.

https://www.business-standard.com

Polyhouse technology to help cultivate off-season crops

A polyhouse is a specially constructed structure like a building where specialized polythene sheet is used as a covering material under which the crops can be grown in partially or fully controlled climatic conditions. It is covered with a transparent material as to permit the entry of natural light. Polyhouses are also helpful in reducing threats such as extreme heat and pest attacks in crops.

Professor (Dr.) Harish Hirani, Director, CSIR-CMERI, Durgapur recently inaugurated a "naturally ventilated polyhouse facility" and laid the foundation stone of "retractable roof polyhouse" at CSIR-Central Mechanical Engineering Research Institute (CMERI)'s regional center based in Ludhiana. Briefing about the technology, Prof. Hirani said that with rapidly rising temperatures due to mounting greenhouse gases in the atmosphere from human activities, crops are increasingly facing both threats—extreme heat and pest attacks—simultaneously.

This is especially important for crops growing in the open field with no protection from the weather, and therefore its yield, quality, and crop maturity timings are changed. A combination of open field conditions and conventional greenhouse conditions is a more robust way to deal with climate change and associates problems in the future. Crop losses in India due to insect pests is about 15% at present and this loss may increase as climate change lowers the plant defense system against insects and pests.

"Retractable Roof Polyhouse Technology will have an automatic retractable roof which will be operated based on weather conditions and crop requirements from the conditional database using PLC software. This ongoing development will be useful in our country with its 15 different agro-climatic zones and will help farmers to cultivate off-season crops that can fetch higher value and income," says Dr. Hirani.

Jagdish Manikrao, Senior Scientist, who is leading the research team on the development of this technology, explained that the retractable roof will be used to manipulate sunlight quantity, quality and duration, water stress, humidity, carbon dioxide levels, and crop and soil temperatures. Dr. Pradeep Rajan, Sr. Principal Scientist, Head, Farm Machinery and Precision Agriculture, further elaborated that this structure is being developed in collaboration with CSIR-IHBT, Palampur and is in the process of integrating artificial intelligence (AI) in automating the Polyhouse based on the crop and weather requirements and providing an IoT-enabled farmer friendly user interface.

The director also briefed that as the scientific experimental data on the advantages

of the new polyhouse system are lacking, therefore, horticultural crops will be cultivated in both naturally ventilated polyhouse and retractable roof polyhouse for comparing the crop production and produce quality. "With installation of naturally ventilated polyhouse and retractable roof polyhouse side by side, we can get the required scientific data and by analyzing the results we can enhance productivity," said Dr. Hirani.

https://www.eetindia.co.in

Ocean-energy-powered desalination plant

Chennai-based National Institute of Ocean Technology (NIOT) will soon start working to build the world's first self-powered desalination plant using Ocean Thermal Energy Conversion (OTEC) at Kavaratti Island in Lakshadweep. OTEC is an eco-friendly method to generate power using the difference in temperatures of the surface and the deep sea. As we go deeper and deeper in the sea, the temperature gets lower. In tropical countries like India, the temperature gradient is more or less constant throughout the year, thus ensuring constant power generation potential. The process involves vaporizing a low-boiling-point fluid like ammonia or water under vacuum using the surface warm sea water and condensing the vapor thus generated using deep-sea cold water. The vapor generated would drive a turbine connected to a generator, thus generating power. This cycle can be continued without breaks, and is fully renewable.

NIOT head (energy and fresh water group) Purnima Jalihal said that the Kavaratti plant, which has a capacity to produce one lakh liters of fresh portable water, will be the world's first prototype of a OTEC-powered desalination plant and would pave the way for future large-scale plants.

"The main advantage of OTEC is that it's completely environment friendly. NIOT had installed Low Temperature Thermal Desalination (LTTD) plants in Kavaratti in 2005 and subsequently at Agatti and Minicoy Islands. The pumps used in these plants are run using the diesel generator grid on the islands. Transportation of diesel is difficult especially during monsoon. It is also better if we adopt clean and green energy sources for the islands' delicate ecosystem," she said. NIOT officials also noted that there are many challenges in this project since it is being carried out for the first time ever.

https://www.newindianexpress.com

INDONESIA

Pokemon-style app to save Indonesia's forests

An Indonesian crowdsourcing app is tapping into the competitive spirit of its users by creating Pokemon Go-type games to help map land across the sprawling archipelago and protect forests and indigenous people, organizers said. The Urundata application uses publicly available satellite images to create games where users visit an area and then answer simple questions on the type of land they see and what it is being used for—plantations, natural forests, or shrub, for instance. Initially started as a pilot project in April last year in South Sumatra and East Kalimantan provinces—with the help of more than 600 students - the mobile application went nationwide in November and is due to end in March.

"You can choose what kind location you're interested in - it's pretty much a game because you collect scores as you are providing answers," said Ping Yowargana, a coordinator at land project RESTORE+, which launched the app. "People can compete with each other - they can change their statuses from 'volunteer' to 'warrior' of data - and then share on social media," said Vienna-based Yowargana, whose organization is backed by the German government and aims to restore degraded land in Indonesia and Brazil.

The Urundata app is supported by the World Resources Institute (WRI), a U.S.-based environmental think-tank, as well as Nairobi-based research group the World Agroforestry Centre and the World Wildlife Fund for Nature (WWF). In some ways it is "pretty similar to Pokemon Go," said Yowargana. "We try to make it fun."

Pinning down on-the-ground details about land seen in satellite images is usually done by researchers or experts and can be labor-intensive and costly, a spokeswoman at WRI Indonesia said. "The hope is that by crowdsourcing this, instead of having one expert looking... we can do it in a different way that allows many people to look at a similar amount of data," Yowargana said.

To avoid misuse of the app that could skew results, answers from multiple users on the same area of land will be compared to form a consensus, Yowargana added. Data collected by the Urundata app will be made publicly available on its website. Backers hope the website will improve land restoration efforts by governments and researchers, enable authorities to better protect forests and indigenous lands, and help companies identify and develop land in a sustainable way. It will also make more data available for "people who are needing it", including indigenous groups, Yowargana said. After the Urundata app completes its current mapping project, it may then be used in other efforts, such as looking at the impact of infrastructure or other land use changes.

https://news.trust.org

UAE

Waste heat from solar cells for seawater desalination

Researchers from King Abdullah University of Science and Technology (KAUST) previously developed a photovoltaic-membrane distillation device (PV-MD) capable of producing clean water from seawater while simultaneously generating electricity.

Silicon photovoltaic cells typically convert a quarter of absorbed solar energy that reaches them; the rest heats the solar cell. Cooling with water does little to reduce the temperature, but the researchers realized this excess heat could be repurposed to drive water distillation and desalinate seawater. At the same time, the cell would be cooled. Their PV-MD uses a multi-stage membrane distillation (MSMD) device consisting of four layers: a top thermal

conduction layer, a hydrophilic porous layer for water evaporation, a hydrophobic porous layer for vapor permeation, and a water vapor condensation layer.

The MSMD device, fixed to the back of a photovoltaic cell, draws seawater into the layered channels. The water vaporized in the uppermost channel by the heat of the solar cell passes through a porous membrane to a lower layer, where it is redistilled using the latent heat released during vapor condensation. In their latest study, Wenbin Wang and Sara Aleid helped create a theoretical model to examine the relationship between specific membrane parameters, like thickness, porosity, and solar cell hotness.

The device now features a five-stage photovoltaic-membrane distillation evaporative crystallizer (PME). The result is a reduced solar cell temperature, accompanied by a high and stable freshwater production. In addition, electricity production increased by 8%, and evaporation of concentrated brine – an unwanted byproduct – by the evaporative crystallizer.

This elimination of the concentrated brine byproduct was just one of the issues the team had to overcome before their laboratory results could be applied to real-world applications. Others include minimizing the energy required for desalination. The researchers developed a gravity-driven system inspired by infusion technology. The seawater is fed into the solar-cell device without external pumps while a special fabric wicks away solid salts and minerals, preventing the release of toxic liquid brine.

The scarcity of clean water and the energy shortage crisis are just two of the critical challenges for global sustainable development. This research is focused on providing low barrier-of-entry electricity and fresh water supplies to off-grid communities for points of consumption. Their PV-MD is well suited and will be commercially competitive to supply water and electricity for regions suffering from economic and physical water scarcity, believes Wang.

These investigations have important implications for further understanding and advancing solar distillation. Technology such as this could enable drinkable water production in locations where it is not currently available and provide clean, renewable energy to local communities in areas like the Middle East, which accounts for 45% of the global seawater desalination.

https://www.azocleantech.com

EUROPE

SWITZERLAND

Global restoration now has an online meeting point

With all of the environmental problems in the world, it can be easy to forget that there are also many solutions. Across the globe, people are working to restore nature, and good ideas abound. Organizing and visualizing this work, however, is a mammoth task, but it is one that the online platform Restor is attempting to achieve. Restor is a map-based, open-source platform that combines on-the-ground knowledge, ecosystem research, and satellite imagery, so people can better plan, manage, and monitor restoration projects.

The locations of more than 50,000 restoration and conservation initiatives are now registered in Restor, as well as data from more than 60,000 scientists on environmental parameters such as climate, temperature, precipitation, local plant and tree species, soil characteristics and more.

"Restor will make the whole world of environmental conservation and restoration accessible on any smartphone," Thomas Crowther, a professor at the Swiss Federal Institute of Technology in Zürich (ETH Zürich) whose lab group developed Restor, said in a press release. "We did this by developing a kind of Google Earth to guide the restoration of all types of Earth's ecosystems."

The idea for the platform originated in the Crowther Lab at ETH Zürich in 2017, where researchers create maps of global ecosystems using machine-learning models, field data, satellite imagery, and environmental information. In 2020, in collaboration with Google, the Crowther Lab began working with scientists, communities, and environmental groups to expand Restor into a functioning online ecosystem. Headquartered in Switzerland, Restor is now its own organization and is owned by a charitable foundation.

"Restor combines networking, monitoring, and information exchange in one dynamic and comprehensive visual platform, filling a huge gap in the practice and policy of restoring ecosystems around the world," Robin Chazdon, a global restoration expert from the University of the Sunshine Coast in Australia, who was not involved in the creation of Restor, told Mongabay in an email.

Using the platform, Restor users can view regions of the Earth at a resolution of up to 50 centimeters (20 inches) and learn about their potential for restoration or conservation. The Crowther lab has even developed a model that allows researchers to determine what tree species are native to a particular location to serve as a useful guide for reforestation efforts.

Currently, Restor is collecting data from restoration projects around the world. Anyone with a project can apply for access to the site where they will be able to enter data about their project and ecosystem. The project managers have the option of whether their projects are saved publicly or privately. All of the public data will be made available to the public on the platform.

https://news.mongabay.com

UK

Fighting drug-resistant malaria with genetic surveillance

A large collaborative project of in-depth genomic surveillance of malaria has identified and tracked drug-resistant malaria parasites in the Greater Mekong Subregion*, helping inform public health decisions in Southeast Asia. The project, known as GenRe-Mekong, involves researchers from the Wellcome Sanger Institute, the University of Oxford, MalariaGEN, and several partners in the Greater Mekong Subregion, including multiple National Malaria Control Programmes. It

has gathered data from some of the most remote areas of the Greater Mekong Subregion to give a clearer genetic picture of drug resistance in malaria.

In the latest paper, published on 10 August 2021 in *eLife,* the GenRe-Mekong group describes how they developed and implemented the platform for genetic surveillance of malaria in Southeast Asia, where drug resistance in malaria parasites is an urgent issue. They also describe how the data are used by local public health agencies to plan interventions in malaria endemic areas.

Malaria continues to be a major cause of mortality in many tropical countries, particularly in sub-Saharan Africa, and efforts are ongoing to eliminate the parasite, *Plasmodium falciparum*, which causes the most severe form of disease. Even though the Greater Mekong Subregion is an area of relatively low *P. falciparum* malaria prevalence and mortality, drug-resistant strains of the parasite have repeatedly arisen from this region and migrated into Asian and African countries, undoing years of progress against the disease, and costing many lives**. Hence, malaria elimination has become an urgent priority in the Greater Mekong Subregion.

In collaboration with the Wellcome Sanger Institute, the University of Oxford, and MalariaGEN, the GenRe-Mekong project developed the SpotMalaria genetic surveillance platform that analyses the collected blood samples and provides a broad range of detailed genetic information about each sample. The project has processed 9,623 blood samples from symptomatic patients across eight countries, the majority of which originated from Vietnam, Laos, Cambodia, Thailand, and Myanmar.

GenRe-Mekong also processed samples from Bangladesh, India, and the Democratic Republic of Congo. SpotMalaria processing only requires small dried blood spot samples, which are easy to collect at public health facilities as part of routine treatment, making it possible to obtain data from the most remote and resource-poor parts of these countries. The DNA analysis, which was primarily conducted at the Wellcome Sanger Institute, uses high-throughput technologies to extract large amounts of parasite genetic information from each sample. The results are used to create Genetic Report Cards, which are regularly delivered to National Malaria Control Programmes to keep them updated about changes in the parasite population in their country. National Malaria Control Programmes are involved throughout the entire process, from sampling strategy planning, and sample collection, through to joint analyses of results.

GenRe-Mekong uses the key genetic mutation data extracted to identify areas of parasite resistance to specific drugs, and then collates the results, creating a map showing the prevalence of resistant parasites. These results have helped inform public health agencies, notably influencing decisions in Laos and Vietnam, such as the choice of frontline therapy, or highlighting which areas require special interventions.

https://www.cambridgenetwork.co.uk

NORTH AMERICA

USA

Predicting weather hazards using data and AI

CoreLogic, a leading global property data and analytics-driven solutions provider, announced a nationwide, three-year collaboration with One Concern, a Menlo Park-based, resilience-as-a-service solutions provider. By using CoreLogic's flood, storm surge, wind and climate change data, and flood and wind vulnerability models, One Concern can accelerate its AI-enabled resilience solutions and disaster-risk reduction technologies to address and predict weather hazards and escalating climate threats amidst an increasing global focus to develop environmental, social, governance and resilience (ESG+R) goals.

CoreLogic collects and maintains property data on 99% of all U.S. residential properties. Leveraging this information, One Concern can pinpoint the hyperlocal vulnerabilities ahead of climate threats and continue to train its AI systems to assist organizations in shifting from recovery to resilience.

"Amidst worsening natural hazards, enterprises must build resilience strategies for an environment where black swan events are considered normal. As the world looks to face increasing climate risk, we believe ESG should have an 'R' for Resilience in order to address these evolving new hazards," said Ahmad Wani, CEO and co-founder, One Concern. "Through this partnership with CoreLogic, we will be able to make disasters less disastrous by uncovering climate-risk blind spots, enabling communities to address the ripple effects of adverse climate events. CoreLogic's data will give us a major advancement for data modeling to build the resilience-as-a-service category, while setting the stage for enterprises to operate at the nexus of resilience and sustainability. With unparalleled precision and granularity, we can now identify and plan for resilient enterprises to be sustainable, while also reducing their vulnerabilities from extreme weather caused by climate change."

"Many of CoreLogic's solutions play an integral role in climate change management, as well as in natural hazard risk and post-event recovery. We continue to provide these dynamic solutions to insurance companies, and this collaboration with One Concern presents a new market for CoreLogic as we help inform resilience strategies," said Mick Noland, Managing Director – Protect, CoreLogic. "We look forward to establishing more relationships with cutting-edge solution providers like One Concern as we carry out our mission of helping millions of people find, buy and protect the homes they love."

https://www.businesswire.com

AI to better predict blazes

Last summer, as Will Harling captained a fire engine trying to control a wildfire that had burst out of northern California's Klamath National Forest, overrun a firebreak and raced towards his hometown, he got a frustrating email. It was a statistical analysis from Oregon State University forestry researcher Chris Dunn, predicting that the spot where firefighters had built the firebreak, on top of a ridge a few miles out of town, had only a 10% chance of stopping the blaze.

"They had spent so many resources building that useless break," said Harling, who directs the Mid Klamath Watershed Council, and works as a wildland firefighter for the local Karuk Tribe. "The index showed it had no chance," he told the Thomson Reuters Foundation in a phone interview.

The Suppression Difficulty Index (SDI) is one of a number of analytical tools Dunn and other firefighting technology experts are building to bring the latest in machine learning, big data and forecasting to the world of firefighting. As climate change and gaps in forest management create more intense and deadly wildfire seasons, firefighting resources are increasingly stretched to the limit.

Researchers like Dunn hope their tools can help ease that pressure by making sure scarce fire resources are deployed as efficiently as possible. Dunn said so far firefighters at half of national forests are using one popular analytical tool he helped develop called Potential Operational Delineations (PODs). It combines local firefighter know-how with advanced spatial analytics to help teams plan where to take on a fire even before it breaks out.

The tool superimposes a number of statistical models—such as the SDI—over a map of a region, so fire managers and communities can plan out their control lines and plans of attack in advance. "You will never take the personal element out of fighting fires," said Brad Pietruszka, a fire manager at the 1.8-million-acre (728,000-hectare) San Juan National Forest who has been using advanced analytical tools like PODs since 2017. "But people make bad decisions under stress - they can't crunch all this data on their own. This is about reducing the uncertainty, and helping firefighters make better decisions"

Combining machine learning with years of research, fire analysts like Calkin and Dunn build models that add layers of data on top of the institutional knowledge of local firefighting crews, explained Rick Stratton, a fire analyst at the USFS. "Firefighters only see so much, their careers are short - but now we can model thousands of artificial seasons and pull all sorts of insights," said Stratton, who runs an online dashboard that lets fire managers see analytics of their terrain in real-time. "We wouldn't have been able to do that 15 years ago. We didn't have the computer power."

One of the most complex tools developed by researchers in recent years is the Potential Control Locations (PCL) algorithm, which uses machine learning to suggest where firefighters should place their control lines during a blaze. "It's very data hungry," Dunn explained. "It takes into account distances from roads, where there are ridges and flat ground, what kind of fuel is present on the ground, and it samples historical fire perimeters too." Armed with an alphabet soup of analytic tools—PCLs, SDI, PODs, and others—firefighters are getting crucial help deciding where to direct their efforts during increasingly out-of-control fire seasons, Pietruszka said.

https://news.trust.org

Nanobubble-infused fertilizer

Nanobubble tech company Moleaer and liquid fertilizer group RainAg have announced a partnership to market new nanobubble-infused fertilizers. The partnership will combine Moleaer's patented nanobubble technology with RainAg's patent-pending Rain Technology. RainAg's nanobubble-infused fertilizers have been trialed and utilized across a range of commodity crops including fruit and vegetable crops, corn, cotton, wheat, and sugarcane. According to the companies, the nanobubble enhanced RainAg fertilizers have significant benefits, including increased crop marketability by more than 110% in strawberries, a reduction in fertilizer utilization, and a reduction in off-target nutrient run-off and groundwater leaching.

In agriculture, Moleaer's nanobubbles have independently been proven to improve irrigation water quality, resulting in 50% reduction of crop loss by disease, increased crop resilience in high heat temperatures up to 110°F, and reduction of Pythium levels of up to 94%. The groups said that, when combining Moleaer's nanobubble technology with RainAg fertilisers, farmers would be able to reduce operational costs, reduce risks from crop loss, and reduce the environmental impacts to local water sources from increased phosphorus and nitrogen levels.

"Moleaer has demonstrated its patented nanobubble technology is superior for increasing root zone oxygenation and plant health compared with other methods," said Tim Ford, general manager of RainAg.

http://www.fruitnet.com

SOUTH AMERICA

BRAZIL

AI tool helps forecast Amazon deforestation

Named PrevisIA (from the Portuguese *previsão* for "forecast" and IA for "artificial intelligence"), the tool analyzes images provided by European Space Agency satellites, and through an algorithm created by the Brazilian conservation nonprofit Imazon, finds areas prone to deforestation. Imazon studies published in scientific journals show that 95% of accumulated deforestation in the Amazon is located within a 5.5-kilometer (3.4-mile) radius of roads; 90% of annual fires occur 4 km (2.5 mi) from illegal roads built in the middle of the forest for logging, mining, and land grabbing.

The first report using the new tool launched last week shows that 192 municipalities have a high or very high risk of deforestation in Brazil's portion of the Amazon. Additionally, 48 Indigenous reserves have the same level of risk, as well as 18 conservation units. Also at high and very high risk of deforestation are two quilombos, communities of the Afro-Brazilian descendants of runaway slaves, and 789 rural settlements. In total, this comprises 9,635 km^2 (3,720 mi^2) of threatened forest.

The next step of the project, developed jointly by Imazon, U.S. technology giant Microsoft, and Brazilian mining company Vale, is to build partnerships with local governments and institutions to act on preventing deforestation, which is the most challenging phase of the project, according to Imazon researcher Carlos Souza Jr.

https://news.mongabay.com