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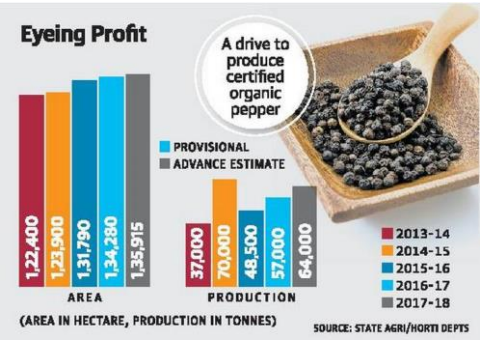
August 2018

AGRITitbits

Monthly Bulletin of Agricultural News



Agri Titbits is an effort to collect and preserve agricultural news, especially spices, appearing in newspapers and online media.

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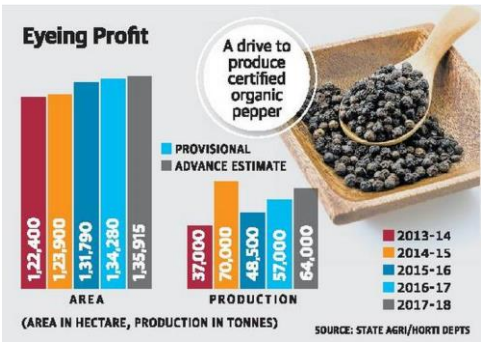
SPICES

Roadmap to revive black pepper economy

THE HINDU-03-AUG-2018



Need for proper policy backup stressed by Kerala Agricultural University's brainstorming session

Kerala Agricultural University (KAU) is in an effort to revive State's the black pepper economy.

Ensuring quality and enhancement of productivity are key to reviving black pepper economy, according to a roadmap formulated by a brainstorming session organised by the KAU on Friday.

KAU Vice Chancellor R. Chandra Babu has stressed the need for a multipronged strategy to address the woes of pepper cultivation in Kerala.

Dr. Chandra Babu said proper policy backup — in terms of subsidy, Minimum Sales Price, and distress mitigation — are imperative to ensure farmers' welfare, which, in turn, would help recover lost ground.

"We have to confess that there exists a gap between research and development and the field situation. Bridging this gap is an essential part of the attempts to revive pepper. Supply of quality planting materials, adherence to scientific farming techniques such as judicious mixture of organic and inorganic inputs, and convergence of extension programmes are vital," the VC said.

A drive to produce and market certified organic pepper; encouraging pepper cultivation in home gardens; promoting bush pepper; and selective production to ensure demand-based supply were the other main aspects of the roadmap formulated after deliberations with farmers, scientists, and extension workers.

KAU Director of Research P. Indiradevi said studies showed that the biodiversity of pepper in the State and the potential international market for Kerala pepper were intact.

"Soil health management and a price support to protect farmers are important aspects of safeguarding production. Market awareness also has to be promoted. Development and promotion of drought-resistant and shade-tolerant varieties are another step forward. Micro-nutrient supply to enhance grain density, use of bio-control agents, and integrated pest and disease management will be promoted. A report on the workshop will be submitted to the State government to facilitate implementation of the recommendations," she said.

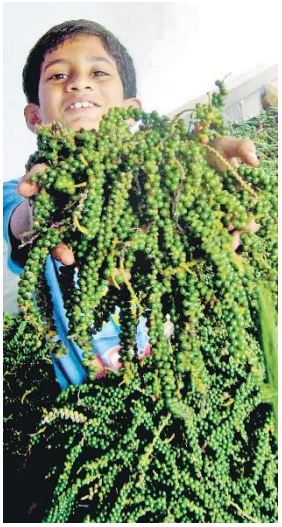
Farmers' demand

The main demand of farmers included supply of quality planting materials; a mechanism to predict incidence of pests and diseases; proper advice on plant protection and marketing; and consistent financial support for pepper cultivation.

Farmers from different parts of the State, scientists of KAU and Indian Institute of Spices Research (IISR), and officials from the Department of Agriculture participated.

The scientists of Pepper Research Station, Panniyur, which won the best All India Coordinated Research Projects (AICRP) centre award, and Nirmal Babu, Project Director of IISR, Kozhikode, which won the best centre award of Indian Council of Agricultural Research, were felicitated at the function.

'Spices Year' to infuse the sector with a lease of life



NEWINDIANEXPRESS : AUG 5, 2018

THIRUVANANTHAPURAM: In an effort to boost the ailing spices sector in the state, the Agriculture Department has decided to observe the Malayalam New Year as 'Spices Year.' The new year starts on Chingam 1, which falls on August 17.All year long, priority will be given to spices cultivation - chiefly pepper, cardamom and nutmeg - and their marketing in Kerala. The state had similarly observed 'Nellu Varsham' in 2016 and Coconut Year in 2017 to infuse new lease of energy into coconut and paddy sectors in the state.

Agriculture Minister V S Sunil Kumar told Express that spices sector, mainly pepper cultivation, has been facing a host of challenges over the past few years and the price crash has further enhanced its difficulties. Price fluctuation in the international market, coupled with smuggling and import of cheap pepper from countries like Vietnam through Sri Lanka, has resulted in a huge crash in domestic price. The state government's effort to address such issues resulted in the Ministry of Commerce fixing a minimum import price (MIP) of Rs 500 a kg in December 2017. But this was later watered down when smuggling and illegal imports continued unabated.

In this backdrop, the 'Spices Year', with its year-long programmes, is expected to help better the prospects of the spice farmers. As part of programme, the department will distribute high-yielding varieties among the

Import of pepper from Vietnam

Year	Quantity (MT)	Value (Rs Cr)
2014-15	10,845	520.33
2015-16	6,780	404.20
2016-17	9,500	477.85
2017-18	10,825	367.56

(The Indian government does not import black pepper from Vietnam. However, pepper is imported from Vietnam and other countries by Indian processors for value addition and re-exports)

In 2016-17 the average domestic price of pepper went down from R694.77 per kg to R473.73 per kg. The price went down further to R359 per kg in June, 2018

Instruction has also been issued to officers of Food Safety and Standards Authority of India (FSSAI) and field formations of Customs to be vigilant against the entry of inferior quality pepper from other countries

To prevent import of cheap pepper from other countries taking advantage of the provisions of India-Sri Lanka Free Trade Agreement (ISLFTA) and Agreement on South Asian Free Trade Area (SAFTA), Sri Lankan authorities have been requested by the Centre to exercise extreme care and diligence in issuing the Certificates of Origin

farmers with an objective to increase the production. Further, the year-long attention is expected to provide the sector much-needed support in terms of training and exploring new markets. Funds will also be set aside to help the sector, Sunil Kumar said.

“The state is also planning to procure pepper from farmers in the state on the lines of paddy and coconut procurement for which the support of the Centre is required. We have already held a couple rounds of discussions with the Central Government including Union Commerce Minister Suresh Prabhu. The state will soon submit a proposal in this regard. If we can start pepper procurement, the issues in the sector can be addressed to some extent,” he said.

Minister said the enforcement measures must also be strengthened to curb illegal trade. For instance, Nepal has been importing pepper through Kolkata port. A large part of their import floods the Indian market due to smuggling through porous borders of Bangladesh, Nepal and Myanmar. Such illegal businesses must be curbed to protect the Indian pepper farmers and the local spices market, the minister said.

Kerala floods spur rise in prices of spices at APMC

TIMES OF INDIA AUG 29, 2018-22 HOURS AGO

The floods in Kerala have pushed the prices of spices imported from the state by at least 25 per cent. The prices of spices have also gone up in the wholesale market. This has increased costs for retailers. A massive wholesale trade of these spices takes place at APMC market in Navi Mumbai. About 300 vehicles are loaded daily here of sugar, jaggery, and spices. The unprecedented flooding that took place in Kerala earlier this month has reduced the supply of cardamom, pepper and bile leaf from 20 to 25 per cent.

The prices are likely to remain high for sometime as large part of crop plantation has been damaged in Kerala and normalisation of supplies is likely to take time.

Speaking about the price hike, Kirti Rana, director, Navi Mumbai Merchants Chamber told Maharashtra Times, "Due to supply disruption, the prices of these spices have gone up. Any natural or man-made disaster affects the production of goods in that region. So the prices of spices have increased after the floods."

In the APMC market of Navi Mumbai, the rates of black pepper are currently 3.5 to 400 Rs/kg. In the wholesale market, this rate is more than 100 rupees to Rs 150 for the same.

The price change in the wholesale market automatically affects the prices in the retail market, added Kirti Rana.

Besides spices, the supply of coconut to most parts in Mumbai is also badly affected due to the devastating floods.

Dada Patil, a trader in a wholesale market of Byculla in Mumbai, said, "Apart from spices, we are also not getting the supply of coconuts. Due to less availability in the market, prices have gone up."

The spices that come from Kerala are nutmeg (jaiphal), dry mace (javantri), cloves (lavang), green cardamom (elaichi/velchi), dry ginger (sonth), and black pepper (kali mirch).

Indian-American researchers find way to use turmeric's power to fight cancer

HINDUSTAN TIMES-12-AUG-2018

A team of Indian-American researchers have used an ingenious process to enable curcumin found in turmeric to kill cancer cells.

A team of Indian-American researchers at the University of Illinois at Urbana-Champaign (UIUC) and at the University of Utah at Salt Lake City, has used an ingenious process to enable curcumin to kill cancer cells. Curcumin is the active ingredient of turmeric (haldi), the ubiquitous kitchen spice that gives curry its yellow colour. Turmeric has been used in India for thousands of years as a spice and medicinal herb because of its powerful anti-inflammatory and strong antioxidant property.

Curcumin is also known to exhibit anti-cancer properties, but its poor solubility in water had impeded curcumin's clinical application in cancer. A drug needs to be soluble in water as otherwise it will not flow through the bloodstream. Despite decades of research, the development of efficient strategies that can effectively deliver poorly water-soluble curcumin to cancer cells had remained a challenge.

A team headed by Dipanjan Pan, associate professor of bioengineering at UIUC, has now found a way out. "Curcumin's medicinal benefit can be fully appreciated if its solubility issue is resolved," Pan told this correspondent in an e-mail.

Pan's laboratory collaborated with Peter Stang at the University of Utah on ways to be able to render curcumin soluble, deliver it to infected tumours and kill the cancer cells. Because platinum is a commonly used cancer therapeutic agent in the clinic, the researchers decided to experiment with a drug consisting of a combination of platinum and curcumin.

"It is a combination of clever chemistry and nano-precipitation utilising host guest chemistry," Pan explained. "The sophisticated chemistry leads to self-assembled hierarchical structure that drives the solubility of curcumin and simultaneously delivers an additional anticancer agent, i.e. platinum. The combined therapeutic effect — of curcumin and platinum — is lethal for the cancer cells."

The team has reported its work in the Proceedings of the National Academy of Sciences in the US. According to their report, the metallocyclic complex created using platinum "not only enabled curcumin's solubility, but proved to be 100 times more effective in

treating various cancer types such as melanoma and breast cancer cells than using curcumin and platinum agents separately".

"Our results demonstrate that curcumin works completely in sync with platinum and exerts synergistic effect to show remarkable anticancer properties," says the report. "The platinum-curcumin combination kills the cells by fragmenting its DNA."

"Extensive animal studies are in progress in my laboratory, including in rodents and pigs," Pan said. His team also hopes to prove that this method will be effective in killing cancer stem cells — the birth place of cancer cells — thereby preventing the recurrence of cancer.

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Pan's team included post-doctoral researcher Santosh Misra at UIUC, and Sougata Datta, Manik Lal Saha, Nabajit Lahiri, Janis Louie, and Peter J Stang from the University of Utah.

High-tunnel transplanting increases ginger yields

PRODUCE GROWER (PRESS RELEASE)-27-AUG-2018

Durham, N.H. – For the relatively new crop known as "baby ginger," delaying the harvest date increases yields in New Hampshire, according to preliminary research from the New Hampshire Agricultural Experiment Station at the University of New Hampshire.

The research was conducted by experiment station researcher Dr. Becky Sideman, professor of plant biology and extension professor and specialist in sustainable horticulture production, and Sabrina Beck, undergraduate research assistant, at the experiment station's UNH Woodman Horticultural Research Farm.

"U.S. consumers are likely most familiar with the golden cured rhizomes of mature ginger plants, but recently, growers in the north-eastern United States have been successfully producing 'baby ginger,' or rhizomes from young ginger plants grown for just a single growing season," Sideman said. "Unlike mature ginger, the baby ginger is pink, tender, non-fibrous, and perishable. It can be used for cooking and can be candied or pickled, and keeps well in the freezer for culinary use year-round."

Given the regional interest in growing baby ginger, experiment station researchers wanted to explore if early-season heating dramatically increases end-of-season yields, if growing in a low tunnel rather than a high tunnel could decreases costs, and if yields and/or quality of ginger is reduced by harvesting early, rather than late in the fall.

In New England, ginger seed rhizomes are typically purchased from Hawaii, and they arrive in late February or early March. Rhizomes are sprouted in trays held in temperatures ranging from 75 to 85 degrees Fahrenheit using a heat mat, germination chamber or other approach. They are transplanted into high-tunnel soils once the soil temperatures are consistently above 65 degrees Fahrenheit. Rhizomes are dug for market in fall, typically starting in late September, but prior to frost.

In this one-year study, they found ginger rhizomes sprouted much faster in flats that were on heat mats than in flats that were not kept on heat mats. In addition, the early-season heating also resulted in higher ginger yields once the ginger was transplanted in high and low tunnels. At each harvest date, the plots with plants exposed to early-season heating produced higher yields. With all dates combined, yields were significantly higher for the heated treatments.

"However, it is important to weigh this against the cost of heating. In our system, we ran a heat mat for nearly 12 weeks," Sideman said. "We found that the first sprouts did not emerge until nearly 6 weeks after planting, even on the heat mat. Thus, the same results

could likely be obtained by sprouting the ginger in a warm, insulated location without need for light for several weeks."

When transplanted in high and low tunnels, the ginger in the high tunnels produced much higher yields than ginger grown in the low tunnels. According to Sideman, it is possible that low tunnels might be suitable for ginger production if other variables were modified, such as different coverings used and different fertility regimes. However, based on these preliminary results, the high-tunnel environment produced the best yields of high-quality ginger.

Finally, harvesting ginger early reduced yields. While it was possible to harvest nice ginger around September 1, yields were doubled by waiting an additional two months. "The take-home message here is that growers should delay harvest to maximize yields, and only harvest what is needed for earlier markets," Sideman said. "It also may be worth considering charging a premium price for 'early' baby ginger, as it will result in less yield overall."

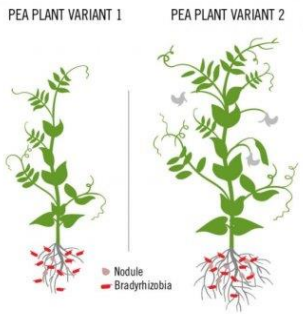
This material is based upon work supported by the NH Agricultural Experiment Station, through joint funding of the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award number 1006928, and the state of New Hampshire. It also was supported by the NH Vegetable & Berry Growers' Association. Additional information on this research is available from UNH Cooperative Extension in Effects of Early Season Heating, Low Tunnels and Harvest Time Ginger Yields in NH, 2017.

RESEARCH NEWS

Top-performing soil microbes could be key to sustainable agriculture

SCIENCE DAILY-08-AUG-2018

UCR RESEARCHERS HAVE SHOWN THAT SOME GENERIC VARIANTS OF THE PEA PLANT ACMISPON STRIGOSUS ARE BETTER THAN OTHERS AT RECRUITING GROWTH-PROMOTING MICROBES INTO THEIR ROOT NODULES.



Beautiful things can happen when plants surround themselves with the right microbes. A study on Acmispon strigosus, a plant in the pea family, showed a 13-fold growth increase in plants that partnered with a highly effective strain of the nitrogen-fixing bacteria Bradyrhizobium.

The ability of plants to use beneficial microbes to boost their growth is not lost on agronomists. Some breeders think understanding the traits that enable crops to recruit top-performing microbes is key to the future of sustainable agriculture.

A roadblock in capitalizing on the beneficial work of microbes is the complex genetic and environmental factors that govern their role in plant growth. Left unattended, plants don't always recruit beneficial microbes, instead surrounding themselves with a mix of

both helpful and ineffective bacteria. Attempts to manage the microbial populations plants encounter in the soil -- by inoculating with beneficial strains -- have largely failed.

"It is very difficult to predict which combinations of microbes will be successful under field conditions, since the microbes that are beneficial to plants in the lab do not always compete successfully against microbes that already exist in the field," said Joel Sachs, a professor of evolutionary ecology at the University of California, Riverside and member of the university's Institute for Integrative Genome Biology. "A promising alternative is to breed plants that are better at managing their own microbial partners, an advancement that will be passed down to future generations."

In a study published today in New Phytologist, Sachs' team has advanced our understanding of how plant genetics and environmental factors affect microbial soil populations in the field. The paper's first author is Camille Wendlandt, a graduate student in Sachs' research group.

The researchers investigated whether Acmispon strigosus (the pea plant) changes how it associates with different strains of nitrogen-fixing bacteria when its environment changes. Surprisingly, they found that changing the plants' environment by fertilizing the soil did not change how plants associated with microbes. Instead, the researchers found that genetic variation between the pea plants was most important in explaining whether plants invested in relationships with the most beneficial microbes. In other words, some variants of the plant are better than others at developing these beneficial partnerships.

The variants of pea plant that were best at investing in beneficial microbes also had very high growth benefits, in contrast to other pea plant variants that did not invest as much and gained less growth benefit.

"The fact that the traits that govern these partnerships vary between plants of the same species and are heritable shows that they can be selected for by breeders," Wendlandt said. "Ultimately, we hope that agronomists will use this research to develop plant varieties that make the most of the soil microbes they encounter. This could reduce reliance on chemical fertilizers, which are expensive for growers and can pollute the environment."

Future work in the lab will focus on whether the pea plants still show genetic differences when they interact with much more complex microbial communities, similar to what they encounter in field soils. The lab is also expanding its research to ask similar questions with cowpea plants, which are an important legume crop in sub-Saharan Africa.

The title of the paper is "Host investment into symbiosis varies among genotypes of the legume Acmispon strigosus, but host sanctions are uniform." In addition to Sachs and Wendlandt, contributors are John Regus, Kelsey Gano-Cohen, Amanda Hollowell, Kenjiro Quides, Jonathan Lyu, and Eunice Adinata, all at UC Riverside. The work was funded by the National Science Foundation.

A start to Farming 3.0

THE HINDU BUSINESSLINE-05-AUG-2018

In a country where two-thirds of the population depends on agriculture for their livelihood, the importance of this sector cannot be overemphasised. It accounts for nearly 17 per cent of the country’s GDP and feeds 1.3 billion people.

Over the past few decades, agriculture has witnessed different phases of growth. The first phase, which is referred to as Farming 1.0, extended from 1947 to 1966 and was characterised by radical land reforms. The second phase was the Green Revolution which increased farm productivity and rid us of our dependence on foreign food aid. Farming 2.0 was a golden age in India's agriculture.

India's farmlands today are at a critical juncture. Our population continues to grow, placing an ever increasing strain on the sector. The country is also rapidly industrialising and there is massive migration to cities. Agricultural incomes are falling and the sector is in danger of being left behind.

The need has arisen for another revolution: a new phase in Indian agriculture which will be defined by innovation and technology; an age where we will look to balance productivity and economics with social and environmental considerations. This age will usher in an era of unprecedented productivity and prosperity for farmers. This Farming 3.0 age will be all about disruptive innovations like Smart Farm Machinery, Micro Irrigation, Precision Farming, Digital Platforms and Partnering Stakeholders. Smart Farm Machinery is about producing more with less. Smart machines and technological breakthroughs have the potential to increase output, lower costs and boost farm incomes.

Micro irrigation frees the farmer from vagaries of seasonal monsoon while also conserving the limited water resources. With agriculture consuming about 80 per cent of the total renewable water resources, adoption of micro-irrigation practices will help conserve our precious water reserves and also boost yields and productivity.

Precision farming is an approach to farm management that uses information technology to access real time data about crops, soil, weather etc. to ensure crops and soil receive exactly what they need for optimum health and productivity.

Digital platforms have the potential to put farmers directly in touch with the consumer. Middlemen will be frozen out of the system, and farmers will get fair price for their produce. The government is working with a few States to move APMCs — the Agricultural Produce Market Committees — to the national electronic platform, eNAM, for selling fruits and vegetables. Digitisation of agriculture also has the power to boost productivity by putting farmers in touch with each other and also with agri experts.

Partnering stakeholders is all about collaborating with a wider ecosystem of partners and engaging them in devising solutions to the present and upcoming challenges of agriculture. This involves working with agricultural colleges, research institutions, scientists, commercial investors, grant-making organisations, key influencers, the government and the public at large.

Farming 3.0 is changing the narrative around agriculture from subsistence to sustainability. A strong engagement with farmers, and investments in key technologies like micro-irrigation, crop care, advanced seeds and digital platforms will play an important role in this new revolution. Technology and innovation will lay the foundation for Farming 3.0, and help realise the vision of doubling farmers' income.

The writer is MD and CEO, Mahindra Agri Solutions Ltd.

Scientifically Designed Integrated Farming Systems Promoted to achieve the vision of Prime Minister Narendra Modi of "Doubling Farmers' Income by 2022"

BUSINESS STANDARD-02-AUG-2018

Scientifically designed and tailor-made Integrated Farming Systems (IFS) is being promoted to achieve the vision of Prime Minister Narendra Modi of "Doubling Farmers' Income by 2022". This was stated by the Union Minister of Agriculture and Farmers' Welfare Radha Mohan Singh at the in-session meeting to discuss Integrated Farming Systems (IFS) for livelihood security and enhanced income of the farmers. Members of the Parliamentary Consultative Committee of Ministry of Agriculture and Farmers' Welfare, Government officials and scientists of Indian Council of Agricultural Research (ICAR) participated in the in-session meeting.

Singh said that the IFS can be classified as natural and intentional integrated systems. The intentional integrated systems are one which addresses the multiple objectives of increased production, profit, cost-reduction through recycling, family nutrition, sustainability, ecological security, employment generation, economic efficiency and social equity.

The Agriculture Minister said high-yielding grain varieties heavily dependent on chemical fertilisers were used to reduce India's dependence on food imports and meet the country's food requirement. However later, due to the use of low fertilizers, productivity fell leading to decline in the income of farmers. He highlighted the Economic Survey of India 2017-18 tabled in Parliament which indicates that over a period of 10 years, the share of income of farmers from crop production increased by only 1% while it increased by 7% for livestock.

He further said that small farms (up to 2 ha) hold the key to ensuring food and nutritional security of India. Therefore, location specific integration of field crops, orchard, floriculture, agro-forestry, livestock such as dairy, poultry, piggery, fishery and other less land requiring activities such as mushroom, apiary, and boundary plantations is being done for improving the livelihood of marginal and small households.

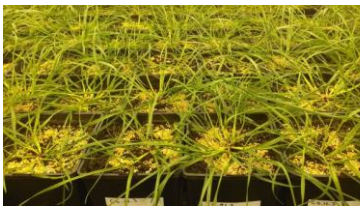
The Minister said ICAR has partnered with 25 State Agricultural universities (SAUs), 5 research institutes and 1 Central University through All India Co-ordinated Research Project (AICRP) and developed 45 Integrated Farming System (IFS) models suitable to 23 states and 1 Union Territory for providing better production and income.

He concluded by requesting the committee and the Members of Parliament to urge upon states to promote these location specific IFS models and initiate the National Mission on Integrated Farming Systems by converging the schemes of crops, horticulture, livestock and fisheries in order to give impetus to integrated farming systems among farmers for fast tracking the goal of doubling farmer's income by 2022.

Experimental atmospheres: When temperatures rise, what will grow?

IRISH TIMES-15-AUG-2018

Agricultural research in Ireland is increasingly seeking out new ways to deal with the environmental pressures of climate change. Met Éireann predicts that our national annual mean temperature will rise by 1.5 degrees over the next 30 years, alongside an increase in the frequency of extreme events such as storms, heatwaves and drought.



Ryegrass grown under high carbon dioxide conditions, at UCD's Programme for Experimental Atmospheres

Moreover, the IPCCs 5th assessment report, the world's main body determining climate change impacts, predicts significant decreases in crop yield around the globe, including in Ireland. For the agricultural sector this poses challenges in adapting to new environmental constraints, not least for the cultivation of crops, a problem which is now the focus of a number of research groups across the country.

At University College Dublin's Programme for Experimental Atmospheres (PEAC), a project called Futurye has been designed to look at the growth of ryegrass in the warming climate of the near future.

"The agri-food sector in Ireland is currently employing 50,000 people directly and provides the primary outlet for the produce of 128,000 family farms," says UCD's Dr Charilaos Yiotis, who is leading the research.

"These jobs are dispersed throughout all regions of Ireland, meaning the agricultural sector plays a key role in maintaining a sustainable rural development," he says. "So, the threat that climate change poses on Irish agriculture has both economical and sociological dimensions."

Experimental atmospheres

According to Dr Yiotis, ryegrass is the most common grass used in productive pastures in Ireland, and is the country's most important forage grass, accounting for 95 per cent of all grass seeds sold in the country.

Using state-of-the-art growth facilities, Dr Yiotis and other scientists at PEAC grow various genotypes of ryegrass in controlled experimental atmospheres thought to be representative of the future. By increasing carbon dioxide and temperature, and by changing water availability in the soil, the researchers are aiming to identify key traits associated with increasing ryegrass productivity and resilience in our new climate.

volume is gedemptvolume is 80%volume is gedempt

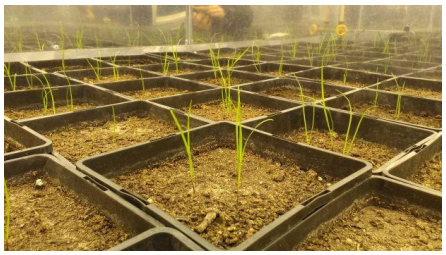
Agriculture is Ireland's leading contributor to climate change

"We anticipate that the research will result in breakthroughs in the field of plant biology and especially crop science," he says, "putting Ireland at the forefront of crop research."

Research at Teagasc is also focussing on rye-grass. According to Dr Susanne Barth, senior research officer in plant genetics, researchers are working on improving spring growth

in perennial ryegrass, and identifying reasons why certain varieties make better use of amenable warm days and sun rays in spring.

"For this research I am using plant physiological and genetics approaches," says Dr Barth. "Another research interest is to investigate the option of introducing hybrid breeding in perennial ryegrass to make quicker decadal yield gains."



Ryegrass growing in UCD in an enclosed chamber, similuting conditions in a warming world

Leading carbon emitter

But there is a catch. Climate change campaigners rightly point out that agriculture is Ireland's leading contributor to climate change, meaning the agricultural research framework is a complex one for Irish society.

On the one hand, agriculture employs tens of thousands of workers and helps to feed the nation, but on the other it prevents the nation meeting its emissions reduction quotas, because methane, a byproduct of animal agriculture, is a potent greenhouse gas.

"The challenge is to meet the world's growing food requirements with reduced inputs and in a sustainable way," says Dr Yiotis. "Much of the greenhouse gas emissions are associated with livestock production systems that produce methane, so this is a key issue."

Dr Barth points out that if we can produce good quality home-grown feed and food, our carbon footprint is reduced by avoiding long and unnecessary transport.

There may also be new methods on the horizon which aim to reduce the climate impact by breeding crops for animal feed, she says – crops which would in theory reduce animal methane emissions by altering the digestion process.

What's clear is that any investigation into future crop research will need a focus on reducing climate impacts at the same time. According to Dr Barth, this will require a deep knowledge of the production processes in the agricultural sector.

"By knowing our production systems well," she says, "we can influence reduction in greenhouse gas emissions by optimising land use."

CO2 chambers

The growth chambers used for experimentation with ryegrass are just one of two main types of experimentation conducted on crops by simulating future atmospheres.

"The study of plant responses to climate change requires the use of Free AirCarbon Dioxide Enrichment (FACE) facilities, or state-of-the-art growth chambers in which all the environmental variables – that is carbon dioxide, temperature, humidity and light intensity – can be controlled," explains UCD's Charilaos Yiotis.

UCD's PEAC laboratory is a Marie Curie Excellence and UCD co-funded facility, comprising eight walk-in and seven new "reach-in growth chambers".

The chambers can host a range of atmospheric compositions, climate regimes and light intensities which can be used to simulate the climate future. The facilities can also be used

to simulate climates of the past and test assumptions made about plants and atmospheres throughout geological time.

According to Dr Yiotis: "The facility is unique in the sense that it is the only in the world that can simultaneously control three atmospheric gasses – oxygen, carbon dioxide, and sulphur dioxide – and therefore represents a major technological advance."

New Research Highlights Promising Alternatives to Antibiotics in ...

THE PEW CHARITABLE TRUSTS (BLOG)-07-AUG-2018

The journal Veterinary Research recently published a special edition on new techniques that may provide alternatives to antibiotics in animals. This compilation of research resulted from the 2nd International Symposium on Alternatives to Antibiotics, co-hosted by the U.S. Department of Agriculture (USDA) and the World Organisation for Animal Health (OIE). The symposium brought together academics, government agency officials, and animal industry representatives from around the world to discuss the challenges of commercializing these products, and how to overcome them.

Alternatives to antibiotics are essential tools for minimizing the need for these drugs, and commercial operations already successfully utilize them to reduce antibiotic use and increase animal productivity. However, certain shortcomings—such as the difficulty of administering them, their relatively high cost compared with traditional antibiotics, or their variable effectiveness—have so far hindered their ability to substitute for antibiotics on a broader scale. Highlighted below are four research innovations or advancements that show promise for enhancing these products' attractiveness as antibiotic alternatives, and the scientific community is excited about them.

CRISPR-Cas nucleases reprogram parts of a bacterium's immune system to inactivate their harmful aspects. Because these tools precisely target specific pathogens, there is limited to no negative impact on beneficial bacteria. While still far from commercial use, new data generated from mouse models have provided a proof of concept and indicate that this approach is promising.

Host defense peptides offer an alternative way of killing bacteria—with less risk for developing resistance compared with traditional antibiotics. These proteins are naturally produced by some animals and rely on a variety of molecular processes to protect against bacterial infection, which should make it more difficult for resistance to emerge. Recent scientific advances allowing for mass production of these proteins at an economical price point for food animal producers bodes well for their future use.

Phytochemicals are plant-derived compounds with antibacterial and growth-promoting properties. Research into their interactions with an animal's microbiome offers insight into the conditions necessary for maximizing their efficacy. Although some commercial

poultry operations already use these compounds, new research should shed light on how to best deploy them to make them more consistently effective.

Spore-based vaccines are not only highly stable, cheap to mass-produce, and resistant to harsh environmental conditions, but they also generate robust, durable protection against disease—qualities that many vaccines lack. Whereas most traditional vaccines must be given to each animal individually by injection, spore-based vaccines can easily be administered to an entire herd or flock, potentially by adding them to feed. These products have already been successfully used in aquaculture, at least experimentally, and research is underway to expand their use to other animals.

The majority of these alternatives are still in the early stages of product development—which makes symposia such as USDA's and OIE's all the more imperative to driving progress. This international conference, and the numerous peer-reviewed articles that stem from it, provides not only guidance on product development for scientists and financial investors, but also optimism that by working together, the global agricultural research community can solve challenges related to the commercial development of alternative products.

Karin Hoelzer works on The Pew Charitable Trusts' safe food and antibiotic resistance projects; Nora Wong works on the antibiotic resistance project.

The world's first 'intelligent sprayer'

THE OHIO STATE UNIVERSITY NEWS-02-AUG-2018

Equipment could save money, protect the environment

It's not often that a grower comes across a piece of new equipment that can give a full return on investment in one year and can reduce their farm's impact on the environment.

But a device developed by researchers from the U.S. Department of Agriculture and The Ohio State University's College of Food, Agricultural and Environmental Sciences is promising just that.

Their "intelligent sprayer" is the first automatic spraying system of its kind.

"Using conventional sprayers, growers simply turn on the sprayer at one end of the row of trees and stop spraying at the other end," said Erdal Ozkan, professor of agricultural engineering in the Department of Food, Agricultural and Biological Engineering.

"We are still using the same type of sprayers designed more than 60 years ago," he said. "Applying a fixed rate of pesticides continuously regardless of variations in the target conditions is no longer a principle we can practice."

A partnership with the USDA

The intelligent sprayer development arose from a collaboration between Ohio State researchers and the USDA-Agricultural Research Service. It was led by Heping Zhu, an Ohio State adjunct professor and USDA agricultural engineer.

Using high-speed sensors and computing technology, the team of researchers is bringing pesticide application into the digital age. Lasers detect the tree canopy around the sprayer, and an algorithm the researchers developed determines the optimum level of spray to be emitted by each of the sprayer's 40 nozzles.

The sprayer development team, from left: Heping Zhu, Erdal Ozkan, Luis Canas, Adam Clark, Mike Klingman, Christopher Ranger, Michael Reding, Andy Doklovic and Barry Nudd. While the system can run automatically as the sprayer moves through the field, the operator can also manually control the system through a built-in touchscreen.

"Researchers around the world have tried to come up with a sprayer with similar functions to the one our team designed, but so far the intelligent sprayer developed here in Ohio is the only one of its kind working satisfactorily," Ozkan said.

In testing, when compared to conventional sprayers, the intelligent sprayer reduced airborne spray drift by up to 87 percent, lowered spray loss on the ground by up to 93 percent and reduced pesticide use by more than 50 percent, the researchers said.

The intelligent sprayer showed the same level of pest control as a conventional sprayer, they said.

Good For Cost, and the Environment

"Preventing environmental pollution by pesticides of air or of water must be as important today as controlling pests, if not more important," Ozkan said. "The technology employed in the intelligent sprayer is one example of achieving both: satisfactory pest control and the reduction of the risk associated with pollution of the environment with pesticides."

By reducing the overall use of pesticides, nursery growers who have used the intelligent sprayer report chemical savings of around $230 per acre annually. Given these significant savings in chemical costs, a grower with a 100-acre field could recoup the cost of the intelligent sprayer within one year.

The team is also working to develop an intelligent sprayer kit that can be retrofitted onto almost any sprayer, which would reduce the additional expense of using this new technology.

The intelligent sprayer has received several recognitions, including a national award from the American Society of Agricultural and Biological Engineers and the 2018 Innovator of the Year Award from the College of Food, Agricultural and Environmental Sciences. Manufacturers also have expressed interest in this new technology and how it can be adapted into their own sprayer designs.

Government implementing Swaminathan panel report to boost farming: Agriculture Minister

MONEYCONTROL.COM-09-AUG-2018

Currently, there are 585 mandis and 22,000 rural markets across the country to enable small farmers to sell their produce in an effective way.

The government is implementing recommendations suggested in the Swaminathan Commission report to improve the living standards of farmers and uplift the farm sector, Agriculture Minister Radha Mohan Singh said on August 8.

Singh said that the government has made budgetary provisions of Rs 2.11 lakh crore to implement policy reforms and new schemes in the agriculture sector, according to an Economic Times report.

In 2006, President of the National Commission on Farmers (NCF) Swaminathan had advised the then government to give more attention to the welfare of farmers along with agro-based thinking

"The NCF had made a number of recommendations for enhancing the income of farmers. Keeping them in mind, the government has implemented a lot of reformatory schemes," Singh added.

The government has introduced the Model Agricultural Land Leasing Act, 2016, which is an important step in agricultural reforms.

“The interests of both – the landholders and the recipient of the lease – are protected. The implementation of market reforms has led to enhancement of transparency in the market. The e-National Agricultural Market (e-NAM) scheme links agriculture markets across the country,” Singh said.

Currently, there are 585 mandis and 22,000 rural markets across the country to enable small farmers to sell their produce in an effective way.

Keeping in view the recommendations of the National Commission on Farmers (NCF), the Indian Council of Agricultural Research (ICAR) has developed 795 improved varieties of crops in the last four years to increase productivity and eliminate malnutrition.

About 495 of these improved varieties are tolerant to climate change, said Singh, adding that these have been handed over to farmers so they can take advantage of advanced varieties.

The agriculture commission has drawn the attention of science-based natural resources and sustainable production and development on the issue of unabated erosion of natural resources and climate change.

The government has taken a number of initiatives for the development of the agriculture sector, Singh said, adding that these measures helped in reducing the cost of production.

“These efforts have resulted in a significant transformation in their lives. Establishing the nationwide soil health card scheme is an important aspect of this thought,” Singh noted.

The government has created corpus funds for improving the infrastructure of dairy, cooperative, fisheries and aquaculture, animal husbandry, agriculture market and micro-irrigation sectors.

Singh pointed out that the government has adopted an income-oriented approach towards sustainable production keeping the welfare of agriculture, farmers and consumers in mind.

BIODIVERSITY

Adapt, move or die: how biodiversity reacted to past climate change

EUREKALERT 30-AUG-2018

A new paper reviews current knowledge on climate change and biodiversity. In the past, plants and animals reacted to environmental changes by adapting, migrating or going extinct. These findings point to radical changes in biodiversity due to climate change in the future. The paper is published in the scientific journal Trends in Ecology and Evolution by an international group of scientists led by the Center for Macroecology, Evolution and Climate, University of Copenhagen.

Image: Will Species Be Able To Adjust Quickly Enough To Survive Changing Temperatures, Precipitation And Seasons? Many Alpine Plants, Like The Comastoma Falcatum Growing In High Altitudes, Are Under Risk

Nature is reacting to climate change. We see altered behaviour and movement among plants and animals; flowers change flowering period and owls get darker body colour, due to warmer winters. So, how does the future for biodiversity look like? Will plants and animals be able to adjust quickly enough to survive the changing temperatures, precipitation and seasons? Lead-author of a new study Professor David Bravo-Nogues from Center for Macroecology, Evolution and Climate, University of Copenhagen, explains,

"We compiled an enormous amount of studies of events, which we know influenced biodiversity during the past million years. It turns out species have been able to survive new conditions in their habitat by changing either their behaviour or body shape. However, the current magnitude and unseen speed of change in nature may push species beyond their ability to adapt".

Too fast changes leave species small chances

Until now, scientists thought species' main reaction to climatic changes was to move. However, the new study shows that local adaptation to new conditions seems to have played a key role in the way species survived. Species adapt when the whole population change, e.g. when all owls get darker body colour. This happens slowly over a long period of time. Coauthor Stephen Jackson, director of the US Geological Survey's Southwest Climate Adaptation Science Center, elaborates,

"From fossils and other biological "archives" we have access to a nearly limitless number of case studies throughout Earth's history. This provide us with valuable knowledge of how climate changes of various rates, magnitudes, and types can affect biodiversity".

Past extinctions help to protect future biodiversity

The new study might give us the answer to decode how biodiversity changes under climate change. This knowledge can inform policy-makers in order to implement effective conservation schemes in the future. Some species, when failed to adapt or move fast enough, like the orange-spotted filefish, have already gone extinct due to climate change. Co-author Francisco Rodriguez-Sanchez from the Spanish Research Council (CSIC), says,

"We know animals and plants have prevented extinction by adapt or migrate in the past. However, the models we use today to predict future climate change, foresee magnitudes and rates of change, which have been exceptionally rare in the last million years. Thus, we need to expand our knowledge and improve our prediction models. Also, we must recognise the limitations of the models, because they are used to inform politicians and decision-makers about effects of climate change on biodiversity".

For carbon storage, biodiversity can help -- or hurt

SCIENCE DAILY-28-AUG-2018

Biodiversity plays a significant role in forest carbon storage, but surprisingly less than previously thought, new research suggests.

Biodiversity plays a significant role in forest carbon storage, but surprisingly less than previously thought, new research in Ecology Letters suggests.

By analyzing stores of carbon in temperate and boreal forests, researchers found that tree diversity does influence the amount of carbon stored in a given part of an ecosystem. But in a departure from previous research, researchers found biodiversity's role was relatively small when compared to other forest traits and environmental factors -- and even can decrease carbon storage in some cases.

The research team, led by Carol Adair of the University of Vermont and David Hooper of Western Washington University, found that climate, site topography, time since fire, and characteristics of the tree species in each plot explained most of the variation in forest carbon storage across temperate and boreal forests in Québec, Canada. Alain Paquette of Université du Québec à Montréal and Bruce Hungate of Northern Arizona University co-authored the study.

The impacts of biodiversity on carbon storage were not trivial. It increased live tree carbon storage by up to 20 megagrams per hectare (Mg C per hectare), about one-third of the live tree carbon in an average forest (13% of total C) -- or equal to the carbon in 8,500 gallons of gasoline. However, other factors had a much larger impact. For example, going from well- to poorly-drained sites increased the amount of carbon in undecomposed organic matter (leaves, twigs and branches) on the forest floor in an average forest by more than 400%.

Researchers also found that tree diversity did not have uniformly positive impacts on forest carbon storage. While biodiversity increased carbon stored in lived trees, it decreased carbon storage in forest floor organic matter by up to ~10 Mg C per hectare.

"These new findings indicate that ecosystem scientists should shift away from treating biodiversity as an assumed amplifier of key ecosystem services like carbon storage, and instead treat it as a subset of factors that influence such services," says Carol Adair of UVM's Rubenstein School and Gund Institute for Environment.

Instead of manipulating diversity in experimental plots in one location with a single soil type and climate, as some recent biodiversity studies have done, Adair and her team reviewed decades' worth of data collected from thousands of forest plots in Québec through the prism of a different question: what state factors and interactive controls affect carbon storage, and how important is species diversity among that suite of variables?

The well-inventoried Québec forests offered a trove of data to work with: the number of tree species, how many of each, and how big the trees in each plot were had all been documented. Scientists had counted how many trees were alive, or dead, and how much dead tree matter had accumulated on the surface of the soil. The researchers also analyzed climate, local topography and soil drainage, and when the last fire had swept through each plot.

Using a technique called structural equation modeling, which calculates the likelihood and strength of different causal relationships, the research team evaluated how different factors could explain the total amount of carbon in the plots. The team found that forest traits and factors, such as tree size, climate conditions and time since last fire increased carbon storage more than diversity. In warmer regions, where trees grow faster and larger and accumulate more carbon, larger tree species, such as white spruce and maple, replaced smaller species like black spruce. Plots with topography that restricted water flow (low, swampy areas) stored more soil carbon, because soil microorganisms run out of oxygen in wet places and decomposition slows down. Plots that had burned more recently stored less carbon.

"This study is among the first to explicitly compare the effects of environmental factors with biodiversity in ecosystems outside of experimental plots." says David Hooper of Western Washington University. "The study also helps to integrate diversity -- a relatively recent consideration as an ecosystem driver, with these other well-known factors. By integrating biodiversity into such a framework, ecologists can better ask when, where, why and how much diversity matters for ecosystem services that benefit society."

"Forest managers can focus on facets of tree diversity to increase live tree carbon, while acknowledging that a warming or drying climate may have much larger impacts," the researchers add. For example, if swampy forests become warm and dry, they could release three times as much carbon to the atmosphere as is stored in an average forest.

'Biodiversity in Valley of Flowers undergoing changes'

TIMES OF INDIA-06-AUG-2018

DEHRADUN: A reported change in the biodiversity of the Valley of Flowers has raised an alarm among the experts of the forest department in Uttarakhand, prompting them to call a meeting of national experts for assessing the situation in the valley.

During a recent visit to the valley situated near Badrinath in the Garhwal Himalayas, senior officials of the forest department found that some species of plants had started flourishing at the expense of others while the presence of snow had also remarkably reduced in the area. Notably, about 70 per cent of the valley remains under a perpetual snow cover and the valley is accessible only during a few months of the year when part of the snow melts. However, the forest team found not only a change in the snow cover but also changes in the flowering plants in the valley.

Providing details, Uttarakhand head of forest force Jai Raj said, "There is a clear-cut shift in the treeline in the area due to which now we have a significant number of birch as well as rhododendron trees which are found in sub-alpine areas and not alpine. It shows that the valley of flowers is undergoing some kind of change in its biodiversity and that needs to be well-managed."

Elaborating further, he said, "Since grazing in the valley of flowers has been stopped since 1982 under the Wildlife Protection Act of 1972, hence there is dominance of ferns like osmunda and polygonum which is possibly suppressing growth of small medicinal herbs as they are unable to do photosynthesis. Similarly there is no snow which was generally seen even during these months in the past which may have had an impact on flowering of species in the area. These things have to be analysed. We will be conducting a seminar and researching on this issue shortly."

Incidentally, the Valley of Flowers is a UNESCO World Heritage site famous the world over because of its alpine meadows and rare species of flowers which may be under threat because of the changes happening in the valley's biodiversity.

Meanwhile, commenting on the valley adopting sub-alpine characteristics from its original alpine nature, , Chandra Prakash Kala, ecologist at the Indian Institute of Forest Management, Bhopal, who has done a PhD on the ecology of the valley, told TOI, "Availability of these species of ferns and trees was seen two decades ago as well but there might be a change in their numbers or maybe there is a shift in the treeline. However, all this needs to be well-researched and a clear link has to be established before we claim that there is a change in the biodiversity from alpine to sub-alpine."

CLIMATE CHANGE

Climate change projected to boost insect activity and crop loss, researchers say

SCIENCE DAILY-30-AUG-2018

Scientists report that insect activity in today's temperate, crop-growing regions will rise along with temperatures. Researchers project that this activity, in turn, will boost

worldwide losses of rice, corn and wheat by 10-25 percent for each degree Celsius that global mean surface temperatures rise.

Scientists have already warned that climate change likely will impact the food we grow. From rising global temperatures to more frequent "extreme" weather events like droughts and floods, climate change is expected to negatively affect our ability to produce food for a growing human population.

Symptom of stem borer on corn cause by Ostrinia furnacalis.

But new research is showing that climate change is expected to accelerate rates of crop loss due to the activity of another group of hungry creatures -- insects. In a paper published Aug. 31 in the journal Science, a team led by scientists at the University of Washington reports that insect activity in today's temperate, crop-growing regions will rise along with temperatures. Researchers project that this activity, in turn, will boost worldwide losses of rice, corn and wheat by 10-25 percent for each degree Celsius that global mean surface temperatures rise. Just a 2-degree Celsius rise in surface temperatures will push the total losses of these three crops each year to approximately 213 million tons.

"We expect to see increasing crop losses due to insect activity for two basic reasons," said co-lead and corresponding author Curtis Deutsch, a UW associate professor of oceanography. "First, warmer temperatures increase insect metabolic rates exponentially. Second, with the exception of the tropics, warmer temperatures will increase the reproductive rates of insects. You have more insects, and they're eating more."

In 2016, the United Nations estimated that at least 815 million people worldwide don't get enough to eat. Corn, rice and wheat are staple crops for about 4 billion people, and account for about two-thirds of the food energy intake, according to the UN Food and Agriculture Organization.

"Global warming impacts on pest infestations will aggravate the problems of food insecurity and environmental damages from agriculture worldwide," said co-author Rosamond Naylor, a professor in the Department of Earth System Science at Stanford University and founding director of the Center on Food Security and the Environment. "Increased pesticide applications, the use of GMOs, and agronomic practices such as crop rotations will help control losses from insects. But it still appears that under virtually all climate change scenarios, pest populations will be the winners, particularly in highly productive temperate regions, causing real food prices to rise and food-insecure families to suffer."

To investigate how insect herbivory on crops might affect our future, the team looked at decades of laboratory experiments of insect metabolic and reproductive rates, as well as ecological studies of insects in the wild. Unlike mammals, insects are ectothermic, which means that their body temperature tracks the temperature of their environment. Thus, the air temperature affects oxygen consumption, caloric requirements and other metabolic rates.

The past experiments that the team studied show conclusively that increases in temperature will accelerate insect metabolism, which boosts their appetites, at a predictable rate. In addition, increasing temperatures boost reproductive rates up to a

point, and then those rates level off at temperature levels akin to what exist today in the tropics.

Deutsch and his colleagues found that the effects of temperature on insect metabolism and demographics were fairly consistent across insect species, including pest species such as aphids and corn borers. They folded these metabolic and reproductive effects into a model of insect population dynamics, and looked at how that model changed based on different climate change scenarios. Those scenarios incorporated information based on where corn, rice and wheat -- the three largest staple crops in the world -- are currently grown.

For a 2-degree Celsius rise in global mean surface temperatures, their model predicts that median losses in yield due to insect activity would be 31 percent for corn, 19 percent for rice and 46 percent for wheat. Under those conditions, total annual crop losses would reach 62, 92 and 59 million tons, respectively.

The researchers observed different loss rates due to the crops' different growing regions, Deutsch said. For example, much of the world's rice is grown in the tropics. Temperatures there are already at optimal conditions to maximize insect reproductive and metabolic rates. So, additional increases in temperature in the tropics would not boost insect activity to the same extent that they would in temperate regions -- such as the United States' "corn belt."

The team notes that farmers and governments could try to lessen the impact of increased insect metabolism, such as shifting where crops are grown or trying to breed insect-resistant crops. But these alterations will take time and come with their own costs.

"I hope our results demonstrate the importance of collecting more data on how pests will impact crop losses in a warming world -- because collectively, our choice now is not whether or not we will allow warming to occur, but how much warming we're willing to tolerate," said Deutsch.

'Natural enemies' theory doesn't fully explain rainforests' biodiversity

UPI.COM-25-AUG-2018

"Our analysis suggests that the natural enemies on this island may actually be harming the ability of many species to survive," said researcher Simon Stump.

Aug. 23 (UPI) -- Tropical forests are home to a rich diversity of tree species. Scientists have previously argued competition among "natural enemies" explains the ecosystem's unique biodiversity. But new research suggests such an explanation is not sufficient on its own.

The Janzen-Connell hypothesis posits that each species in a tropical forest has a natural enemy. Competition between natural enemies, theoretically, keeps species from dominating the ecosystem, creating the space and stability needed for biodiversity.

When ecologists at Yale University tested the theory using statistical modeling and biodiversity data collected on Barro Colorado Island in Panama, they found some species

are more susceptible to natural enemies than others. The simulations showed competition among natural enemies doesn't always promote stability and biodiversity.

"Our analysis suggests that the natural enemies on this island may actually be harming the ability of many species to survive rather than uniformly helping species co-exist," Simon Stump, a postdoctoral associate at the Yale School of Forestry and Environmental Studies, said in a news release. "This finding calls into question -- or at least adds a significant caveat -- to a major hypothesis in community ecology. At the very least it suggests that other explanations may be needed."

Scientists are still trying to understand how and why tropical forests host such tremendous biodiversity.

According to the Janzen-Connell hypothesis, the evolutionary success of each tree species is kept in check by herbivorous insects, fungal pathogens or some other type of specialized enemy, which depress the survival rates of the trees' seeds and seedlings.

The seeds and seedlings near their source are most likely to be preyed upon by these natural enemies, a phenomenon called conspecific negative density dependence. The phenomenon creates space for the success of rarer species.

Critics of the Janzen-Connell hypothesis contend that some common tree species are more susceptible to natural enemies than others. Critics also argue some rare species are not immune to the enemies of other species.

Yale ecologists designed a model to test the Janzen-Connell hypothesis in a forest with varying levels of vulnerability to natural enemies among tree species. The simulations showed the variability can have a destabilizing effect, curbing biodiversity.

The findings -- published this week in the journal Ecology Letters -- support the conclusions of previous surveys of Barro Colorado Island, which showed rare tree species on the island are actually more susceptible to natural enemies than common species.

"Thus, contrary to the commonly held assumption that conspecific negative density dependence always promotes tree diversity, our new theoretical study suggests that it may actually reduce the number of species that coexist," said Liza Comita, an assistant professor of tropical forest ecology at Yale. "Our study shows how combining data from field with theoretical models can result in big advances in our understanding of complex systems, such as tropical forests."

Noida's biggest biodiversity park to be ready next year

HINDUSTAN TIMES-21-AUG-2018

The Noida authority has started work on the Biodiversity Park in Sector 91. The proposed 75 acre green area off the Noida-Greater Noida Expressway is to be the city’s largest park.

The authority has decided to spend Rs 50 crore on this park, which will be ready in the next six months, officials said. Currently, Meghdootam park, spread on 28 acres in Sector 50, is biggest park in city. Another park named D-Park, spread over 18 acres in Sector 62, also has a lake.

"We have started constructing the footpath and planting saplings at the park. We aim to plant as many as 4,322 traditional trees including neem, jamun, banyan and mango. We will also plant 19,625 ornamental trees to make this park the most beautiful in the city," Rajiv Tyagi, general manager, Noida authority, said on Friday.

The park site is surrounded by newly developed housing societies and it would offer an ideal picnic spot for residents. With long cycle tracks, walkways, water bodies and amphitheatre, among others facilities, will offer a unique experience to visitors, officials said.

According to officials, the cycle tracks and walkways will be nearly 5km long. There will be two water bodies spread over an area of two acres each and an open-air theatre for recreational events for visitors.

"The 75 acre Biodiversity Park will be full of fruit trees, unlike the other existing parks that have more ornamental trees. These trees do not produce much oxygen and are used only for aesthetic purposes," Tyagi said.

Officials said it will be the biggest oxygen bank in Noida in the future as a 35 acre medicinal park is also being developed in the vicinity to the 75 acre Biodiversity Park.

Currently, Noida has 27% of its area reserved as green, as opposed to the 33% mandated by the forest department in every city. The authority said that it has decided to develop this park with an aim to increase the green cover even as the city is turning into a concrete jungle.

Biggest lesson from Kerala: The developmental agenda should be ...

HINDUSTAN TIMES-25-AUG-2018

We all know that development comes with a cost, but as such tragedies strike, the poor suffers the most and they seem to pay a higher price.

Residents collect food and water from a truck distributing relief materials to those stranded by floods in Pandanad in Alappuzha district, Kerala, August 21, 2018(AFP)

"Many cities are caught in a 'perfect storm' of population growth, escalating adaptation needs and substantial development deficits created by a shortage of human and financial resources, increasing levels of informality, poor governance, environmental degradation, biodiversity loss, poverty and growing inequality", noted the Intergovernmental Panel on Climate Change (IPCC) in 2014. The flood disasters in various parts of India, especially the recent events in Kerala, only reiterate this statement.

The 2018 floods in Kerala have no parallels in the state's recent history; the last such was in 1924. The intensity of flooding then was probably the same but with a much lower

impact. What has changed between 1924 and now? I recount the backdrop of my small village named Thalayolaparambu in central Kerala. Built in 1934, my riverside home was in the middle of a large coconut plantation, bordered all around by canals. The compound was flooded during most monsoons but not our home, built a couple of meters above the ground, probably based on the experience of the 1924 floods. Over the years, the region has been transformed and the numerous canals have been reclaimed, to make approach roads. The 2018 flood inundated the ground floor of most houses in this region, but spared ours.

A narrow strip of land with its highlands transforming to steep slopes, midlands and coastal tracts, Kerala it picturesque, and is a favourite destination for tourists. But this topography is also sensitive to anthropogenic alterations. Construction projects, deforestation and excessive quarrying affect the stability of hilly regions. Madhav Gadgil (former professor at the Indian Institute of Science, Bangalore), an expert on Western Ghats ecology, shared his concern recently that “rainfall is the natural trigger, but the severity of outcome is entirely man made”.

Reclaiming of wetlands, conversion of paddy fields and alteration of flood plains are the most widely accepted reasons for flooding, as in the case of the Cochin International Airport, which had to be closed due to water logging. It is ironic that the airport has been awarded with the highest environmental honour ‘Champion of Earth Prize -2018’ by the United Nations, for its operations based on solar power, with panels installed on reclaimed wetlands and former paddy fields. The airport is just about 400 metres from the Periyar river, the longest in the state and with the largest discharge potential. Local people point out how a creek --- Chengal Thodu --- and three irrigation canals were realigned to make space for the runway, which is now flooded. It is not unusual that runways get flooded, and for airports remain closed following intense rains, as it has happened in other airports of India and elsewhere in the world. But what happened at the Cochin airport is an example of a river recapturing its flood plains.

There are other examples: the 2013 Uttarakhand flood, which happened due to a cloudburst, was followed by numerous landslides. The river overflow was caused by the intensity of the rainfall together with the blockages in the river due to debris. There are also numerous urban examples like the 2015 Chennai flood. As with most urban floods, the anthropogenic factors for the Chennai flood far outweigh the natural causes. The Comptroller and Auditor General of India blamed the authorities for the unplanned development by encroachment of lakes and river floodplains. The same is the story with metros like Mumbai and even Bengaluru (geographically better positioned as it is away from the sea and at a higher elevation). Clogged drainages, unplanned underpasses, shrinking wetlands, fading green cover, vanishing lakes and other inherent problems of urbanisation are considered as the culprits.

Although the reasons and zones of impact may vary, there are many common underlying reasons, such as unplanned and excessive development, poor management of tourism, reduction in forest cover and encroachment of water bodies and wetlands. We all know that development comes with a cost, but as tragedies of such dimensions strike, it is the poor who suffer the most. The biggest lesson from the recent flood is that developmental agenda should be sustainable, transparent, socially and economically inclusive and protective of ecological systems.

Kusala Rajendran is professor at the Centre for Earth Sciences, Indian Institute of Science, Bengaluru, India

ORGANIC FARMING

India has the highest number of organic farmers globally, but most of them are struggling

DOWNTOEARTH.ORG.IN AUG 2, 2018

Poor policy measures, rising input costs and limited market are affecting growth of organic farming in the country

Small and mid-sized farmers located in hilly regions and tribal belts find it difficult to access the market. Credit: Jitendra Choubey

India is home to 30 per cent of the total organic producers in the world, but accounts for just 2.59 per cent (1.5 million hectares) of the total organic cultivation area of 57.8 million hectares, according to the World of Organic Agriculture 2018 report.

At the same time, most organic farmers are struggling due to poor policy measures, rising input costs and limited market, says a study by the Associated Chambers of Commerce and Industry of India (ASSOCHAM) and global consultancy firm Ernst & Young.

Organic farming is yet to taste success

Problems are evident even in Sikkim, which was recognised as the country's first organic state in 2018. A survey by Delhi-based Centre for Science and Environment shows that the state's transition to organic farming is yet to become a true success. The survey found that the phasing out of chemicals in Sikkim was not complemented by a simultaneous increase in availability of and access to organic manure.

Farmers also complained of low productivity during the transition from conventional chemical farming to organic farming. Pest attack on organic crops is another reason cited by the farmers for low productivity and demanded education and training to deal with it. The problem of pest attacks increased after the conversion to organic farming, but the state is yet to maintain data on this, which is needed for plant disease management.

Similarly, nearly 98 per cent farmers in Rajasthan are aware of ecological hazards of conventional chemical-based farming, but fear of decline in production and unavailability of organic inputs in the market discourage them from switching to organic farming, says a 2015 study conducted by the Consumer Unity and Trust Society.

Organic farming fraught with hurdles

According to the Indian Council of Agricultural Research, productivity on an average dips by 6.7 per cent in the first year, and the government needs to have a plan in place to support farmers during the transition. The report on Doubling of Farmers' Income by Ashok Dalwai committee, too, echoes the concern of the farmers who claim up to 30 per

cent drop in yields when embracing organic. It takes about a decade to attain pre-conversion yield levels, according to the committee report.

To ensure marketing of organic produce, connecting farmers with the domestic and global supply chain is extremely important. But a new ICRIER study found the supply chain to be underdeveloped. As a result, the small and mid-sized farmers located in hilly regions and tribal belts find it extremely difficult to access the market.

Expensive organic produce discourages customers, affects sales

Even after the produce reaches the markets, consumers find them expensive and discouraging. Rs 1,200–1,500 per month is the additional expenditure if a consumer switches to organic food, says ASSOCHAM study.

Farmers say that their organic produce are usually more expensive due to higher labour cost and comparatively lower yields. According to the ASSOCHAM report, post-harvest handling of relatively small quantities of organic foods also results in higher costs because of the mandatory segregation of organic and conventional produce, especially for processing and transportation. “Specialised farmer training costs, processing and inventory holding costs (without chemical additives), and increased packaging, logistics and distribution costs (due to low volumes), contribute to the high price of organic food products,” says the report.

Multiple certification systems

Even as farmers are struggling to find a better market, the existing certification systems for organic food are making things difficult for them. The certification systems are not only cumbersome and time-consuming, but also expensive. It is important to eliminate confusion over multiple certification systems and multiple ministries regulating organic production and sales. In fact, FSSAI is reconsidering its regulations on organic food that kicked in from July 1 this year, after farmers’ protests.

The government, meanwhile, has not done enough to address the hurdles. Paramparagat Krishi Vikas Yojana (PKVY)—the Centre’s free certification programme for organic farmers—is an example. A 2018 report on the implementation of PKVY highlights that all states, except Tripura, Odisha and Karnataka, have failed to utilise even 50 per cent of their funds under the scheme. While the Centre has increased allocation for the scheme by 44 per cent for the current year, corrective measures are needed to ensure that the states become responsible and contribute toward “organic India”.

ICAR IN PRINT

ICAR sounds alarm with discovery of deadly foreign maize pest in ...

THE HINDU-08-AUG-2018

The Karnataka finding is the first report of the pest in Asia.

The Indian Council for Agricultural Research (ICAR) has sounded the alarm after the invasive agricultural pest Fall Armyworm (Spodoptera frugiperda) was discovered in Karnataka this July. A major maize pest in North America, the Fall Armyworm arrived in

Africa in 2016. Since then, it has threatened the continent's maize crop, a staple which feeds 300 million people.

The Karnataka finding is the first report of the pest in Asia. The discovery is more worrisome because the pest feeds on around 100 different crops, such as vegetables, rice, and sugarcane.

Its discovery in Karnataka means its spread to the rest of the country, as well as neighbouring countries, could be just a matter of time.

Entomologists C.M. Kalleshwara Swamy and Sharanabasappa from Shivamogga's University of Agricultural and Horticultural Sciences first suspected that something was amiss when the pest infestation in maize crops in Shivamogga spiked this year.

Initially, they suspected it was the Northern Armyworm, or Mythimna separata, a common local pest. But when they examined the moth, they were able to identify it as the Fall Armyworm through its distinctive genitalia. Further confirmation came through DNA barcoding at Bengaluru's Indian Institute of Horticultural Research.

The first line of defence against the Fall Armyworm will be insecticides like lambda-cyhalothrin. It's efficacy is currently being studied in field trials. Also, the researchers have found some natural predators such as coccinellid beetles, that can aid biological control. A fungal species called Nomuraea rileyi also infects the Fall Armyworm. But these natural enemies may not be as effective as insecticides, Prof. Swamy told The Hindu.

Now, that the pest is here, not much can be done to keep it from spreading elsewhere in the subcontinent, said A.N. Shylesha, an entomologist at Bengaluru's National Bureau of Agricultural Insect Resources. Africa's experience shows how quickly the pest can colonise a new continent. First reported in Central and Western Africa in 2016, it has spread to 44 African countries today and has proved hard to control.

In India, Andhra Pradesh and Tamil Nadu are at immediate risk. And even though the pests reported in Shivamogga and Chikballapur, Karnataka, are only feeding on maize and sorghum at the moment, they are likely to spread to other crops.

Four new wilt-resistant brinjal varieties to be launched soon

TIMES OF INDIA-16-AUG-2018

PANAJI: The four varieties of wilt-resistant brinjal produced by ICAR-CCARI, Old Goa have received a green signal from the state government and will be launched soon.

"We are currently awaiting formal notification from the agriculture department in the official gazette. We will be giving the seeds to farmers to sow in the coming Rabi season. The quantity is yet to be decided," said R Ramesh, senior scientist, department of plant pathology.

Following release, the new brinjal seeds can be multiplied and distributed among farmers for cultivation.

"Even 2-3 kg of seeds are enough to distribute among approximately 200 farmers," Ramesh said.

TOI had earlier reported that the institute has submitted a proposal to the government to launch the wilt-resistant brinjals. These varieties have been scientifically developed by the institute to grow without being susceptible to bacterial wilt, a soil-borne disease that brinjals grown in coastal regions like Goa are prone to.

The new varieties can be harvested once they reach full fruition otherwise, in the local varieties, the crop collapses before fruiting, experts said. These varieties are suitable for cultivation during both kharif and rabi seasons. They take about 45-50 days to flower and another 60-65 days until it's time for its first harvest. Each crop can bear up to 30 brinjals.

Currently, almost all the brinjal available in Goa comes from Belagavi and other areas. There is very less production of the crop in Goa with the Taleigao and Agasaim varieties being the only local produce.

Paddy vulnerable to rising rainfall & heat patterns in C'garh

DAILY PIONEER-26-AUG-2018

The yield of crops is projected to be more vulnerable to increasing frequency and intensity of extremes in rainfall and rise in temperature during the last 40-50 years in Maharashtra, Odisha, Chhattisgarh and Assam for rainfed paddy, Central and East India for wheat; Punjab, Haryana and Rajasthan for irrigated paddy, the Central Government has informed.

Studies indicate that there is an increasing frequency and intensity of extremes in rainfall and rise in temperature during the last 40-50 years resulting in adverse effects on agriculture, it informed.

Further, decline in wheat yield in Eastern and Central India due to terminal heat stress and unseasonal windy rainfall during February-March; damage to horticultural crops such as mango, guava, papaya, brinjal, tomato, potato due to cold waves; damage to horticultural crops due to hailstorms in Maharashtra, upward shift in apple production zones in Himachal Pradesh etc. have been experienced in the recent past.

This may lead to projected average reduction of yield by 6 per cent in wheat, 4-6 per cent in rice, 18 per cent in maize, 2.5 per cent in sorghum, 2 per cent in mustard and 2.5 per cent in potato. Recognising the likely impact of climate change on agriculture and allied sectors, Government through Indian Council of Agricultural Research (ICAR) has initiated a network project, National Initiative on Climate Resilient Agriculture (NICRA) during 2010-11. It encompasses multi-pronged strategic research, technology development, capacity building of stakeholders and technology demonstrations at farmers' fields.

The impact of climate change is also expected in economic viability and production of livestock systems through poor availability of quality feed and fodder, decreased

reproductive performance and decline in milk production. Further, ICAR- CRIDA has also mapped 572 districts of the country for their vulnerability to extreme events due to climate change.

The Central Government has taken several initiatives to reduce GHG emissions and improve agricultural productivity through promoting rice cultivation under System of Rice Intensification (SRI) and Direct Seeded Rice (DSR), Neem coated urea, judicious use of water and fertilizers, water saving technologies and shifting area from transplanted rice to other cereals, pulses and oilseeds especially in Punjab, Haryana and western Uttar Pradesh.

Further, location and crop specific efficient management practices for conservation agriculture (CA), resource conservation technology (RCT), broad bed furrow (BBF) method of sowing, micro irrigation has been developed by ICAR institutes, which reduce GHG emission from crops and have been demonstrated through Front Line Demonstrations (FLDs).

Under Technology Demonstration Component of NICRA, the climate resilient interventions are implemented by taking one representative village in 151 climatically vulnerable districts of the country. Major interventions implemented under the scheme for climate resilient agriculture include efficient management of natural resources, adoption of resilient agronomic practices, adoption of stress tolerant varieties, efficient management of livestock, poultry and fisheries and strengthening local institutions.

Government is also addressing the issues of climate change through National Mission on Sustainable Agriculture (NMSA). The NMSA as pragmatic intervention aims at adopting location specific, integrated/ composite farming system; soil and moisture conservation measures; comprehensive soil health management, efficient water management practices and mainstream rainfed technologies. Besides, climate resilient interventions have been embedded and mainstreamed into Missions/Programmes/Schemes of Department of Agriculture, Cooperation & Farmers Welfare (DAC & FW) through a process of restructuring and convergence.

Doubling farmers' income by 2022 is possible: ICAR DG

DAILY PIONEER-25-AUG-2018

ICAR DG, Dr Trilochan Mohapatra while briefing the press on Saturday said that achieving the goal of doubling farmers' income by 2022 as per the vision of PM Narendra Modi is possible if proper market leakage, irrigation facilities and value chain is developed in a uniform way. "Strategic documents have been issued to the State government as what steps must be taken up for doubling farmers' income. All required assistance is being provided to the State Government," Dr Mohapatra added.

IISR IN PRINT

Spicy Jackpot: Where Kenyans need to place their bet

KENYANEWS.GO.KE-16-AUG-2018

Ms. Esther Wambui cutting some leaves from a spring onion plant in her kitchen garden.

Kenya is spices deficient. But it has no excuses for this gap. The country is gifted by Mother Nature with abundance of suitable climate and good soils. It also boasts of a knowledgeable and skilled human resource. That the environment for domestic and commercial production of spices is conducive is in no doubt.

The spices deficiency falls in the backdrop of a multi-billion industry, whose potential is yet to be exploited in the Kenyan soils and market.

According to available data, from the Ministry of Agriculture, Livestock, Fisheries and Irrigation, the domestic value of horticulture by 2012 amounted to Sh. 306 billion. Out of this, herbs and spices contributed Sh. 4.9 billion accounting for less than 2% of the total values of the domestic horticulture.

Spices production (2012) Source: Ministry of Agriculture, Livestock, Fisheries and Irrigation

Spice crops	Area (Ha)	Quantity (Ton)	Value (KShs)
Long cayenne chilies	299	1,323	46,290,740
African birds eye (Abe) chillies	209	817	43,527,800
Bullet chilies	112	781	33,622,750
*Garlic	215	1,217	177,010,200
Corriander	196	2,254	49,546,126
Cloves			
*Ginger			
*Turmeric			
Tamarind			
Vanilla			

Chart explanation: *With the exception of chilies, spices production largely remain unexploited in Kenya especially due to inadequate research and development as well as crops promotion and utilization. Production remains low but expansion and commercialisation continues especially for ginger, turmeric and garlic.

“The country is capable of producing triple what it does presently to mitigate more than 80% importation of our national requirement of spices,” Head of State Corporations Unit in the State Department of Agriculture, Mr. Eliud Kamau states.

Kamau, an agricultural economist says that the main spices produced in Kenya include garlic, cayenne, chili, bullet chili, cloves, ginger, turmeric, tamarind, coriander and vanilla.

Spices are still in the category of emerging crops with the country remaining a net importer.

“Spices in this country are grown by smallholder farmers who are not able to meet the market demand. Majority do it as a hobby, for domestic consumption. Very few of them have ventured into the export market,” he concedes.

Further he says, one doesn’t need an acre to make millions from the seasonings because they are low volume but high value products. He calculates that a kilo of ginger for example costs about Sh 250 in the local market.
“To produce one tonne of ginger, a farmer requires only a fraction of an acre, with a turnover of Sh. 250, 000 from even a quarter acre,” he elucidates.

His admission on the miniature practice of spice farming is corroborated by a spice enthusiast, Ms. Esther Wambui, who has put up a kitchen garden in her 40 feet by 80 feet plot. Within the plot, she has planted some spring onions, sukuma wiki, pawpaw, amaranth and passion fruit.

Wambui has barricaded a section in the kitchen garden to prevent their dog from damaging the plants which are neatly arranged in containers and a few planted on the demarcated soil ground.

“I do add spices to my food as I cook. I do not add any processed spices but prefer to use them in their natural form,” Wambui says.

Asked what spices she adds, she replies; “The bulb onion of course. I also love spring onions. I tend to believe the spring onion is tastier, especially the green part. It has a way of colouring the food and it also makes it more attractive.”

Wambui mentions that she adds spring onion in her mukimo (mashed maize and beans mixed with either potatoes or green bananas) as the seasoning makes the dish aromatic.

The mother of two teenage girls adds that in the mix are tomatoes for taste and colour and often, some ginger and garlic.

“I use the last two because I hear they are medicinal,” she quips with a smile, adding, and, “eggplant, georgette (or zucchini), cucumbers and dhania (coriander) are a by-the-way.”

Her challenge however, is that she has to buy what she needs away from the kitchen garden, “in small quantities” because of their perishability.

A group of participants who had attended a training on Value Addition on Spices at the Indian Institute of Spices (IISR), Kozhikode, Kerala, India being taken through how spices extracts are used to make drugs
Courtesy of Mr. Eliud Kamau, Head of State Corporations Unit, Ministry of Agriculture, Livestock, Fisheries and Irrigation.

Druscila Nakhauka, a resident in Ongata Rongai Ward, Kajiado County, also does some small scale farming where she has planted kales, cabbage, egg plant, cucumbers and bulb onions. A few corianders are also found in the one acre farm.

Asked whether she puts spices in her food she replied; “I do. In fact I do not miss to add onions and tomatoes in my food. Once in a while I go to Kware market and buy a tuber of ginger. I do not like garlic at all in my food. It has an offensive smell.”

What Nakhauka does not seem to realise is that there is a difference between spices and vegetables as confirmed by Mary Wanjiku, a bio-medical graduate specializing in phytochemicals, and currently championing for spices farming in Kenya.

“I too used to think that onions and tomatoes are spices, but in my studies and exposure, I now understand that these are vegetables,” notes Wanjiku.

Wanjiku, who is a member of Women Farmers Association of Kenya (WOFAK), who did phytochemicals in her undergraduate studies, explains the importance of spices in people’s lives.

“Plants use phytochemicals as a defense against potential threats which may include bacteria, viruses, and fungi. When we consume these plants as fruits and vegetables, these defenses are passed along to us in order to fight off threats to our health,” says Wanjiku.

She emphasizes the need to make Kenyans more aware of the health benefits, noting that brightly coloured fruits and vegetables contain the highest concentrations of phytochemicals, and may help us fight off diseases such as cancer and heart disease.

“Phytochemicals interfere with the processes that cause chronic diseases, for example, they may prevent carcinogens, the cancer-causing agents, from forming in our bodies. People should eat foods containing phytochemicals like fruits, vegetables, grains, and beans,” she says.

Wanjiku says she is working with farmers in Maragua, Murang’a County who have shown interest in spice farming. She is on a pilot sensitisation program with two groups, one a women only group and another of mixed gender at Maragua Ridge and Mbombo area.

“I want to teach them how to grow some spices like turmeric, which in our local stalls mostly comes from Uganda and Tanzania. I am particularly interested in making them aware of the medicinal value in spices that will in the long term create local demand and consumption as a launch pad. It is also a good avenue to empower the women economically,” she expresses.

Ms. Mary Wanjiku, member of Women Farmers Association of Kenya who is sensitizing a women’s group, and mixed gender group at Maragua Ridge and Mbombo are, on spices farming

Spices are multi-beneficial; including adding colour and preservation of foods; providing sweet smells in perfumes, are used in cosmetics, have immense medicinal value as well as making concoctions for religious rituals, the spices advocate adds.

To facilitate spice production and consumption, a training program on Triangular Cooperation adapting technological advances and innovative solutions to address food security challenges in Africa was started in 2010 in India.

It involves conducting training on select countries of which the pilot phase focused on three African countries, namely Kenya, Malawi and Liberia. This is via Feed the Future India Triangular Training (FTF ITT) program that aims to train 1400 agricultural professionals from 17 partner countries in Asia and Africa by the year 2020.

Kenya has started benefitting from this cooperation as between 13th -29th May, 2018, a six member team composed of agribusiness officers, research unit, agricultural extension, and agricultural policy representatives attended training on Value Addition on Spices. The training was undertaken at the Indian Institute of Spices (IISR),

Kozhikode, Kerala, an institution specifically dedicated to spices research. Kamau who attended the training explains that India is way ahead of the pack in the spice industry. Other than research, he observes, India has invested heavily and supported spices related institutions such as Central Food Research Institute (CFTRI), in Mysore, Karnataka; and spices industries like Kancor Ingredients Ltd, Angamaly and Panda, areas of which they visited.

He expounds; "While Kenya is sleeping on a goldmine, on the other hand, India, the world's largest producer and consumer of its own spices in the world, is thriving on this lucrative trade."

According to India Brand Equity Foundation, (IEBF) in their website www.ibef.org, India, known as the 'home of spices', boasts a long history of trading with the ancient civilisations of Rome and China.

"Today, Indian spices are the most sought-after globally, given their exquisite aroma, texture, taste and medicinal value," reports IEBF.

Further, it states, India has the largest domestic market for spices in the world, is the world's largest producer, consumer and exporter of spices and that it produces about 75 of the 109 varieties listed by the International Organization for Standardization (ISO) and accounts for half of the global trading in spices. Their major importers are United States of America, Vietnam, China, United Arab Emirates, Iran, Thailand, United Kingdom, Saudi Arabia, Malaysia and Germany.

Top spices produced in the country include pepper, cardamom, chilli, ginger, turmeric, coriander, cumin, celery, fennel, fenugreek, ajwain, dill seed, garlic, tamarind, clove, and nutmeg among others.

Kamau in his training report indicates that Indian spice export in 2016 –17 amounted to 9, 47,790 tons – worth Rs. 17664.60 Crores (10 Lakhs) (2633.30 million USD). They command a share of 48% in quantity in world spice market, and 44% in value. Total spices export from India stood at 1.08 billion kilogrammes, valued at US$ 3.11 billion in the year 2017-18.

And herein lies an opportunity for the agribusiness savvy farmers, particularly those who may not own large tracts of land, but can even lease to earn their first million in a quarter of an acre, if well managed.

A shrub of red pepper, a spice used in seasoning foods in either raw or processed form.

Regrettably, every day, Kenyans, both young and old, females and males are indulging in betting, an addictive behaviour that is minting billions across the gender and age divide.

The youth are the ones mostly trapped by this trend and are burning their shillings in bundles buying from the telecoms and cyber cafes as they try to predict winners and losers in multiple gaming sites like Betway, BetPawa, mCheza, SportPesa, and Betin among others.

They are enticed by an allure of hitting the jackpot worth tens of millions. This has in many cases been counterproductive with even some bidders destroying their relationships with family and friends while others committing suicide after losing their bets.

GENERAL

Kerala floods hit paddy, banana, spices in 45,000 hectare of farmland, says

FIRSTPOST-27-AUG-2018

New Delhi: Floods in Kerala have damaged paddy, banana, spices and other crops in 45,000 hectares of farmland, Agriculture Secretary Shobhana K Pattanayak said on Monday.

The state government has been asked to submit a detailed proposal seeking central funds to provide relief to the growers, he said.

"The state has estimated damage to 45,000 hectares of farm fields. We have also got the same report. More than crops, the damage to houses and other infrastructure is more in Kerala," Pattanayak told PTI.

Paddy has been affected in 20,000 hectare and even banana plantations has been hit badly. Spices like cardamom have been affected in 2,000 hectares or so, he said.

As per the official data, the area sown to paddy crop in Kerala stood at 57,000 hectares till last week in the current season, lower than 62,000 hectares in the year-ago period.

The sowing of paddy, the main Kharif crop, begins with the onset of southwest monsoon from July and harvesting is done from October onwards.

1.11 crore farmers register on e-NAM to sell produce online: Radha Mohan Singh

ECONOMIC TIMES-07-AUG-201

NEW DELHI: Over 1.11 crore farmers spread over 16 states and union territories have registered on e-NAM platform, which promotes better marketing opportunities for farmers to sell their produce online, Union Agriculture Minister Radha Mohan Singh said today.

Singh said in the Lok Sabha that farmers wishing to join e-NAM platform need to register themselves on e-NAM portal and can sell their produce on e-NAM platform in any e-NAM mandi of their choice.

"e-NAM platform promotes better marketing opportunities for farmers to sell their produce through online, competitive and transparent price discovery system and online payment facility.

"It also promotes prices commensurate with quality of produce. All these contribute towards better marketing efficiency and also better prices to farmers," he said during Question Hour.

Singh said three essential reforms the states must carry out for consideration are e-trading, single point levy of market fee and unified single trading licence for the state.

Big Change:
The end of Five-Year Plans: All you need to know

The minister said a total of 585 'mandis' have been integrated till March 31, 2018 on e-NAM platform. Mandis are on-board to the e-NAM platform based on proposals received from respective states with an appropriate detailed project report.

Singh said three essential reforms the states must carry out for consideration are e-trading, single point levy of market fee and unified single trading licence for the state.

The government of India provides certain assistance to the states, such as free access to e-NAM platform, financial assistance for computer hardware, Internet facility and assaying equipment, mandi analyst for each e-NAM mandi for a year and training to stakeholders in mandis being integrated, he said.

Production estimate for major crops raised to record 285 million tonnes

ECONOMIC TIMES-28-AUG-2018

The first advance estimate was issued in September 2017, followed by the second in February, and the third in May.

NEW DELHI: India raised its estimate on foodgrain production for the ongoing crop year ending June, with normal rains last monsoon season boosting the output of wheat, rice, coarse cereals and pulses.

The agriculture ministry's fourth advance estimates of major crops pegged the output at a record 284.83 million tonnes, raising its May forecast by 1.9%. The previous record was 275.11 million tonnes, achieved in 2016-17. The first advance estimate was issued in September 2017, followed by the second in February, and the third in May. The fifth and final estimate will come by December-January.

"As a result of near normal rainfall during monsoon 2017 and various policy initiatives taken by the government, the country has witnessed record food grain production in 2017-18," the agriculture ministry said.

The government expects rice production to reach 112.91 mt, 1.23% higher than the third advance estimate and breaking the previous record production of 109.70 mt achieved during 2016-17. Wheat output is pegged at 99.70 mt, a rise of 1.10% from the May estimate. The country previously had its highest wheat production in 2016-17 at 98.51mt.

Output of pulses — largely gram, urad and tur — is again a record at 25.23 mt, an increase of 2.93% over the third advance estimate, as a result of significant increase in the area coverage and productivity of all major pulses. In 2016-17, production was 23.13 mt.

Coarse cereals production is estimated at 46.99 million tonnes, a 4.72% increase from the third advance estimate. Further, it is also higher by 3.22 million tonnes as compared to output of 43.77 million tonnes achieved during 2016-17. The government predicts cotton production to increase 0.86% over the third advance estimate to 34.89 million bales in the fourth estimate. Each bale weighs 170 kg. Production of sugarcane is estimated at 376.91 million tonnes, 6.14% higher than the third advance estimate. This is 70.84 million tonnes more than the year before, the government said in its statement.

Production of oilseeds, including groundnut, mustard and soya bean, saw an increase of 2.18% to 31.31 million tonnes over the third advance estimate. This is marginally higher than the previous year's 31.28 million tonnes. Jute and mesta output is estimated at 10.14 million bales (of 180 kg each).

Only 23% of rural income from farming, reveals NABARD 2016-17 ...

THE INDIAN EXPRESS-18-AUG-2018

According to the survey, whose reference period is 2015-16, the average net monthly income of Indian rural households — after deducting expenses incurred in the course of economic activity — was Rs 8,059.

The highest share of this (Rs 3,504) was accounted for by wage labour (both farm and non-farm). (Express Photo)

AGRICULTURE GENERATES not even a quarter of rural household incomes in India. Even for so-called agricultural households, just over 43 per cent of their average income comes from cultivation of crops and rearing of animals, according to the National Bank for Agriculture & Rural Development's (NABARD) All India Rural Financial Inclusion Survey 2016-17.

The survey reinforces a trend that has gathered momentum since the start of this century — of an increasingly less 'Krishi' in 'Bharat'. While agriculture may, by definition, be largely rural, the converse, though, isn't true. The NABARD survey estimates the total number of rural households in India for 2016-17 at 21.17 crore. The definition of "rural" is a broad one, covering revenue villages and semi-urban centres with a population of less than 50,000. Out of the 21.17 crore rural households, 10.07 crore, or under 48 per cent, are "agricultural" — those with at least one member self-employed in farming and reporting annual value of produce at more than Rs 5,000. The remaining 11.10 crore households or 52 per cent are "non-agricultural".

AVERAGE MONTHLY INCOME OF RURAL HOUSEHOLDS

Income Source	Agricultural Households	Non-Agricultural Households	All Households
Cultivation	3,140	NA	1,494
Livestock Rearing	711	NA	338
Other Enterprises	489	851	679
Wage Labour	3,025	3,940	3,504
Govt/Pvt Service	1,444	2,326	1,906
Other Sources	122	152	138
All Sources	8,931	7,269	8,059

Figures in Rupees

According to the survey, whose reference period is 2015-16, the average net monthly income of Indian rural households — after deducting expenses incurred in the course of economic activity — was Rs 8,059. The highest share of this (Rs 3,504) was accounted for by wage labour (both farm and non-farm), which was followed by government or private service jobs (Rs 1,906). On the other hand, agriculture — i.e. income from crop cultivation and livestock rearing — contributed only Rs 1,832.

But what's interesting is that even within "agricultural households", the share of average income from cultivation and livestock rearing was just over 43 per cent. The balance 57 per cent income in their case, too, was from non-agricultural sources.

The NABARD survey not only reconfirms, but magnifies, the findings of the National Sample Survey Office's (NSSO) Situation Assessment Survey of Agricultural Households conducted for 2012-13. That survey had estimated agricultural households to constitute 57.8 per cent of all rural households. One reason for the higher share could be that the NSSO's definition of "rural" did not extend to semi-urban centres with below 50,000 population, which made up 16 per cent of households in the NABARD survey.

In the NSSO survey, 67.2 per cent of the average income of agricultural households came from cultivation and livestock rearing. That share is even lower, at 43.1 per cent, in the recent NABARD survey. The methodological differences notwithstanding, both surveys highlight the same fact — of rural India becoming less agricultural, both in terms of the share of families engaged in farming and a diversification of income sources even in their case.

The NSSO survey reckoned the average monthly net income of agricultural households in India for 2012-13 at Rs 6,426. That figure in the NABARD survey for 2015-16 is Rs 8,931, an increase of 39 per cent over three years. A doubling of incomes would require this to go up to Rs 17,862 by 2021-22, the target date set by the Narendra Modi-led National Democratic Alliance government. It is significant to note that the doubling is with reference to agricultural household incomes, which could be from both farm and non-farm sources.

India bans 18 pesticides, has many more to go

DOWN TO EARTH MAGAZINE-17-AUG-2018

The ban applies to registration, import, manufacture, formulation, transport, sale and use of all these pesticides. Credit: Meeta Ahlawat

Around three years after the Anupam Verma Committee submitted its recommendations, the Ministry of Agriculture and Farmers' Welfare has finally issued the Pesticides (Prohibition) Order, 2018, banning 18 pesticides. Of these 18, 12 pesticides have been banned from immediate effect (from August 9, 2018) and ban on another six will be implemented from December 31, 2020. The ban applies to registration, import, manufacture, formulation, transport, sale and use of all these pesticides.

The use of toxic pesticides in India has lately been in news in connection with death of farmers and agriculture workers Yavatmal region of Maharashtra. The Centre for Science and Environment (CSE), a non-profit based in New Delhi, has been campaigning for stricter regulation of pesticides and ban on the most toxic pesticides classified as 'Class I' (based on acute toxicity of the active ingredient) by the World Health Organisation. This order bans seven of the 18 Class I pesticides allowed in India, many of which are heavily used. However, there is scope for improvement, the list leaves out two heavily used Class I pesticides: Monocrotophos and Carbofuran.

"Though delayed, this move by the government will address part of the problem. At least some of the heavily used class 1 pesticides would not be allowed after the next couple of years. The government should also consider similar action on other class 1 pesticides, some of which are heavily used," says Amit Khurana, programme director, food safety and toxins, CSE.

Monocrotophos is one of the pesticides connected with the death of farmers in Maharashtra in 2017. The situation is grave since 5,000-7,000 people die every year of poisoning due to accidental intake of pesticides in India and Class I pesticides form about one-third of the pesticides consumed in India. As per the International Code of Conduct on Pesticide Management, jointly released by FAO and WHO, "pesticides whose handling and application require the use of personal protective equipment that is uncomfortable, expensive or not readily available should be avoided, especially in the case of small-scale users and farm workers in hot climates". It is impossible to ensure use of personal protective equipment by small-scale farmers and farm workers in India. On this basis itself, Class I pesticides should have been banned in India long ago.

A public interest litigation has been filed in the Supreme Court by Kavitha Kuruganti, national convenor, Alliance for Sustainable and Holistic Agriculture, seeking review of 104 pesticides permitted in India but banned or severely restricted in other countries. "The Anupam Verma Committee reviewed 66 pesticides and recommended ban of 18 of them and its successive committee headed by Dr JS Sandhu had the task to review a ban on these 18. Our case pertains to 104 toxic pesticides allowed in India but banned or

restricted elsewhere in the world, however, in March 2018, the court ordered us to make our representation to the Sandhu committee which had to be limited to these 18 pesticides only. This ban falls very short of our prayer in the Supreme Court and we hope that the SC looks into the larger matter of 86 more pesticides, serious regulatory lacunae that exist in India and the need to promote non chemical farming," says Kuruganti.

IoT in Agriculture (IoTAg) is Causing a Massive Shift from Traditional Farm Management towards Software Control & Data-driven Operations -- 2018-2023 Market Analysis

PRNEWSWIRE : AUG 1, 2018

This research assesses the technologies, companies, and solutions for IoT in agriculture.

The report evaluates the overall marketplace and provides forecasts for sensors (and other devices), services, solutions, and data analytics globally, and regionally for the period 2018 to 2023.

Forecasts include precision agriculture, indoor farming, livestock, and fisheries. Forecasts cover IoT in Agriculture solutions globally and regionally including: Intelligent Farm Equipment, Smart Sensor Systems, Intelligent Drones, Smart Farm Robots, and Software. Within the Smart Sensor area, the report forecasts the following: Sensors for Detecting Physical Properties, Sensors for Chemical Analysis and Applications, Sensors for General Monitoring, Sensors for Quality, Sensors for Autonomous Agriculture, and Others.

Agriculture has transformed in the last few decades from small to medium farming operations to highly industrialized, commercial farming that is concentrated among a few large corporations.

Growing crops and raising livestock and fish has become an increasingly mechanized and computer-driven operation. This allows corporations to treat agriculture like manufacturing in the sense that measurements, data, and control is very important to manage costs, maximize yields, and boost profits.

The Internet of Things (IoT) in Agriculture (IoTAg) represents the use of technology wherein agricultural planning and operations becomes connected in ways previously impossible if it were not for advances in sensors, communications, data analytics and other areas.

The commercial agriculture industry is rapidly becoming one of the most IoT data-driven markets. With the emergence of M2M, IoT, and advanced data analytics technologies, data is becoming available that was previously uncollectible.

The application of various AgriTech analytics tools and methodologies, such as predictive analytics will provide substantial enhancements to agriculture operations. Virtually every

aspect of agriculture that can be automated, digitally planned, and managed will benefit from IoT technologies and solutions.

Accordingly, IoTAg will change the way agricultural operations and farms are managed, which will bring various benefits to farming, including enhanced crop quality and quantity; improved use of resources and farm equipment; real-time monitoring of farms, animals, and machines; and automated irrigation systems, fertilizer spraying, and pest control.

Another M2M/IoT and data-driven shift in traditional farm management is evolving to a software-managed operation that is managed by people unskilled in traditional farming practices.

The agriculture sector is increasingly controlled by companies that are not conventional experts of agriculture, such as farmers and traditional farm value chain, including farm equipment makers, seed suppliers, and producers and suppliers of plant foods and chemicals.

We see a transition from conventional agriculture to Farm Management Systems. With this shift, software developers and predictive data analytics companies will take over control of end-to-end agricultural operations.

MALAYALAM NEWS

2018 ഓഗസ്റ്റ് 31 വെള്ളി മലയാള മനോരമ

കൃഷിമേഖലയ്ക്ക് 19.51 കോടിയുടെ നാശനഷ്ടം

കോഴിക്കോട് ● പ്രകൃതിദുരന്തത്തിൽ ജില്ലയിലെ കൃഷിമേഖലയ്ക്ക് 19.51 കോടിയുടെ കനത്ത നാശ നഷ്ടം. ഓഗസ്റ്റ് 23 വരെയുള്ള പ്രാഥമിക കണക്കുകൾ പ്രകാരമാണിത്. നാശനഷ്ടങ്ങളുടെ അന്തിമ കണക്കുകൾ തയാറാക്കി വരുന്നു. കൊടുവള്ളി, കുന്നമംഗലം ബ്ലോക്ക് പഞ്ചായത്തുകളെയാണ് ദുരന്തം ഏറെ ബാധിച്ചത്. തെങ്ങ്,വാഴ,നെല്ല്,കവുങ്ങ്, റബർ,ജാതി എന്നീ വിളകൾക്ക് കാര്യമായ നാശ നഷ്ടം സംഭവിച്ചിട്ടുണ്ട്.

നാശനഷ്ടം ഇങ്ങനെ:

● 12308 തെങ്ങ്, 768503 വാഴ,11790 കവുങ്ങ് ,550 കൊക്കോ,7839 റബർ,1341ജാതി, 65 ഗ്രാമ്പു,100 കശുമാവ്,5555 കുരുമുളക്, 119 ഹെക്ടർ നെല്ല് 35.28 ഹെക്ടർ കപ്പ,4.2 ഹെക്ടർ പച്ചക്കറി.

● 860.68 ഹെക്ടർ കൃഷിഭൂമിയിലെ വിളകളാണ് ഉരുൾപൊട്ടലും വെള്ളപ്പൊക്കവും കാരണം നഷ്ടമായത്. 7277 കർഷകരാണ് ദുരിതത്തിലായത്.

നടപടി ഇങ്ങനെ:

● നാശനഷ്ടങ്ങൾ ബ്ലോക്ക് തലത്തിൽ വിലയിരുത്തിയശേഷം പ്രാഥമിക റിപ്പോർട്ട് ജില്ലാ കൃഷി വകുപ്പ് തയാറാക്കി.

● കേന്ദ്ര സർക്കാർ 25.5 ലക്ഷം രൂപയും സംസ്ഥാന സർക്കാർ 7.05 കോടി രൂപയും നഷ്ടങ്ങൾ പരിഹരിക്കാനായി നൽകി.

● പ്രിൻസിപ്പൽ കൃഷി ഓഫിസിൽ പ്രത്യേക സംഘം രൂപീകരിച്ചു, 3.7 കോടി രൂപ നഷ്ടപരിഹാരമായി അനുവദിക്കുന്നതിനുള്ള നടപടികൾ ആരംഭിച്ചു.

● പത്തിനകം അർഹമായ കർഷകർക്ക് നഷ്ടപരിഹാരം ലഭ്യമാക്കാനാണ് ലക്ഷ്യമിടുന്നത്.

● വിള ഇൻഷുറൻസ് പദ്ധതി പ്രകാരം 13.32 ലക്ഷം രൂപ കർഷകർക്ക് നൽകിക്കഴിഞ്ഞു.