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AGRI Titbits

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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Malayalam News

Botanical Survey of India Scientists Discover Two new ginger species

News18-11-Sep-2019

Of the two species, *Zingiber dimapurense* is taller, with leafy shoots measuring 90-120 cm high, whereas the leafy shoots of *Zingiber perenense* reach up to 70 cm.

Two new species of *Zingiber*, commonly referred to as gingers have been discovered from Nagaland by the scientists from the Botanical Survey of India (BSI). *Zingiber perenense* has been discovered from the Peren district of Nagaland, while *Zingiber dimapurense* was found in the Dimapur district of the State, reported The Hindu.

Of the two species, *Zingiber dimapurense* is taller, with leafy shoots measuring 90-120 cm high, whereas the leafy shoots of *Zingiber perenense* reach up to 70 cm.

Zingiber dimapurense

The lip of the flower (modified corolla) for *Zingiber dimapurense* is white in colour, with dense dark- purplish red blotches. Its pollen is a creamy-white and ovato-ellipsoidal, whereas the fruit is an oblong 4.5 cm-5.5 cm long capsule.

The specimen of *Zingiber dimapurense* was collected in October 2016 from the Hekese village forest under the Medziphema subdivision. Some rhizomes of this plant collected along with field data were planted in the Botanical Survey of India's Eastern Regional Centre garden in Shillong, where itself they began flowering in June 2018, reported the daily.

Zingiber perenense

Zingiber perenense was discovered about 50 kilometers away from where *Zingiber dimapurense* was found. The lip of the flower for *Zingiber perenense* is white in colour with purplish-red streaks all over, and the pollen is ellipsoidal.

The type specimens of *Zingiber perenense* were collected in September 2017, when botanists were working on the 'State flora of Nagaland' in the Peren district. "The plant was found growing in moist shady places on the bank of a small stream in the hilly terrain forest of the Tesen village under the Peren subdivision," The Hindu quoted the publication authored by four botanists mentioning.

The daily reported Dr. Dilip Kumar Roy, who has contributed to both the publications saying that the genus *Zingiber* has 141 species distributed throughout Asia, Australia and the South Pacific, with its centre of diversity in Southeast Asia. He added that more than 20 species have been found in northeastern India. Furthermore, according to Dr Roy, over the last few years, more than half a dozen species have been discovered from different states of northeast India only.

Earlier discoveries of Zingiber include Hedychium chingmeianum from the Tuensang district of Nagaland, Caulokaempferia dinabandhuensis from the Ukhrul district in Manipur in 2017, and Zingiber bipinianum from Meghalaya in 2015.

Another scientist with the BSI, Dr. Nripemo Odyou, who also contributed to both the new discoveries in 2019, said that the high diversity of ginger species in northeast India reveals that the climate is favourable for the growth and diversity of the genus.

Dr Odoyu said that while most species of ginger have medicinal values, more studies are required to ascertain the medicinal properties of the newly discovered species.

Ginger is useful for skin and hair, Know how to use

News Track English-20-Sep-2019

In cold weather, you often like to drink ginger tea. Ginger is a very familiar thing that is found in every household. Ginger contains antioxidants and is also antiseptic. Due to this, ginger proves to be very helpful in anti-ageing, acne problems, skin burns, dandruff, hair loss etc. Today we are going to tell you some of its benefits.



Skin ageing

Ginger contains too many anti-oxidants. Anti-oxidants increase blood circulation and reduce toxins. These anti-oxidants protect the skin by fighting against free radicals. It keeps the skin young by removing the problems of lifeless skin, wrinkles etc.

Remove pimples and blemishes

Due to the antiseptic properties present in ginger, it removes the problem of acne and blemishes from the skin. It also acts as a deep cleanser for closed pores and eliminates any bacteria that causes acne. With its help, dead cells can also be removed. People with sensitive skin can also use ginger as its effect is not strong.

Remove dandruff

The antiseptic properties of ginger are also useful in curing infection and dandruff problems. You can also use ginger oil to tackle this problem of the scalp.

Skin burns

If any part of the skin burns, then ginger plays a very special role in it. Soak cotton in ginger juice and immediately apply it on the burnt place.

Cardamom given harmful coat in pursuit of 'Alleppey Green'

The Hindu-27-Sep-2019

Cardamom given harmful coat in pursuit of 'Alleppey Green'

Cardamom being manually checked for chemical colouring in Idukki.

Chemical colouring will botch crop's export chances

Increased instances of chemical colouring in cardamom have been reported in Idukki, prompting the authorities to take action to prevent such adulterated crop from reaching the auction centres.

The chemical colouring may result in the rejection of the consignment, leaving a long-term negative impact on the cardamom export. The Food Safety Department has collected samples of cardamom to test for chemical colouring.

Benny Joseph, assistant commissioner, Food Safety Department, told The Hindu on Friday that an awareness campaign among the farmers had been launched in association with the Spices Board of India against chemical colouring. However, farmers go for colouring, lured by high prices for the 'first grade' cardamom at the auction centres.

The quality of cardamom is decided by its colour, shape, size and oil content. 'Alleppey Green' is considered the best by the buyers and farmers tend to add colour to make the crop resemble Alleppey Green.

'Demand will fall'

Mr. Joseph said if the trend continued, Indian cardamom would be rejected in the global market as other countries had strict norms on chemical residue. If it was found above the limit, the consignment would be summarily rejected.

There were carcinogenic elements in chemical colouring and legal action would be initiated if they were found in the samples, he said. The colouring is done at the dryer unit. A worker at a cardamom dryer unit in Peerumade taluk said the farmers insisted on adding the colour. In the domestic market, the colouring is not checked and it leads to rampant practice of adding colour to cardamom.

A.K. Vijayan, a scientist at the Indian Cardamom Research Institute, said that the farmers had been using chemical colours for nearly three years.

From October 1, cardamom reaching the e-auction centre at the Spice Park at Puttady would be checked. If chemical colour was found, it would not be allowed in the auction, he added. He said that legal action would be initiated under the Food Safety Act if the produce contained chemical elements.

Turmeric to add more teeth to TB shots

Deccan Herald-22-Sen-2019

Indian scientists have found out that BCG — the world's only vaccine against tuberculosis (TB) — can be made more effective if the nano-particles of curcumin, the main component of popular kitchen spice turmeric, are used in tandem with the shot.

The discovery, scientists say, open up a new window to tackle drug-resistant tuberculosis, one of the world's biggest public health threats that kills lakhs every year.

Biologists at the Jawaharlal Nehru University, Delhi, were looking for ways to improve the existing treatment options for TB when they turned their attention to nano-curcumin, an ultra-small version of the wonder chemical that lies at the core of the kitchen spice, known to harbour many medicinal properties.

"We have shown that a booster dose of BCG together with nano-curcumin gives superior vaccine efficacy. This opens up a new area of vaccine research and has huge implications. We are ready for clinical trials," team leader Gobardhan Das from JNU's Special Centre for Molecular Medicine told DH.

Discovered in 1921, BCG is the world's sole TB vaccine, but it only protects children, and that too, with varying efficacy.

In their experiments aimed at enhancing the vaccine's efficiency, the researchers first injected laboratory mice with BCG vaccine and subsequently gave them nano-curcumin shots for 30 days. The JNU team collaborated with KITT University, Bhubaneswar, and Vanderbilt University, Tennessee, USA, to source the nano-curcumin and analyse the results.

When they measured biochemical parameters to examine the immune responses, they found an improvement in the vaccine's efficacy. Nano-curcumin not only creates an environment conducive for priming and activating the cells that fight the enemy but also enhances the production of two key immune cells.

"Curcumin nano-particles hold promise for enhancing the efficacy of TB vaccines," the team reported in *Infection and Immunity*, a journal published by the American Society for Microbiology. "This is a significant result with the potential to address a critical unmet need in TB vaccine development," said Anand Ranganathan, a JNU scientist and a member of the team.

"A vaccine candidate that imparts better protection by BCG would mean less antibiotics are required, hence minimising the chances of development of drug-resistance. The study demonstrates that curcumin nano-particles holds promise to enhance the efficacy of BCG vaccines but more experiments are required to further evaluate its safety and efficacy in other animal models," commented Ramandeep Singh from Translational Health Science and Technology Institute, Faridabad, who researches on TB but is not associated with the BCG paper.

With nearly 28 lakh cases, India had the world's highest number of TB patients in 2016 even though the researchers fear there are lakhs who escape the surveillance net. The disease causes one death every 90 seconds and 12 lakh new infections each year besides an economic burden of nearly \$340 billion between 2006 and 2014.



Cure from kitchen

Curcumin may protect against muscle damage & soreness after exercise

NutraIngredients-usa.com-03-Sep-2019



Supplementation with curcumin may reduce muscle damage and soreness without impacting the 'natural inflammatory response', says a study from Mississippi State University.

Data from a randomized, double-blinded, placebo-controlled trial indicated that NOW's CurcuFresh supplement led to significant reductions in creatine kinase, a muscle damage-associated biomarker, and lower perceived muscle soreness, compared to placebo.

"These data suggest curcumin supplementation of 28 days may result in decreased muscle damage and muscle soreness in active healthy men," wrote the researchers in the *Journal of Dietary Supplements*.

"Inevitably, curcumin supplementation may be a viable source for improving recovery in trained individuals."

#1 selling herbal supplement in the natural channel

The study adds to the ever-growing body of science supporting the potential health benefits of turmeric and curcumin.

According to the [2017 Herb Market Report](#) published by the American Botanical Council (*HerbalGram* 119), turmeric is the number one selling herb in the natural channel, with \$50.3 million (12% growth year-over-year). It is number five in the mass channel (MULO) with \$32.5 million in sales (48% growth y-o-y).

Study details

The researchers recruited 19 men aged between 18 and 39 to participate in their study. The men were randomly assigned to consume either the CurcuFresh supplements (1.5 g/day, providing 69 mg of curcuminoids) or placebo for 28 days. A muscle-damaging protocol was performed before and after the supplementation period.

Results showed that there were no significant differences between the curcumin and placebo groups for biomarkers of inflammation and oxidative stress (OS), such as tumor necrosis factor alpha (TNF-alpha) malondialdehyde (MDA).

On the other hand, significant reductions in creatine kinase (CK) in the curcumin group (199.6 U/L) post-supplementation, compared to the placebo (287.0 U/L).

Perceived muscle soreness was also decreased in the curcumin group (VAS scale 2.88) compared to the placebo group (VAS scale 3.36).

"This study examined the effect of a newly formulated curcumin (CurcuFresh) on biomarkers of OS, inflammation, muscle damage, and muscle soreness in humans," wrote the researchers. "This is the first study (to the investigators' knowledge) to implement a 28-day supplementation period.

"The main findings from the current study were that curcumin ingestion resulted in significantly lower plasma concentrations of CK and perceived muscle soreness following the eccentric muscle damage protocol, despite any changes in biomarkers of inflammation and OS."

Research: You're eating the wrong ginger for health benefits

Augusta Free Press-28-Sep-2019

It's been in the news for years. Ginger has been hailed a panacea for whatever ails you, from nausea, muscle soreness, inflammation and arthritis to cancer, Alzheimer's disease and even the common cold.

But a new finding from Virginia State University (VSU) has proven the polyphenols and antioxidants—the good stuff—contained in ginger are significantly higher in young, or "baby" ginger. In fact, VSU research confirms immature ginger contains about twice as many polyphenols and has two to three times more antioxidation activity than the mature ginger found in most grocery stores.

That means if you're eating ginger for its health benefits, you may be selling yourself short at the supermarket.

"Higher antioxidants mean higher health benefits," said Dr. Rafat Siddiqui, associate professor of food sciences at VSU's Agricultural Research Station.

Siddiqui explained polyphenols are micronutrients in certain plant-based foods that are packed with antioxidants. Antioxidants are compounds found in food that help ward off cell damage by "cleaning up" cell waste, called free radicals, before they can do harm. Antioxidants are found in many colorful fruits and vegetables and are released during the digestion process to travel through our bloodstream and into our cells.



Free radicals are produced when our body breaks down certain foods, as well as during inflammation, exposure to radiation, and consuming certain chemicals and drugs, like

chemotherapy medications. The cell damage free radicals causes has been implicated in higher risks of cancer, heart disease, premature aging and a host of other chronic conditions.

The antioxidants, like those found in fresh ginger, wipe out the free radicals much as Pac-Man® gobbles up the multi-colored ghosts, Inky, Blinky, Pinky and Clyde. In both cases, you're a winner once the "bad guys" are wiped out.

So, if baby ginger has more health-beneficial antioxidants, why aren't we eating more of it? "You can't find it," said Dr. Reza Rafie, horticulture Extension specialist at VSU. He explained it just isn't readily available to most consumers.

One hundred percent of the ginger we find at the supermarket is imported, largely from Southeast Asia on container ships. From the time it's packed until it makes its way into your kitchen is usually months. "Baby ginger is more perishable than its older counterpart, which naturally features a papery skin to lock in moisture and freshness," said Rafie. "The immature ginger just couldn't make the voyage."

So, what's a health-conscious, ginger-lover to do? Rafie has a solution that not only holds benefits for consumers, but also for U.S. small-scale farmers, as well.

Since it takes less time to grow and harvest baby ginger (seven to eight months, Rafie explained, compared to commercial ginger, which matures in the ground for about 10-11 months), the tropical plant can grow in regions with shorter growing seasons than Southeast Asia. Rafie explained he and many others have had great success growing baby ginger in pots and in raised beds up and down the East Coast.

"But it's a crop that must be sold close to home and quickly," he added. "It's perfect for those small-scale farmers who sell direct to consumers at farmers markets or through community supported agriculture (CSA) programs or to chefs, who prefer it for its more delicate taste and the fact it doesn't need to be peeled."

For those who want to ensure access to baby ginger next fall, it can be grown at home, as well. "There are certainly some unique challenges in growing a tropical plant in non-tropical conditions, but I've been growing it myself for many years and working with a lot of farmers who have, too, and I think we've figured out most of the obstacles and how to get around them."

And growing baby ginger can prove to be profitable, as well. Immature ginger is selling this fall for about \$5 to \$10 a pound, depending on the market, remarked Rafie. Compared with traditional small-scale farming crops like tomatoes or sweet potatoes, which were selling this summer at a Richmond, Va farmers market for \$2 and \$1.50* respectively, baby ginger can offer farmers the opportunity for greater profits per production area.

He explained that production results at VSU have shown that each ginger plant has the potential of producing three to eight pounds of marketable baby ginger, depending on production techniques, including fertilizer, irrigation, disease management and mounding.

Baby ginger is usually harvested and marketed September through December. Rafie is currently investigating techniques to be able to extend the production season and, therefore, its availability for consumers.

The market potential is considerable, says Rafie. And he's hoping to get more farmers on board with the crop. But he understands, too, this is something new to consumers. They'll need to "discover" it first.

"It's only in the past few years that Americans have become familiar with ginger's potential health benefits at all. Now we're going to have to educate them that it's worth digging deeper in their pockets for the young stuff," he remarked. But he's hoping Siddiqui's new research discovery will help.

"Now that we know baby ginger knocks its older sibling out of the park with its anti-oxidant punch, we need to continue our research at VSU to learn its health benefits," said Siddiqui. For example, his preliminary data indicate ginger can be very effective in preventing obesity, but he said he still needs to perform additional studies in human subjects. He added, "Until then, I don't think it's too early to encourage more farmers to start learning more about how to jump on what I estimate to be the start of a baby ginger bandwagon."

To that end, Rafie and Siddiqui are hosting a Ginger and Turmeric Field Day at Virginia State University, Petersburg, VA, on October 24, 2019. The program will cover the health benefits of ginger and turmeric; diseases of both plants; Richmond's Hardywood Brewery Gingerbread Stout runaway success story (featuring locally-grown baby ginger); and a field visit where participants will see four new varieties of container and outdoor grown ginger, as well as learn about the harvesting, washing and packing of the crops for market. For more information, visit the calendar of events at ext.vsu.edu and click on the event.

Diabetes: Here's how to use this wonder spice to reduce blood ...

The Indian Express-16-Sep-2019

Can a diabetes patient have dates?

Lipid in humans can help control blood sugar, says study

blood glucose levels, diabetes, type 2 diabetes, indianexpress.com, indianexpress, kitchen condiments, insulin activity, blood sugar levels, coriander seeds, coriander leaves, dhaniya seeds for diabetes, coriander in ayurveda,

Diabetes is a lifestyle disease that can be controlled with dietary changes. You would be surprised to know that your kitchen is a treasure trove of spices that can help manage various infections and ailments. One such condition is diabetes, which requires the body's blood sugar level to be under control — for which patients need to rely on medicines as well as a strict dietary regimen. So what if we tell you that your spice cabinet may have a condiment that could help you control and manage the condition that is often a result of the pancreas not being able to produce adequate amount of insulin or when the body is unresponsive to it — resulting in unusual spikes in blood sugar levels.

Coriander or dhaniya seeds are said to be useful in managing diabetes. These seeds, which are used to add extra flavour to dal, curries and other delicacies, comprise essential nutrients like potassium, iron, vitamin A, C and K, folic acid, magnesium, and calcium.

blood glucose levels, diabetes, type 2 diabetes, indianexpress.com, indianexpress, kitchen condiments, insulin activity, blood sugar levels, coriander seeds, coriander leaves, dhaniya seeds for diabetes, coriander in ayurveda,

Coriander seeds comprise essential nutrients like potassium, iron, vitamin A, C and K, folic acid, magnesium, and calcium. Due to the presence of such nutrients, coriander seeds are said to reduce blood glucose levels in diabetics and maintain the insulin activity, which further helps in keeping blood sugar levels in check. A study published in the US National Library of Medicine mentioned that coriander seeds are effective in controlling the insulin release from pancreatic beta-cells in streptozotocin-induced diabetic rats.

According to a 2013-study published in The British Journal of Nutrition, it was found that the extracts from coriander seeds have certain compounds that when discharged into the blood caused anti-hyperglycaemic, insulin discharging and insulin like movement that can help keep your blood glucose levels in control.

The presence of ethanol in the seeds is said to be effective in reducing serum glucose or blood sugar.

Harnessing tomato jumping genes could help speed-breed drought-resistant crops

<https://www.sciencedaily.co> :September 16, 2019

Once dismissed as 'junk DNA' that served no purpose, a family of 'jumping genes' found in tomatoes has the potential to accelerate crop breeding for traits such as improved drought resistance.

Once dismissed as 'junk DNA' that served no purpose, a family of 'jumping genes' found in tomatoes has the potential to accelerate crop breeding for traits such as improved drought resistance.



Researchers from the University of Cambridge's Sainsbury Laboratory (SLCU) and Department of Plant Sciences have discovered that drought stress triggers the activity of a family of jumping genes (Rider retrotransposons) previously known to contribute to fruit shape and colour in tomatoes. Their characterisation of Rider, published today in the journal PLOS Genetics, revealed that the Rider family is also present and potentially active in other crops, highlighting its potential as a source of new trait variations that could help plants better cope with more extreme conditions driven by our changing climate.

"Transposons carry huge potential for crop improvement. They are powerful drivers of trait diversity, and while we have been harnessing these traits to improve our crops for

generations, we are now starting to understand the molecular mechanisms involved," said Dr Matthias Benoit, the paper's first author, formerly at SLCU.

Transposons, more commonly called jumping genes, are mobile snippets of DNA code that can copy themselves into new positions within the genome -- the genetic code of an organism. They can change, disrupt or amplify genes, or have no effect at all. Discovered in corn kernels by Nobel prize-winning scientist Barbara McClintock in the 1940s, only now are scientists realising that transposons are not junk at all but actually play an important role in the evolutionary process, and in altering gene expression and the physical characteristics of plants.

Using the jumping genes already present in plants to generate new characteristics would be a significant leap forward from traditional breeding techniques, making it possible to rapidly generate new traits in crops that have traditionally been bred to produce uniform shapes, colours and sizes to make harvesting more efficient and maximise yield. They would enable production of an enormous diversity of new traits, which could then be refined and optimised by gene targeting technologies.

"In a large population size, such as a tomato field, in which transposons are activated in each individual we would expect to see an enormous diversity of new traits. By controlling this 'random mutation' process within the plant we can accelerate this process to generate new phenotypes that we could not even imagine," said Dr Hajk Drost at SLCU, a co-author of the paper.

Today's gene targeting technologies are very powerful, but often require some functional understanding of the underlying gene to yield useful results and usually only target one or a few genes. Transposon activity is a native tool already present within the plant, which can be harnessed to generate new phenotypes or resistances and complement gene targeting efforts. Using transposons offers a transgene-free method of breeding that acknowledges the current EU legislation on Genetically Modified Organisms.

The work also revealed that Rider is present in several plant species, including economically important crops such as rapeseed, beetroot and quinoa. This wide abundance encourages further investigations into how it can be activated in a controlled way, or reactivated or re-introduced into plants that currently have mute Rider elements so that their potential can be regained. Such an approach has the potential to significantly reduce breeding time compared to traditional methods.

"Identifying that Rider activity is triggered by drought suggests that it can create new gene regulatory networks that would help a plant respond to drought," said Benoit. "This means we could harness Rider to breed crops that are better adapted to drought stress by providing drought responsiveness to genes already present in crops. This is particularly significant in times of global warming, where there is an urgent need to breed more resilient crops."

This work was supported by the European Research Council and the Gatsby Charitable Foundation.

Drug screen reveals potential treatments for Rett syndrome

Spectrum-11-Sep-2019

Critical cog: A new drug screen relies on the expression of a protein essential to neurons' functioning.

An experimental leukemia drug and a chemical in black pepper ease breathing and movement problems in a mouse model of Rett syndrome, according to a new study¹.

Rett syndrome is a rare brain condition related to autism, caused by mutations in the MECP2 gene. Because the gene is located on the X chromosome, the syndrome occurs almost exclusively in girls. No drugs are available to treat Rett.

In the new study, the researchers developed a rapid drug screen and tested more than 900 chemicals. Many of these are approved by the U.S. Food and Drug Administration (FDA) or are in clinical trials for cancer or other conditions.



In 2016, the same team reported that neurons cultured from people with Rett, as well as the brains of mice with mutations in MECP2, have diminished expression of KCC2, another gene thought to be involved in the syndrome². So, they looked for any drugs in their screen that increase KCC2's expression.

The team tested two KCC2 boosters in mice lacking MECP2 — and found that both ease some Rett-like features in the mice.

“Our findings illustrate the power of an unbiased approach for discovering drugs that could significantly improve the treatment of Rett and other neurological diseases,” says Rudolf Jaenisch, lead researcher and founding member of the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts. “Because we screened known and FDA-approved drugs, the path to clinical translation is likely to be shorter than with other non-approved compounds.”

Most approaches to treating Rett center around either replacing MECP2 or restoring its expression, but neither tactic is straightforward — motivating the search for other options.

KCC2 ferries electrically charged molecules in and out of neurons in the brain and spinal cord. This process calibrates neuronal activity and, when disrupted, may underlie various brain conditions. The gene has been tied to autism, epilepsy, schizophrenia and fragile X syndrome.

“Manipulating the expression of MECP2 has many hurdles, and having another target that shows promising preclinical data is exciting,” says Wendy Gold, head of molecular

neurobiology at the Children's Hospital at Westmead in Sydney, Australia, who was not involved in the work.

Searching libraries:

Jaenisch's team inserted a gene for a fluorescent protein expressed along with KCC2 into human stem cells, providing a fast readout of KCC2 levels. They coaxed the cells to develop into neurons. And they deleted MECP2 in some of the neurons. These neurons are smaller and less mature than controls, and they signal poorly.

The team screened 929 compounds from three large drug libraries, including one focused on Rett therapies. They found 30 compounds that boost KCC2's expression in the MECP2 neurons; 14 of these also increased the protein's expression in control neurons.

"All of the identified compounds significantly boosted KCC2 gene expression," says Xin Tang, study investigator and a postdoctoral fellow at the Institute.

Two of the compounds rescued signaling problems in the MECP2 neurons and normalized their size and maturity.

"The neurons carrying the MECP2 mutation became similar to healthy neurons," Tang says.

The team tested two of the identified compounds in mice with mutations in MECP2: KW-2449, which is a small molecule in clinical trials for leukemia, and piperine, an herbal supplement and component of black pepper. These mice have several traits reminiscent of Rett. They are prone to seizures, breathing problems, movement difficulties and disrupted social behavior.

Injecting the mice with either drug daily for two weeks improved the animals' mobility relative to untreated mice. The drugs also eased the mice's breathing problems, decreasing the frequency of pauses in breathing (apnea). The findings appeared in July in *Science Translational Medicine*.

The researchers assessed the drugs' effect on only some of the mice's traits, however. It is unclear, for instance, how the drugs might affect the animals' lifespan, tremors or cognitive function.

The team also probed the biology of KW-2449. It is known to block FLT3, an enzyme in a molecular pathway implicated in blood cancers. Several of the compounds that boost KCC2 expression in the screen also inhibit this pathway. The new study is the first to indicate that this pathway is important in neurons.

"[The new work] is clever, comprehensive and covers a lot of basic biology," says David Beversdorf, professor of radiology, neurology and psychology at the University of Missouri in Columbia. But he cautions that the compounds the study flags are far from ready for clinical use.

Still, Tang and his colleagues plan to test KW-2449 and other drugs in a mouse model of fragile X syndrome, another condition closely related to autism.

Stanford study describes spice makers adding lead to turmeric

New Atlas-24-Sep-2019

A new study has found that some spice makers in Bangladesh are using lead as part of their turmeric production

Over the past decade or so, investigations have strengthened ties between the consumption of turmeric and exposure to lead, a destructive neurotoxin. In newly published research, a team of Stanford scientists now claim to provide the first direct evidence of such a link in Bangladesh, with the team's analysis finding lead concentrations in the spice exceeding the national limit by as much as 500 times.

Lead is bad news for anyone that consumes it, but is particularly potent so far as young children and pregnant women are concerned. Once in the body, it can have a destructive impact on the brain and central nervous system, harming cognitive development and leading to cardiovascular problems among a raft of other health risks, including miscarriages and premature birth. For this reason, it has long been banned from food products.



But freeing food from the toxic chemical element entirely isn't all that straightforward. All the way along the food chain, production can bring a risk of lead contamination. Some regions where spices like turmeric are grown are susceptible to inadvertent lead pollution from gasoline, smelters, battery plants, mines and fertilizers.

Once exported, these spices can drive elevated blood lead levels in foreign children who consume them, according to one University of North Carolina study published last year. Since 2011, more than 15 turmeric distributors in the US have had to recall their products for this reason, leading the Food and Drug Administration to rethink the safety standards for imported spices, which make up more than 90 percent of the spice supply in the US.

While accidental contamination is a very real cause of spoiled spices, deliberate adulterating of turmeric with lead has also long been seen as another possibility. Since 2014, a Stanford team has been stationed in rural Bangladesh exploring the population's exposure to lead. Its early investigations found that more than 30 percent of pregnant women had elevated levels of lead in their blood.

The team's pair of newly published studies are based on analyses including soil sampling and interviews with farmers and spice makers across different regions of Bangladesh, who together output almost half of the country's turmeric. The researchers say they have uncovered evidence of some spice processors adding an industrial lead chromate pigment to the spice as a cheap and quick way of giving it that characteristic yellow tinge.

The most rock-solid evidence came by way of isotope analysis, where the scientists were able to match the lead isotopes from chromate-adulterated turmeric to the lead isotopes in

people's blood. This, the scientists say, is the first research to directly link lead in turmeric to lead in people's blood.

Evidence of this turmeric tampering was uncovered in seven of Bangladesh's nine turmeric-producing regions, and was found to be largely driven by consumer demand for the yellow coloring. Processors working with poor quality and discolored roots can polish them with lead chromate as a way of increasing profits and meeting demand for use in yellow curries. The researchers say their results indicate the workers doing the polishing are unaware of the pigment's neurotoxic effects.

In some cases, the lead concentrations in the turmeric exceeded the national limit by up to 500 times, and were between two and 10 times higher than that reported in other studies.

"Unlike other metals, there is no safe consumption limit for lead, it's a neurotoxin in its totality," says the papers' senior author Stephen Luby. "We cannot console ourselves proposing that if the contamination were down to such and such level, it would have been safe."

The team reports no clear evidence of this contaminated turmeric making its way beyond Bangladesh, but do note that the current food safety checks for these traded goods "may catch only a fraction of the adulterated turmeric being traded worldwide."

From here, the researchers will advocate for measures to lessen this reliance on turmeric adulteration through new and improved processing techniques. They call for import inspectors to be equipped with X-ray devices for lead-detection, and one team member is even working on low-cost devices with the same capabilities.

"People are unknowingly consuming something that could cause major health issues," says the papers' lead author Jenna Forsyth, a postdoctoral scholar at the Stanford Woods Institute for the Environment. "We know adulterated turmeric is a source of lead exposure, and we have to do something about it."

Connecting fragmented pieces of habitat can help endangered species recover

<https://www.sciencemag.org> By Erik Stokstad Sep. 26, 2019, 2:00 PM

Loss of habitat drives most extinctions. When farms or roads carve forests or fields into fragments, the isolated survivors are more likely to be wiped out. Now, a new study suggests connecting these patches with corridors of suitable habitat can help save populations and species—far more than scientists ever thought.

Researchers focused on longleaf pine savanna, an ecosystem that used to exist across the southeastern United States. This grassland habitat hosts many unique plants, such as blazing stars, and also the more common butterfly milkweed (above), as well as the endangered red-cockaded woodpecker. But just 3% of the original ecosystem is left, and what remains exists only as small fragments.

To study the effect of habitat corridors, the scientists created new fragments of savanna inside a large pine plantation in South Carolina and connected some of them with habitat corridors. Every year, the team tallied the number of native plant species.

And every year, they found, new species arrived in the patches. But many more turned up in the connected patches; the annual rate of colonization was 5% higher than in unconnected patches—a surprisingly large boost, they report today in *Science*. Many species likely arrived after their seeds were transported into the patches by wind or animals. Bluebirds, for example, prefer to forage in the grassland patches and corridors than the dense pine forest, so they transport more seeds between connected patches of savanna.



After 18 years—a long time for an ecological experiment—the connected patches had, on average, 200 plant species, 14% more than the unconnected patches. The duration of the study also shows that the benefits of linking habitat fragments continues to grow.

The Australian National University (ANU) has been awarded two Australian Laureate Fellowships from the Australian Research Council (ARC), including a project using synthetic biology to generate 'smart plants'.



Professor Barry Pogson, from the ANU College of Science, was awarded \$2.9 million to create higher-yielding and more resilient 'smart plants' for good and bad seasons.

He said the project could help chart the future of Australian agriculture and food security.

"We know drought can drastically reduce yield for our crops and this threatens food security across the globe," said Professor Pogson.

"I aim to produce higher yielding, more resilient wheat and rice, which together provide much of humanity's dietary energy and protein.

"These smart plants will be able to switch on a resilience that will help chart the future of Australian agriculture.

"Australia, indeed the world, faces an unprecedented set of challenges, many of which will impact food security. My proposal aims to contribute to providing some solutions. But given the scale and breadth of challenges facing our rural communities we need a nationwide, integrated, large scale mission to produce better crops and communities."

Professor Quentin Grafton, from the ANU Crawford School of Public Policy, won \$3.3 million for his sustainable water use project which aims to improve our understanding of the relationship Indigenous Australians have with water.

The professor said a sustainable Australia could only be achieved by recognising water's economic, environmental and socio-cultural value - including the values of First Peoples.

"Water is life; for people, our communities, our environment, our economy and our nation," Professor Grafton said.

"So properly valuing water, and reallocating it when necessary, is crucial to avoid catastrophic costs and recovery after droughts, and to ensure a sustainable water future for all Australians.

"This project aims to rethink how water is valued, used and governed in Australia."

Acting ANU Vice-Chancellor Professor Mike Calford congratulated Professors Pogson and Grafton on their success.

"ARC Laureates are extremely competitive and prestigious. They recognise Australian researchers at the pinnacle of their game as well as research of the highest quality and impact," he said.

"Their research makes a major difference to Australia and Australians every day.

"With these projects they will help drive deeper understanding and better outcomes for two major challenges facing our nation and the world - crop resilience and water use.

"On behalf of the entire ANU community and Australians everywhere who will benefit from their work, I congratulate both of them and look forward to seeing what their vital work delivers."

The ANU has been awarded 26 Australian Laureate Fellowships since the scheme began in 2009.

Researchers design salt-tolerant varieties of Indian rice

Research Matters-03-Sep-2019

Researchers design salt-tolerant varieties of Indian rice

During the summer monsoon season this year, many regions of India saw spells of floods and droughts. In a country that predominantly depends on rain for irrigation, loss of crops due to such disruptive weather continues to be a source of distress to farmers. With about half of the country's land under cultivation being rain-fed, approaches to make crops tolerant to the vagaries of weather are necessary.

A large portion of a plant's weight is from water, which is maintained by drawing water from the ground. During droughts, increasing evaporation takes away water from the ground and leaves behind the salt, thereby increasing salt concentration in the soil. When the groundwater is saltier than the plant, the flow of water reverses direction, and the parched earth sucks the plant dry. In a recent study, researchers from J.C. Bose Institute, University of Calcutta and Bethune College, Kolkata, and Louisiana State University in the



US, have shown that, by modifying particular genes, rice plants that would normally die of dehydration can be kept alive through periods of acute salinity in their water supply.

Modifying or improving plants through selective breeding is as old as civilisation. Studies show that rice, in particular, has been bred for 10,000 years to make them sturdier and produce more yield. Traditional breeding methods, which involve selecting the best plants at each generation, make it a long process. However, with modern gene-editing techniques, scientists can get quicker results by modifying specific genes that influence yield or adaptation of the plant to its environment.

To home in on the particular genes, scientists need detailed knowledge of the metabolism of the plant. A compound called inositol plays a crucial role in cellular metabolism, and thus in the growth of the plant. Furthermore, compounds derived from inositol are involved in various functions of the plant cell including communication inside the cell and between the cell and its environment.

Any disturbance to the balance of inositol, in the cell, damages the plant. One such factor that can perturb this balance is high salinity. When salt levels are high, the production of inositol shuts down in the cells. As a result, the plant is unable to produce food or perform photosynthesis, and withers away and dies. Many plants, including most rice varieties, are susceptible to this. However, some rice varieties like *Porteresia coarctata* can survive for about ten days under high salt concentrations.

"Earlier studies have suggested that the mechanism by which *Porteresia* achieves its salt-tolerance could be transferred to other rice species," say the researchers.

Porteresia has two genes that are responsible for the production of inositol in its cells under high salinity. The first, *PcIN01*, is involved in producing an enzyme that generates the most common form of inositol called myoinositol. The second gene, *PcIMT1*, codes for a protein that produces a derivative of inositol, called pinitol. In the current study, the researchers transferred the two genes into 20-day old saplings of IR64 indica, a rice variety that produces high yield but is not salt-tolerant.

The researchers compared the genetically-modified plants with the unmodified IR64s and those with extra copies of the gene that usually produces inositol. They found that the plants with the salt-tolerant genes could withstand high salt concentrations of up to 18 grams of salt per litre for ten days. That is equivalent to about half the salinity of seawater. The modified plants resumed healthy growth when regular water supply was restored. On the other hand, the unmodified plants withered and died.

The researchers found that the genetically modified plants had longer (by 300-400%) and better-branched roots at all salt concentration levels than the unmodified plants. They also better retained their chlorophyll content through the ten days of salt-exposure—retaining about 50% while the unmodified plants lose almost 90%. Besides, the fourth and later generations of the modified plants continued to produce seeds of comparable quantity and weight as unmodified plants grown under normal conditions.

Interestingly, plants with only the *PcIN01* gene added outperformed those with only the *PcIMT1* gene, and those with both genes, when exposed to salinity. The former also had marginally better yields in the fourth and later generations. These observations suggest that

a complex web of interactions centred around inositol is involved in the salt-tolerance and recovery of the modified plants.

Modifying the genome of a plant, especially that of a food crop, can be risky as there may be unforeseen interactions between the genes in the plant or of the plant with its environment. Hence, genetically modified crops are extensively tested before they are introduced for consumption.

"Both the genes considered in the study are non-allergenic," say the researchers, explaining that neither gene is involved in the production of compounds known to cause diseases.

As extreme weather occurrences becoming more common, successfully modifying crops to withstand drought and high salinity could become essential in preventing crop-failures and averting famines.

Biodiversity

The value of biodiversity is not the same as its price

Nature.com-25-Sep-2019

David Attenborough will be the public face of the UK government's assessment of biodiversity and economics. Credit: John Phillips/Getty

How much do species and ecosystems contribute to the size and growth of economies? How will the unprecedented rate of biodiversity loss affect economies in the future?

Ecologists and economists have been struggling with these questions for decades, including in the pages of this journal. Governments, too, have tried to weigh in, with variable success. Earlier this month, it was the turn of the UK Treasury to announce the members of an expert panel it has chosen to continue the search for a way forward.



The panel will be chaired by economist Partha Dasgupta at the University of Cambridge, UK. The broadcaster David Attenborough will be its public face, and the team will report back in time for the conference of the parties to the United Nations Convention on Biological Diversity, which takes place in China in October 2020. The panel has issued a call for evidence.

But assessing biodiversity's contribution to economic growth is fraught with problems because there are so many ways to value nature. Take the contribution of insect pollinators

to the economy: this can be worked out by computing the cost of humans or machines required to carry out those tasks if bee populations vanished.

By contrast, valuing a lake is more complex. One method relies on asking people in surveys what they might pay to enjoy the lake and its surroundings — but that assumes that respondents will agree to the principle of payment for its benefits. Some might argue that public spaces are part of a shared commons, and are already paid for through taxation. Others might say that the lake's value to them is too great to be measured in dollars and cents.



Posing the question of nature's contribution to economic growth is itself contentious, considering that continued economic growth is a factor in biodiversity loss. We know that species and ecosystems can't withstand unsustainable human consumption and increases in spending — two of the variables that growth statistics record. Should we be measuring biodiversity's contribution to growth when our present form of growth is itself harming the planet?

The experiences of past assessments suggest that Dasgupta and colleagues will not be able to reconcile such a spectrum of viewpoints. But there are other things they can do. It is good to see the team consulting the international biodiversity research network known as IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services), which is also undertaking a global assessment of the value of biodiversity and encountering many of the same challenges.

The IPBES assessment team has responded to the diversity challenge by embracing it: they are seeking ideas and inspiration from a wide range of people, including philosophers and historians, alongside ecologists and economists. IPBES is itself structured in such a way that the perspectives of researchers in developing countries and of indigenous peoples' organizations are mainstream, not marginal, voices.

How to retool our concept of value

IPBES is not rushing things — its final report is expected in 2022. And it will be posting the text of draft reports online for anyone to comment on. All comments will be considered by the team, says its co-chair, Unai Pascual at the Basque Centre for Climate Change in Leioa, Spain. The Dasgupta assessment team should consider a similarly consultative approach as it starts to plan its work.

Most of the world's biodiversity hotspots are in developing countries, including areas where biodiversity is protected by indigenous peoples. For many, an economic assessment, especially one led by Britain, will bring back uncomfortable memories of the age when scientists from developed countries came to nations in Africa, Asia and Latin America and took home biological samples for research and commercialization without permission — something the Convention on Biological Diversity now prohibits.

Establishing the value of biodiversity to economies is important, in part because it will help policymakers in all countries to appreciate that there's a cost to losing nature. But at the

same time, an economic assessment must take into account the perspectives of the humanities, of developing countries and of members of indigenous communities.

Getting the process right matters. Too often, big policy reviews focus on the final report. As it begins work, the Dasgupta team should keep in mind the words of the late Maurice Strong, founding director of the UN Environment Programme, who famously said, "The process is the policy."

Can the gene editing technology CRISPR help reduce biodiversity loss worldwide?

GreenBiz-20-Sep-2019

It's been an alarming year for the world's outlook on biodiversity. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) put the world on notice that around 1 million species are facing extinction (PDF). A study published in August concluded that it would take New Zealand 50 million years to recover the diversity of bird species it has lost since human colonization. And, while headlines about an insect apocalypse may have been hyperbolic, insect biodiversity is decreasing, and it's a problem.

As evidenced in the IPBES report, current conservation efforts have not been sufficient to stem biodiversity loss, so innovative solutions might be necessary to support the web of life that supports human existence. In 2012, scientists first described the gene editing capabilities of CRISPR, a molecular tool that can be used to make targeted, precise changes to the DNA of plants, animals and microbes.



Since then, scientists have proposed myriad ways to use the technology. But could it be a boon to biodiversity? Can it help researchers understand and preserve corals and their ecosystems? What about applications to diversify agriculture to shore up food security? Or to combat invasive species plaguing ecosystems around the world?

While many scientists are eager to discuss the possibilities of using CRISPR to preserve biodiversity, they are also cautious. The effects of human interventions are not always predictable, and once a gene-edited species is released into the wild, controlling any negative effects will be difficult. Toni Piaggio, a research scientist at the U.S. Department of Agriculture (USDA) National Wildlife Research Center, says researchers should "never entirely sip the Kool-Aid" when it comes to CRISPR. Instead, she says, they should "spend a lot of research time and intellectual energy" questioning themselves and their work.

While many scientists are eager to discuss the possibilities of using CRISPR to preserve biodiversity, they are also cautious.

Posing the right questions to the right stakeholders — including communities that would be affected by the application of gene editing — might help to avoid the unintended consequences that so often accompany human solutions to ecosystem challenges.

Diversity for food security

About 12,000 years ago, ancient people began cultivating the wild ancestors of many plants we eat today. Over time, they selected seeds from plants that evolved helpful traits to plant in future years. As a result, a plant called teosinte with 5 to 12 kernels in rock-hard casings gave rise to corn, and the small red berries of wild tomatoes gave rise to tomatoes of today. This process of crop domestication was a turning point for humans. It allowed us to settle into communities and build societies.

But as millennia passed, domestication also decreased the genetic diversity within the plants we grow and eat. To understand why, imagine an ancient human 10,000 years ago, tired of smashing teosinte with rocks to get a few measly kernels out of their hard casings. If that person saw a plant with naked kernels — exposed and available to eat without rock smashing — they might select seeds from that plant to grow the next year. That works out great for the person, but the genetic diversity in the rest of the field is lost to future generations.

The same forces are at play today. When each tomato plant, for example, looks the same, grows at the same rate and produces pounds upon pounds of tomatoes, farming is easier and the food supply is more predictable — if everything goes as usual.

Problem is, farming doesn't always follow usual, expected patterns. And climate change is increasing variability and unpredictability in agriculture. Many crops, as a result of their low genetic diversity, are not particularly well suited to cope with emerging climate patterns, leaving them susceptible to challenges such as drought, flooding or salty soils. So, says Lázaro Peres, a professor of plant physiology at the University of São Paulo, relying on a limited number of crop species to produce the world's food is risky.

Peres and other researchers are trying to infuse agriculture with the genetic diversity of wild species. His research team started with a wild tomato and used CRISPR to edit a handful of key genes. Its goal was to make the versions of the genes in wild tomato look like the versions of the genes in domesticated tomato. In doing so, the wild tomato species gained some beneficial characteristics common to domesticated species. Through this process, *de novo* domestication, Peres and colleagues produced a tomato with more fruit, bigger fruit and more lycopene than wild tomatoes and that are genetically diverse from conventional domesticated tomatoes.

Such diversity, they say, might mean that farmers coping with various climatic stresses will have access to domesticated tomato species suited to the unique challenges they face.

But, looking beyond a single crop into the ecosystem within which it exists is important, says Yolanda Chen, an associate professor in the College of Agriculture and Life Sciences at the University of Vermont. Chen studies the impact plant domestication can have on insect populations. She says that researchers need to consider how genes "operate within a broader

community context" and not just in a single plant. Does a change in plant size or color affect which insects are attracted to it? How does that affect the predators of those insects?

Peres is mindful of the potential effects on agricultural ecosystems. Domesticating a wild tomato and growing it at scale could impact nuanced ecological relationships. Still, he says, he "sees mainly positive things" about the potential impacts of his work. "And one of the things is food security, because it is quite dangerous to depend on very few species for our food, feed and fiber."

Chen says that she thinks gene editing for *de novo* domestication is "less risky" than other genetic approaches, such as those that introduce entire new genes into a plant species. In *de novo* domestication, the edited versions of genes already exist in related domesticated tomato plants.

It likely will be a while before a new species of tomato developed to increase the genetic diversity of our food is available at the local grocery store. Peres says the work he and his group have published so far was a proof of concept; in other words, they showed that *de novo* domestication is feasible, but have no plan to commercialize that tomato. They've since turned their attention to a species of wild tomato from the Galápagos Islands that grows especially well in salty soils and is resistant to a white fly that can cause severe crop damage. If they are able to *de novo* domesticate this tomato, it could be used as an important crop for farmers dealing with salty, coastal soils.

In the end, Chen and Peres are both concerned about climate change, agriculture and biodiversity. They approach solutions to these concerns from different research perspectives, but both see diversity — on the genetic and species levels — in agricultural ecosystems as an important aspect of a food system that can withstand the challenges of climate change. In the future, domesticating new plant species — potentially with gene editing — might give farmers more options for growing diverse crops well-suited to specific climates.

Coral conservation

In 1770, British explorer Captain James Cook ran his ship, Endeavor, aground on the "insane labyrinth" that would become known as the Great Barrier Reef off the coast of Queensland, Australia. While Cook was credited with "discovering" the reef, coral reefs had been important to indigenous people for centuries before.

A few hundred years later, pollution and warming water have resulted in huge coral bleaching events around the world. While corals can survive bleaching, the stress does lead to increased mortality. That's bad news for the marine species that inhabit corals. When corals are lost, reef ecosystems suffer, throwing the relationships between the thousands of species — including fish, invertebrates, plants and turtles — that live there out of balance.

Bleaching occurs when the symbiotic relationship between corals and the algae they live with becomes stressed — for example, by warm waters. As a result of the stress, corals expel the algae, resulting in bleached coral. Bleaching events began to increase in frequency and magnitude in the 1980s. Between 2014 and 2017, high ocean temperatures precipitated major global coral bleaching events.

Current conservation efforts for the world's corals have been insufficient to curb bleaching events and sustain the valuable ecosystems corals support, according to the IPBES report. So there is a certain urgency to finding new approaches to conservation. A 2019 report by biologists laid out different conservation approaches and evaluated their potential risks and benefits. And with the 2018 announcement that scientists have used CRISPR to edit genes in coral, gene editing is seen as a potential strategy. Maybe.

Conservation scientists, Piaggio says, are "just as concerned about the technology as anyone that I've ever met or talked to about it." Scientists using gene editing on corals are no exception. In fact, they are quite clear: They are not using gene editing to make heat-resistant corals to populate the ocean. Their intent is to use CRISPR to understand, in a laboratory setting, which coral genes are important for handling stress in the environment and use that information to help other coral conservation efforts.

Marie Strader, now an assistant research professor at Auburn University, was a lead researcher as a graduate student on the international team of scientists that produced the work. The scientists edited three types of genes in a vibrantly colored coral called *Acropora millepora*. The goal of the editing was to "break" or mutate the genes, and in some larvae, it did.

As this proof-of-concept study was successful — meaning they were able to edit the coral genes they targeted at least some of the time — other researchers can use their methods as a blueprint for editing other genes in *Acropora millepora* and editing other coral species. For starters, Strader says, they'll likely look at genes involved in the coral life cycle and temperature sensitivity. Understanding those processes, Strader says, can "translate into conservation efforts down the line."

For example, researchers can use CRISPR in the lab to help them understand which genes are important for tolerance to warm waters. If they edit a gene in the lab and the resulting coral can better tolerate warm waters, according to Strader, the scientists could look at natural coral populations for those that naturally have that genetic mutation. Armed with that understanding, researchers might be more successful at conservation efforts such as breeding corals to help them keep their cool as the heat turns up.

So why don't scientists want to populate the ocean with heat-tolerant, CRISPR-ed corals?

For one thing, there are still plenty of technical obstacles. In Strader's work, individual edited corals ended up with a mix of edited and unedited copies of the genes. To realize the full effect of a gene edit and to pass it down to future generations, each cell of the coral ideally should have the same edit. And other details, such as making sure CRISPR edits only the targeted gene or genes, "need to be worked out before it would be a viable option for conservation purposes," Strader says.

Furthermore, says John Bruno, a marine ecologist at the University of North Carolina at Chapel Hill, conservation efforts need to protect not just corals but also the thousands of other species that rely on them. According to Bruno, gene editing 10 or 20 species of corals to tolerate warm water just isn't enough. As "nobody's going to CRISPR all billion species that are in the ocean," he says, conservation needs to focus on the whole ecosystem and not just a few species. "The solution is rather obvious, just radically mitigate greenhouse gas emissions," he says — acknowledging that's no easy feat.

Running interference

The situation with corals is "dire," according to Bruno. But even in coral species that have seen precipitous declines, often still many — potentially on the order of millions — of individuals are left, he says.

Back on shore, some animal populations are much smaller and easily could slip out of existence under the thumb of invasive species. In New Zealand, native birds evolved without mammalian predators. Many are large and flightless, so when mammals such as rats, possums and stoats arrived with humans, the birds were easy targets. According to one study, these invasive animals are responsible for the loss of an estimated 26.6 million chicks and eggs of native bird species each year.

Despite serious conservation efforts, many New Zealand bird species are extinct or endangered. To save those left, the New Zealand government has set an ambitious goal to rid the country of its mammalian pests by 2050. As it stands, invasive species are often managed with traps and toxicants, which aren't pleasant ways to die, Piaggio notes.

Gene drives, which have become more plausible with the advent of gene editing, could offer a more humane way of managing invasive populations and protecting the species they endanger.

Put simply, a gene drive changes the odds of inheriting a trait, such as sex. If one out of every 10 possum births is male instead of the normal five out of 10, reproductive opportunities for the females will decrease.

If rats, possums or stoats were gene edited in this way, it could release some pressure on threatened and endangered New Zealand birds.

Unfortunately, as evidenced by mongooses in Hawaii and cane toads (or Bart Simpson's bullfrog) in Australia, humans have a less-than-perfect track record when it comes to intervening in ecosystems.

"So many things have been done with the best possible intention, and we find that there's just been unforeseen consequences," says Helen Taylor, a conservation geneticist and honorary research fellow at the University of Otago. She points out that while possums are pests in New Zealand, they are an important species in Australia. If a possum with the New Zealand gene drive somehow were released in Australia, the effects could be devastating.

Maud Quinzin, a conservation geneticist and senior postdoctoral associate, recently began working in MIT's Sculpting Evolution Lab with Kevin Esvelt, the scientist who first proposed CRISPR as a tool to create gene drives. Quinzin is using her understanding of ecosystem dynamics to help the Sculpting Evolution Lab think about the complex rippling effects of human interference in ecosystems.

It's important to look at the science from all angles, she says. "Developing gene-editing tools requires scientists with very different expertise sharing ideas and progress from early on in the process." For example, if an invasive rat species is eradicated from an island, will other species — even other invasive species — become more populous? "You have to think about ... the dynamic in that ecosystem," she says. Since suggesting that CRISPR could be used for gene drives, Esvelt himself has been vocal about his concerns.

Still, Quinzin has been on the front lines of conservation biology, watching populations of valued species go extinct, and she wants communities to be presented with all options for conservation. For scientists to present those options, though, they really need to understand the places where they might work, Quinzin says. That understanding comes not just from researchers, but also from the people who live in those places. "It is really important that you respect the values and the knowledge in a place," Quinzin says, including "not only the scientific information but also the indigenous or local knowledge." By engaging with local communities as technology develops, Quinzin says, researchers can focus on developing technology in ways that align with a community's cultural, social, political and environmental values.

Moving forward

In the short term, agriculture might be the most likely use of CRISPR to protect biodiversity. In fact, the first gene-edited crop hit the market in the United States in early 2019. Individual countries are still figuring out how to regulate edited plants, with a big distinction being made between plants that could have emerged through natural mutations and plants containing larger edits, such as those containing new DNA.

At the very least, the work of scientists such as Peres could expand the genetic diversity of our crop plants, adding more options to the table as farmers, scientists and other stakeholders work toward a food-secure world. And having options is important. No single solution can save biodiversity everywhere. And carelessly applied solutions can cause more problems.

Scientists do seem to be proceeding with caution. At least some coral researchers decline to consider using CRISPR in the wild. Scientists studying gene drives are vocally pointing out the limitations of the technology and extolling the role nonscientists must play in the decisions to use or not use CRISPR for conservation purposes.

"I think we have a really big — not just opportunity, but an obligation to get it out there in the public eye as much as possible," Piaggio says. And if scientists don't get public buy-in, they shouldn't use the technology, she says. "I think we have to be OK with that."

Quinzin says that she and other scientists in her group want guidance from the public. At the same time, she notes that CRISPR "could be such an amazing tool if we are respectful [and] responsible and use it properly."

There are no perfect or universal solutions to the biodiversity crisis the world is facing. And the causes cannot be forgotten in pursuit of an antidote. That's why it will take scientists and conservationists with diverse approaches working in different areas to make a difference.

The Seeds Of Tomorrow: Defending Indigenous Mexican Corn That Could Be Our Future

Wisconsin Public Radio News-13-Sep-2019

Corn Born In Southern Mexico Gets Nitrogen From Air

You could make a solid argument that the most important invention in human history involves fertilizer.

In the early 1900s, two German chemists — Fritz Haber and Carl Bosch — developed a method for manufacturing ammonia from atmospheric nitrogen. That might not sound exciting, but the result was that humans were soon able to grow more food than ever before. By some estimates, synthetic fertilizer from the Haber-Bosch method now sustains nearly half the world's population.

But over the past century, this incredible breakthrough has wreaked environmental havoc. Excessive nitrogen causes dead zones in the Gulf of Mexico, and algae blooms in lakes and nitrates in well water. Just making all that fertilizer today accounts for up to 2 percent of the world's greenhouse gas emissions.

In this context, I heard last year about an unusual, giant corn in southern Mexico that gets its own nitrogen from the air — no manufacturing required.

Scientists have tried for decades to figure out how cereal grains like wheat and corn could do such a thing. The elusive problem has even been called "the Holy Grail of Agriculture." Publications like *The Atlantic* were calling it "the wonder plant." And why not? The notion that farmers in the birthplace of domesticated corn had already figured this out a long time ago, and that the rest of the world could now benefit from it seemed like a perfect, natural circle.

Back in May, I decided to check this corn out for myself. It grows in the mountains of the Sierra Mixe region in the state of Oaxaca in southern Mexico. A good friend of mine happens to live there, so I thought it'd be fun to visit him, interview some farmers and tell the story of how this ancient grain might someday solve some of the modern world's most vexing problems.

During my two weeks in Oaxaca, however, my neat-and-tidy narrative quickly fell apart.

One of the first people I spoke to was Alejandro de Avila, founding director of the Ethnobotanical Garden of Oaxaca.



Nitrogen-fixing corn varieties secreting large amounts of sugar-rich gel as they grow in Madison, Wisconsin. *Jean-Michel Ané/University of Wisconsin-Madison*



Clear mucilage drips from aerial roots on a stalk of corn grown this summer in research plots at the University of Wisconsin. *Seth Jovaag/TTBOOK*

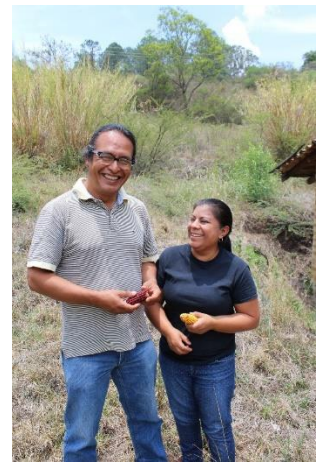
"Well, it's a very comfortable thought," de Avila said of my story idea. "Oh yeah, the people in Oaxaca, those Indians down there, they can take care of the biodiversity that brought us this commodity. Yeah, and the people of Oaxaca are poor, they are dirt poor, and they are being taken advantage of."

Policies from Mexico and the United States consistently favor industrialized agriculture, he told me, rather than indigenous communities maintaining old farming traditions. One result: young people around Oaxaca aren't farming anymore. They've migrated north, looking for jobs. The gene diversity of maize and other crops is being left to people in their 60s, 70s, or 80s.

That's where the real story is, he said. Focusing on one miraculous variety of corn masks the larger dilemma. Plant breeders of the future — the small farmers tinkering daily with their crops in the face of a changing climate — are disappearing. And if they go away, no one is left to defend, or preserve the seeds.

"The keepers of our insurance for the future are the indigenous people," de Avila said. "They keep the gene diversity that is our best bet against the vagaries of climate."

Gonzalez Rojas and Gabriela Linares Sosa are activists for indigenous communities with the Union of Organizations of the Sierra Juarez of Oaxaca (UNOSJO). Seth Jovaag/TTBOOK



My story about this "wonder plant" was complicated by other factors, too.

There were claims of biopiracy.

Critics said an agreement to share benefits with one Oaxaca community — even though the corn in question is found elsewhere — went against local ethics of communal ownership.

The potential has also attracted the interest of American researchers, including those at the University of Wisconsin-Madison, the University of California, Davis, and at the private company Mars Inc., who have studied the corn. Many of these researchers argue this corn truly could benefit not only humanity at large but also the region from where it came. Another journalist, Martha Pskowski, spent this spring delving into this part of the story.

But after spending a lot of time reading and listening to people talk about this topic, I was struck by how many kept returning to de Avila's theme that we're missing the larger point.

Aldo Gonzalez Rojas is a Zapotec farmer and activist with the Union of Organizations of the Sierra Juarez of Oaxaca (UNOSJO). The work of small farmers, he said, can't be replicated in labs or by seed vaults like the one in Norway. Their frontline labor might not be the "shiny new thing," but it could be more vital to us all.

"Peasant seeds are reproduced year after year, and they adapt to the new climatic conditions. So those are really the seeds of the future," Rojas said.

Climate change may cut soil's ability to absorb water

Science Daily September 11, 2019

Coasts, oceans, ecosystems, weather and human health all face impacts from climate change, and now valuable soils may also be affected. Climate change may reduce the ability of soils to absorb water in many parts of the world, according to a new study. And that could have serious implications for groundwater supplies, food production and security, stormwater runoff, biodiversity and ecosystems.

Coasts, oceans, ecosystems, weather and human health all face impacts from climate change, and now valuable soils may also be affected.

Climate change may reduce the ability of soils to absorb water in many parts of the world, according to a Rutgers-led study. And that could have serious implications for groundwater supplies, food production and security, stormwater runoff, biodiversity and ecosystems.

The study is published in the journal *Science Advances*.

"Since rainfall patterns and other environmental conditions are shifting globally as a result of climate change, our results suggest that how water interacts with soil could change appreciably in many parts of the world, and do so fairly rapidly," said co-author Daniel Giménez, a soil scientist and professor in the Department of Environmental Sciences at Rutgers University-New Brunswick. "We propose that the direction, magnitude and rate of the changes should be measured and incorporated into predictions of ecosystem responses to climate change."

Water in soil is crucial for storing carbon, and soil changes could influence the level of carbon dioxide in the air in an unpredictable way, according to Giménez, of the School of Environmental and Biological Sciences. Carbon dioxide is one of the key greenhouse gases linked to climate change.

Giménez co-authored a study published in the journal *Nature* last year showing that regional increases in precipitation due to climate change may lead to less water infiltration, more runoff and erosion, and greater risk of flash flooding.

Whether rainfall will infiltrate or run off of soil determines how much water will be available for plants or will evaporate into the air. Studies have shown that water infiltration to soil can change over one to two decades with increased rainfall, and climate change is expected to boost rainfall in many areas of the world.

During a 25-year experiment in Kansas that involved irrigation of prairie soil with sprinklers, a Rutgers-led team of scientists found that a 35 percent increase in rainfall led to a 21 percent to 33 percent reduction in water infiltration rates in soil and only a small increase in water retention.

The biggest changes were linked to shifts in relatively large pores, or spaces, in the soil. Large pores capture water that plants and microorganisms can use, and that contributes to enhanced biological activity and nutrient cycling in soil and decreases soil losses through erosion.

With increased rainfall, plant communities had thicker roots that could clog larger pores and there were less intense cycles of soil expansion when water was added or contraction when water was removed.

The next step is to investigate the mechanisms driving the observed changes, in order to extrapolate the findings to other regions of the world and incorporate them into predictions of how ecosystems will respond to climate change. The scientists also want to study a wider array of environmental factors and soil types, and identify other soil changes that may result from shifts in climate.

The lead author is Joshua S. Caplan, a former Rutgers postdoctoral associate now at Temple University. Scientists at the University of California, Riverside, University of Kansas, Kansas State University and Colorado State University contributed to the study.

'Climate change is farmers' biggest challenge'

Deccan Herald-06-Sep-2019



Climate change has emerged as the biggest challenge before farmers and only an efficient use of technology can help them avoid a crisis, agricultural and horticultural experts chorused on Friday.

Speaking at a convention of the Indian Council for Agricultural Research-Indian Institute of Horticultural Research, ICAR Director General Trilochan Mohapatra said: “New inventions and discoveries can boost productivity. There is a need to create awareness among farmers about such technologies.”

ICAR Deputy Director General K Alagusundaram said climate change had emerged as the biggest adversary of the farmers. “Extremes of weather have pushed farmers into a crisis. It’s necessary to face this challenge,” he said, stressing the role of technology.

Bananas have benefited from climate change – but they won’t in future

New Scientist-02-Sep-2019

There’s trouble ahead for banana suppliers

Climate change has been relatively kind to banana suppliers so far – but in the decades to come, friend may turn to foe. Temperatures are likely to get so hot that the annual production gains enjoyed by banana suppliers will begin to drop. And in some places, total banana yields will begin to decline.



Bananas are a staple crop for millions, and one of the world’s top 10 crops in terms of the cultivated area devoted to their growth and the calories they provide to the global population. For the past 60 years, annual yields have been increasing by 1.37 tonnes a hectare as the world warms, and now stand at about 10-40 tonnes per hectare.

But a new study by Dan Bebber at the University of Exeter, UK, and his colleagues suggests that as climate change continues, annual yield gains will begin to slump. By 2050, they may be down to 0.19-0.59 tonnes per hectare.

“Bananas can take it pretty hot,” says Bebber. “But some of our big suppliers are under serious threat, particularly in Latin America.” India and Colombia will be so badly affected that total annual banana yields will begin to fall, he says.

Bebber and Varun Varma of the National Centre for Biological Sciences in Bangalore, India, built a model of optimal conditions for banana production, based on databases from 27 countries stretching back to 1961, combined with temperature and rainfall records. Globally, the ideal average temperature for the crop appears to be 26.7°C, but the best level varies from country to country. Temperatures in the future were assumed to follow two of the UN climate science panel’s worst scenarios.

Bananas are cheap in high income countries, so producers are likely to be badly affected by any change in production yields. "For farmers, even small losses are a problem, particularly with bananas where the margins are tiny," says Bebber. An estimated 400 million people eat bananas as a staple starch, so there are food security implications too.

Robert Caine at the University of Sheffield, UK, says developing countries may need to use modern technologies to combat the effects of climate change on farming.

Bebber says the recent arrival of a deadly fungus in Latin America, Tropical Race 4 (TR4), is a more immediate and severe danger to bananas. But he says the fungal threat could potentially be less of a problem, because it could be solved by cross-breeding or genetic engineering. Adapting to a hotter Earth, on the other hand, would require changing the whole physiology of bananas.

Greta Thunberg wins "alternative Nobel Prize" for climate change activism

CBS News-25-Sep-2019

Climate activist Greta Thunberg, 16, and three others have been named winners of the 2019 Right Livelihood Award, which is known as the "alternative Nobel Prize."

The Right Livelihood Foundation said in a statement Wednesday that Thunberg won the award "for inspiring and amplifying political demands for urgent climate action reflecting scientific facts." The award comes with a cash award of 1 million Swedish crowns (\$103,000).

"I'm deeply grateful for being one of the recipients of this great honor," Thunberg said in a statement. "But of course, whenever I receive an award, it is not me who is the winner. I am part of a global movement of school children, youth and adults of all ages who have decided to act in defense of our living planet. I share this award with them."

Thunberg started weekly school protests outside Swedish parliament a year ago before it snowballed into a worldwide movement. The award comes days after she gave a fiery speech directed at world leaders at the United Nations Climate Summit.

"People are dying and dying ecosystems are collapsing. We are in the beginning of a mass extinction, and all you can talk about is the money and fairy tales of eternal economic growth," she said Monday, as she fought back tears. "How dare you!"

The other winners of the award were Brazilian indigenous leader Davi Kopenawa, Chinese women's rights lawyer Guo Jianmei and Western Sahara human rights defender Aminatou Haidar.

Thunberg is also among the 301 candidates nominated for the Nobel Peace Prize. The winner will be announced in the first week of October.

According to the Nobel Prize organization, any national member of government can nominate an individual for the heralded peace award. Freddy André Ovstegard and two other Norwegian lawmakers chose Thunberg because of her leadership in the fight against climate change.

If Thunberg wins the Nobel Peace Prize, she would be the youngest recipient since Malala Yousafzai, who was 17 years old when she received the prize.

organic farming

Success story of an organic farmer from Balangir

Kalinga TV-24-Sep-2019

Success Story Of An Organic Farmer From Balangir

The yield from organic farming is of high quality and far better than that obtained from using chemical pesticide and fertiliser: Gangadhar Senapati, Farmer, Bolangir

Once Niti Aayog CEO, Amitabh Kant had said India cannot achieve 9-10 percent GDP growth without a revolution in the farming sector. Many farmers are inspired with his words and started their career in farming but Gangadhar Senapati of Bhainsapali in Bolangir district of Odisha neither knows about Niti Aayog nor its CEO, but the born-farmer is working hard to get his livelihood from rice farming with the help of Reliance Foundation Information Service (RFIS). The organic farmer believes that the yields from organic farming are of high quality and far better than that obtained from using chemical pesticide and fertilizer.



The young farmer, who is also raising goats, said, "I am into farming for the last 15-years. I inherited the skills and learned them from my father but the procedures and technology in farming are changing frequently. Although I gained experience from my father it was really tough to make a profit in the business with that knowledge and skill. But, RFIS helped me a lot to get success in this field."

“We have an agricultural land of 5 acres on which my father used to grow crops. As I grew up, I took over the business, but the initial days were tough. I had to bear heavy crop loss due to adverse weather conditions and pest attack. I tried to get solutions from the nearest government help center that is 25 km from my place. As it was not always possible to get in touch with the officials through phone, I had to travel every time I need guidance. But, even their advice did not yield any good result for my crops,” he said.

“I came in contact with the RFIS toll-free number while reading a local newspaper and instantly I called. As I shared my problems and difficulties, not only I got solutions from the experts, but also personal assistance. Success is not a dream since then,” the young farmer said.



Also read: [Surveen Chawla: Directors Wanted To See My Cleavage, Thighs](#)

The proud farmer practices organic farming and strongly denounces the use of chemical pesticides and fertilizers. He is well-convinced that organic farming increases soil fertility by feeding the soil with micronutrients gained from compost, plant residues, and food wastes.

The yield from organic farming is of high quality and far better than that obtained from using chemical pesticide and fertilizer. While it is unexpected to hear such things from a farmer belonging to a very backward region, Senapati gave all credit of his rich knowledge on organic farming to the RFIS.



After earning a good profit from paddy farming, he has started cultivating black gram, green gram, and other pulses, besides vegetables. Currently, he is also rearing more than 50 goats and earning a good profit. He ventured into goat farming after his success in cultivation.

From his farming activities, Gangadhar meets all his family expenses and has constructed a beautiful house of his own. He shares his art of success among his co-villagers.

Explained: What is PGS, the heart of the organic food ...

The Indian Express-23-Sep-2019

PGS is a process of certifying organic products, which ensures that their production takes place in accordance with laid-down quality standards. The certification is in the form of a documented logo or a statement.

The head of India's food safety regulator has said that she expects the Union Agriculture Ministry's Participatory Guarantee Scheme (PGS) to incentivise more farmers to grow organic food.

"The certified organic food production is still very low. The PGS brings together peer group of farmers and the costs are low. It is being popularised," Rita Teotia, chairperson of the Food Safety and Standards Authority of India (FSSAI) said on the sidelines of a function of Food and Agriculture Organisation (FAO) and the World Health Organisation's (WHO's) Coordinating Committee for Asia (CCASIA) in Panaji Monday.

What is the PGS, and how does it work?

PGS is a process of certifying organic products, which ensures that their production takes place in accordance with laid-down quality standards. The certification is in the form of a documented logo or a statement.

According to 'Participatory Guarantee System for India [PGS-India]', an 'Operational Manual for Domestic Organic Certification' published in 2015 by the National Centre of Organic Farming, Ghaziabad, under the Ministry of Agriculture's Department of Agriculture and Co-operation, PGS is a "quality assurance initiative that is locally relevant, emphasize[s] the participation of stakeholders, including producers and consumers, and (which) operate[s] outside the framework of third-party certification".

Advertising

According to a 2008 definition formulated by the International Federation of Organic Agriculture Movements (IFOAM), the Bonn-based global umbrella organisation for the organic agriculture movement, PGSs are "locally focused quality assurance systems" that "certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange".

PGS, according to this definition, is "a process in which people in similar situations (in this case small holder producers) assess, inspect and verify the production practices of each other and take decisions on organic certification".

Four pillars of PGS

The government's 2015 PGS manual underlines that the system in India is based on "participatory approach, a shared vision, transparency and trust".

PARTICIPATION: Stakeholders such as producers, consumers, retailers, traders, NGOs, Gram Panchayats, and government organisations and agencies are collectively responsible for designing, operating, and decision-making. Direct communication among the stakeholders helps create an integrity- and trust-based approach with transparency in decision-making, easy access to databases and, where possible, visits to farms by consumers.

SHARED VISION: Collective responsibility for implementation and decisionmaking is driven by a common shared vision. Each stakeholder organisation or PGS group can adopt its own vision conforming to the overall vision and standards of the PGS-India programme.

TRANSPARENCY: At the grassroots level, transparency is maintained through the active participation of producers in the organic guarantee process, which can include information-sharing at meetings and workshops, peer reviews, and involvement in decisionmaking.

TRUST: A fundamental premise of PGS is the idea that producers can be trusted, and that the organic guarantee system can be an expression and verification of this trust. The mechanisms for trustworthiness include a producer pledge made through a witnessed signing of a declaration, and written collective undertakings by the group to abide by the norms, principles and standards of PGS.

Advantages and limitations

Among the advantages of PGS over third-party certification, identified by the government document, are:

- * Procedures are simple, documents are basic, and farmers understand the local language used.
- * All members live close to each other and are known to each other. As practising organic farmers themselves, they understand the processes well.
- * Because peer appraisers live in the same village, they have better access to surveillance; peer appraisal instead of third-party inspections also reduces costs
- * Mutual recognition and support between regional PGS groups ensures better networking for processing and marketing.
- * Unlike the grower group certification system, PGS offers every farmer individual certificates, and the farmer is free to market his own produce independent of the group.

However, the operational manual also identifies some limitations of PGS.

- * PGS certification is only for farmers or communities that can organise and perform as a group within a village or a cluster of contiguous villages, and is applicable only to farm activities such as crop production, processing, and livestock rearing, and off-farm processing “by PGS farmers of their direct products”.
- * Individual farmers or group of farmers smaller than five members are not covered under PGS. They either have to opt for third party certification or join the existing PGS local group.
- * PGS ensures traceability until the product is in the custody of the PGS group, which makes PGS ideal for local direct sales and direct trade between producers and consumers.

Zero-Budget Natural Farming Doubles Gujarat Farmer's Income In Just 6 Months!

The Better India-20-Sep-2019

What's more? The water usage has come down by 70%, and in case of heavy rains, the crops won't be damaged. Instead, the excess water will now recharge the groundwater table!

Vanrajsinh Gohil was born in 1988 in the Junavadar village of Gujarat's Bhavnagar district and believes that his destiny was pre-decided.

"I was born in a farmer's family and that is what I was expected to be," he tells The Better India.

After completing his Higher Secondary Education in 2012, he joined the family's cotton plantation. While he enjoyed his work, he was not content with the farming methods.

"Using chemicals and pesticides on the newly-born, nutritious plants did not feel right. I could see the difference in colour and structure of the crops post spraying. But none of my family members had any knowledge of a safe alternative," he says.

With no other choice at his disposal, he continued using harmful chemicals to keep insects and pests away for the next couple of years.

However, destiny's part was not over.

In 2016, he reconnected with his long lost friend, who is also a farmer, and when the two got talking, he expressed his displeasure with the use of chemicals and pesticides.

So, his friend introduced him to Subhash Palekar, an Indian agriculturist, who was awarded the a Padma Shri in 2016.



Fondly known as 'Krishi ka Rishi,' Palekar developed the concept of Zero Budget Natural Farming (ZBNF) or Subhash Palekar Natural Farming (SBNF) that requires almost no monetary investment.

The crops are grown naturally by replacing chemicals with eco-friendly fertiliser. You can read more about Palekar here.

A year later, Vanrajsinh registered for Palekar's organic farming classes in Ahmedabad.

"I interacted with a lot of farmers at the 6-day training class whose stories inspired me to start from scratch. I acquired the farming knowledge from Palekar sir and now all I had to do was shift to natural farming," he adds.



As anticipated, his family refused to even entertain the idea. Practising natural farming on their 40 bigha land was a strict no.

Padma Shri awardee gives free classes on organic farming in Hyderabad

The New Indian Express-15-Sep-2019

Venkateswara Rao along with his team is giving free rooftop organic farming classes in the city.

HYDERABAD: To encourage waste management among the urban class and tackle the growing concerns over pesticide-laced vegetables, Padma Shri awardee and organic farming practitioner Yadlapalli Venkateswara Rao along with his team is giving free rooftop organic farming classes in the city.

Brought-up amid the farming community, Venkateswara Rao was keen on farming since his childhood.

It was the 2004 farmer distress in the then united Andhra Pradesh that shook the commerce graduate from within. “Everyday, the news reports were about farmer suicides. I then decided to start visiting different districts of the State to research about the difficulties farmers faced,” he said.

He added, “One of the major reasons was that farmers were spending a huge amount on producing the yield — from buying expensive pesticides, urea and other chemicals — however, they were still earning lesser than their production costs.”



Rao who has set up a training institute for promoting organic farming in Kornepadu village, Vatticherukuru Mandal, Guntur district says that it is time that the urban class also get to know the benefits of organic farming.

“Terrace organic farming can be a new movement among the people in the city. Due to pesticide-laced vegetables, many suffer from health problems. A middle-class man cannot afford to spend so much on healthcare,” says he.

In March 2019, Rao received the prestigious Padma Shri from President Ramnath Kovind for his service to the farming community in AP and Telangana.

Kerala Woman's Backyard Polyhouse Gives Her Organic ...

The Better India-10-Sep-2019

Turning hard work into smart work, Vijaya Kala, a part-time farmer and a full-time tax-auditor is increasing her food output without toiling under the sun for hours or hopelessly waiting for the rains.

Vijaya is a resident of Kerala's Karunagappally town, who six years ago, opted for farming techniques which were less-labour intensive and more efficient, including polyhouse and Precision Agriculture (PA) and started growing plants and vegetables.

Vijaya Kala

Speaking to The Better India about the benefits of her farming techniques, the 39-year-old says,

“PA is site-specific farming, which means that crops and veggies are grown based on weather patterns, humidity and soil temperature. Instead of using one single approach for all the vegetables, each plant is treated differently. As for the polyhouse, veggies are grown under controlled climatic conditions, and thus, there are fewer chances of crop damage. Plus, food can be grown in a polytunnel around the year. It also keeps the insects and pests at bay.”



Vijaya's motivation to grow organic vegetables in her backyard was neither a life-changing experience nor a childhood passion that was reignited.

It was in fact, a discussion among friends about growing food at home that pushed her to go online and research about the topic. In no time, the research turned to a full-fledged plan that she presented to the state's Agriculture Department to avail farming subsidies.

With no farming land of her own, she installed two polytunnels comprising 100 square metres, one on her terrace and the other one in the house's backyard at an investment cost of 1.20 lakh (50,000 of which was from the government subsidy.) Additionally, she also has an acre of land (taken on lease) to extend vegetable farming through PA .

From veggies like tomatoes, capsicum, radish, onion, spinach, bitter gourd, cabbage, beans to flowers like orchid and marigold, all the food is grown organically. She prepares her own agri inputs like fertiliser which is a mixture of cow dung, urine and water.

ICAR to frame guidelines for use of drones in fields

The Hindu-13-Sep-2019

‘Lot of climate smart agriculture technologies are being created’

The Indian Council of Agricultural Research (ICAR) is in the process of framing guidelines for use of drones for applying pesticides, fertilizers and plant protection chemicals on crops, its Deputy Director General (Agricultural Engineering), K.Alagusundaram, said here on Friday.

“We are talking about precision farming and precise application of inputs. Drones are being used to apply pesticides on horticulture and agricultural crops due to shortage of labour. We are drawing up guidelines to be notified by the Centre,” he said inaugurating a national conference on ‘Climate smart agriculture for livelihood security: Challenges and opportunities,’ at the Anbil Dharmalingam Agricultural College and Research Institute (ADAC&RI), a constituent of Tamil Nadu Agricultural University at Navalurkuttapattu near here.



Drones are set to be used widely soon due to labour shortage and issues concerning labour health. The guidelines would cover various aspects of use of drones including payloads to be carried by them. “The report (containing the guidelines) will be submitted to the government in about a month,” Dr.Alagusundaram told media persons later. Subsequently, the Department of Agriculture and Cooperation would notify it to become a law, he added.

Earlier, elaborating on the measures taken by ICAR to develop climate smart agriculture technologies and approaches, he said the National Innovations on Climate Resilient Agriculture (NICRA), a flagship project of ICAR launched in February, 2011, to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstration is being expanded further. “We are creating a lot of climate smart agriculture technologies under NICRA,” he said and 151 NICRA villages have been adopted by scientists to provide a wide range of technical inputs and support to farmers right from what, when and how to cultivate.

Studies have indicated that the NICRA villages are doing much better than their nearby villages, in terms of productivity, improving livelihood and farmers’ happiness index. Now the Centre has asked the ICAR to create NICRA clusters by including adjacent villages to the

existing NICRA villages. About 150 NICRA clusters are to be created covering about 750 villages.

The government of Maharashtra has decided to adopt and replicate the NICRA model in about 5,000 villages with World Bank assistance. ICAR had agreed to extend technical support. "The Orissa government has approached ICAR to adopt the model. Other states, especially Tamil Nadu, should adopt the model," he said.

N. Kumar, Vice-Chancellor, Tamil Nadu Agricultural University, Coimbatore, said it has become essential to develop new technologies and crop varieties to tackle climate changes. The TNAU was giving a thrust to research on developing technologies and crop varieties to mitigate and reduce exposure to natural vagaries. The varsity is working on developing short duration paddy varieties of 90-95 days so that their exposure to nature is limited. Similarly, drought tolerant crop varieties have been developed.

It was important to address issues such as problematic soil. The TNAU had recently given its recommendations, on a request from the government, on possible alternative crops and cultivation technologies to be adopted in fields affected by soil salinity in Nagapattinam district, he said.

K. S. Subramanian, Director of Research, TNAU, S. Uma, Director, ICAR-National Research Centre for Banana, P.Masilamani, Dean, ADAC&RI, K.V. Peter, Former Vice-Chancellor, Kerala Agricultural University, G. Karthikeyan, Secretary, Madras Agricultural Students Union, and S. Parthiban, Head, Fruit Science, Horticulture College and Research Institute for Women, spoke.

Top agricultural scientists body rejects zero budget natural farming

The Indian Express-09-Sep-2019

Top agricultural scientists body rejects zero budget natural farming

This comes even as Prime Minister Narendra Modi, addressing the 14th Conference of Parties to the UN Convention to Combat Desertification on Monday, mentioned that "we are focusing on ZBNF".

Farm income growth slumps to a 14-year-low in Oct-December 2018

Pink Bollworm infestation in cotton crop drops, now in 20 villages instead of 700

Govt pushed for zero budget farming, top scientists question

Top agricultural scientists have hit out at ZBNF, calling it an "unproven" technology. (Express)

India's premier academic body of agricultural scientists has hit out at Zero Budget Natural Farming (ZBNF), terming it as an "unproven" technology bringing no incremental value gain to either farmers or consumers.

“The government should not needlessly invest capital and human resources towards promoting ZBNF. We have given our recommendations in writing to the Prime Minister and it reflects the view held by the scientific community,” said Panjab Singh, president of the National Academy of Agricultural Sciences (NAAS).

This comes even as Prime Minister Narendra Modi, addressing the 14th Conference of Parties to the UN Convention to Combat Desertification on Monday, mentioned that “we are focusing on ZBNF”. The Finance Minister Nirmala Sitharaman’s Union Budget speech, too, had talked of the need to “go back to basics” and “replicate this innovative model (that) can help in doubling our farmers’ income”.

The New Delhi-based NAAS – a farm scientists’ think tank with over 650 fellows and 15 regional chapters across India – had organised a day-long “brainstorming session” on ZBNF last month. It was attended, among others, by the Director-General of the Indian Council of Agricultural Research (ICAR) Trilochan Mohapatra and NITI Aayog member Ramesh Chand.

“In all, there were about 75 experts that included scientists, policymakers, progressive farmers, NGOs and fertiliser, seed and crop protection chemical industry representatives. We reviewed the protocols and claims of ZBNF and concluded that there is no verifiable data or authenticated results from any experiment for it to be considered a feasible technological option. We had invited Subhash Palekar (the man behind ZBNF) as well, but he did not come,” claimed Singh, who is also a former ICAR Director-General.

ZBNF’s basic concept is that over 98 per cent of the nutrients required by crops for photosynthesis – carbon dioxide, nitrogen, water and solar energy – are already supplied “free” from the air, rains and sun. Only the remaining 1.5-2 per cent nutrients need to be taken from the soil and converted from “non-available” to “available” form (for intake by the roots) through the action of microorganisms.

To enable the microorganisms do their jobs, farmers must apply ‘Jiwamrita’ (microbial culture) and ‘Bijamrita’ (seed treatment solution), besides ‘Mulching’ (covering plants with a layer of dried straw or fallen leaves) and ‘Waaphasa’ (giving water outside the plant’s canopy) to maintain the right soil temperature-moisture-air balance. For insect and pest management, ZBNF recommends use of ‘Agniasthra’, ‘Brahmastra’ and ‘Neemastra’, which, like ‘Jiwamrita’ and ‘Bijamrita’, are concoctions based mainly on urine and dung from desi cows. Since these also do not have to be purchased, it makes farming practically “zero-budget”.

Critics, however, note that plant growth and crop yields require nitrogen, which is also a major component of amino acids that are the building blocks of proteins. “78 per cent of air is nitrogen, but it is not freely available to plants. Being non-reactive, atmospheric nitrogen has to be fixed into a plant-usable form such as ammonia or urea. He (Palekar) is further saying that ZBNF is effective only if dung and urine from black-coloured Kapila cows is used and farmers sow traditional varieties/landraces. It means that all the high-yielding varieties and hybrids developed by us, which have trebled India’s rice production to 116 million tonnes (mt) and increased it more than eight times to 102 mt for wheat in the last 50 years, are useless,” remarked a top ICAR scientist, who didn’t wish to be identified.

But according to Palekar, ZBNF is “seed-agnostic” and can be used for desi, hybrid or even genetically modified crops. “NAAS has no expertise to validate my method of farming. They

have neither spoken to me nor the farmers who are practicing it. The academy should also have taken into consideration my schedule before calling me. Farmers organise workshops that I cannot cancel them just to attend this (NAAS) meeting,” he added.

Meanwhile, the ICAR has appointed a committee under Praveen Rao Velchala, vice chancellor of the Professor Jayashankar Telangana State Agricultural University to study ZBNF’s viability. “We are examining if there is any science behind it and its strengths and weaknesses, including vis-à-vis normal organic farming. Currently, experiments in growing crops using ZBNF are taking place in five research station locations and we are also going to the fields of farmers who have supposedly adopted this technique. All this can be confirmed through analysis of soil data and fertility status,” Velchala told The Indian Express.

The committee, constituted in May, has had two meetings so far, while the five trial locations are Modipuram (Uttar Pradesh), Pantnagar (Uttarakhand), Kurukshetra (Haryana), Ludhiana (Punjab) and Palampur (Himachal Pradesh). At the Indian Institute of Farming Systems Research in Modipuram, ZBNF experiments have already been conducted for 2017-18 (wheat crop) and 2018-19 (paddy and wheat). “We are now doing our second season for paddy. Nothing conclusive has emerged, but meeting crop nutrient demand through this technique seems an issue,” stated N. Ravisankar, principal scientist at the ICAR institute.

IISR in print

Fresh, Single-Origin Turmeric for Fall Dishes

The New York Times (blog)-04-Sep-2019

Over two years ago, Sana Javeri Kadri, who worked as a marketing associate for Bi-Rite Market in the Bay Area, observed that turmeric had rapidly grown in popularity. Yet no one was questioning, in the same way we do the origin of our eggs or coffee, where the spice really came from. As Javeri Kadri explains on her website: “Made in India’ is more likely to signify fertilizer overuse, farmer suicide, and rampant worker abuse than it is colorful piles of freshly ground spices amidst fragrant marketplaces and lush fields of tropical organic produce.” Working with **the Indian Institute of Spices Research**, she learned more about ethically minded varieties of turmeric, and she launched Diaspora Co. in 2017. She now sells



turmeric as fresh and potent as possible (most spices do, in fact, have a shelf life; she’s now also offering green cardamom, too). My order of turmeric, which I recently received, was

harvested earlier this year and grown by the Kasareneni family in the state of Andhra Pradesh in southeast India among marigolds, bananas and black rice. I just used it in a dish of Bengali salmon that I like to cook as the weather cools down in the fall, and it was better than any turmeric I have tasted. Starting at \$12, diasporaco.com.

General

Reduce, Reuse, Recycle: The Future of Phosphorus in ...

SciTechDaily-15-Sep-2019

When Hennig Brandt discovered the element phosphorus in 1669, it was a mistake. He was really looking for gold. But his mistake was a very important scientific discovery. What Brandt couldn't have realized was the importance of phosphorus to the future of farming.

Phosphorus is one of the necessary ingredients for healthy crop growth and yields. When farms were smaller and self-sufficient, farmers harvested their crops, and nutrients rarely left the farm. The family or animals consumed the food, and the farmer could spread manure from their animals onto the soil to rebuild nutrients. This was a fairly closed-loop phosphorus cycle.



But, as the world's population increased, so did food and nutrition needs. More of a farmer's harvest, and therefore nutrients, was sold off the farm. Agriculture adapted by developing many new growing methods, as well as fertilizers. Most phosphorus fertilizers use the world's supply of phosphate rock as a main ingredient. That main modern source is a finite resource and it's running out. Phosphate rock is also hard to mine and process.

All crops need phosphorus for healthy growth. Phosphorus is a building block of plant protein. Working to reduce, reuse and recycle phosphorus will make a more sustainable food system. Credit: See text in photo

"There is an urgent need to increase phosphorus use efficiency in agroecosystems," says Kimberley Schneider, a research scientist with Agriculture and Agri-Food Canada. "There are many chemical, physical and biological processes that affect the availability of phosphorus to crops." This is why farmers place great importance in having enough phosphorus for their crops.

Crop breeding and cultivar selection

Different plants can use phosphorus more efficiently than others. “Phosphorus use efficiency is the ability to yield more crop per unit of phosphorus taken up by the plant,” explains Schneider. “There is potential for crop breeders to develop new varieties that use phosphorus in even more efficient ways. They can also breed crops that work with mycorrhizal fungi in the soil to help increase their phosphorus absorption. Focusing on breeding plants that work well in low phosphorus soils will take an interdisciplinary approach.”



Cropping system design and phosphorus use efficiency

Since some crops can increase soil phosphorus availability for future crops, growers could focus on crop rotations that take advantage of this. Cover crops and green manures can also contribute to phosphorus availability in many conditions. For example, one study found sorghum did well with phosphorus use after alfalfa or red clover, but not after sweet clover. Getting the right combinations for the right crops and fields will be important.

Soil organic matter’s role in mineralizing phosphorus

Soil organic matter is known to indicate soil health. It can improve plant phosphorus availability by allowing for greater root access to phosphorus and by releasing plant available phosphorus. Currently, soil organic matter is not part of the soil fertility measurements on farms, so this is an area of future research potential.

Healthy soil contains fungal networks (white thread-like material) that help with the transport of nutrients to plant’s roots. Future research may find more ways to enhance fungi’s role in capturing phosphorus for crops. Credit: Susan V Fisk



Naturally occurring soil fungi to the rescue

Many soils contain one or more types of friendly fungus called arbuscular mycorrhizal fungi. They work with plant roots to exchange “life chores.” The fungi help free up phosphorus and other nutrients, while the plants make sugar compounds that the fungi use for growth. Of course, the fungi and roots must be able to be near one another for this exchange to happen. Researchers are looking at the promise of building up and better utilizing mycorrhizal fungi populations in soils.

Recycling and recovering phosphorus

Phosphorus is the 6th most common element on earth. Yet, it is a limiting factor in crop yields. Excess phosphorus in the wrong place – streams, lakes and other water bodies – causes pollution. How did this come to be?

Let's trace the "life cycle" of a phosphorus molecule. Most phosphate rock is mined on the continents of Europe and Africa, although some deposits are available elsewhere. After it is made into fertilizer, this phosphorus is then moved to farms. From there, the phosphorus is used by a plant to make a product, perhaps a soybean. The soybean is removed from the farm and manufactured into tofu. It is then transported to your local grocery store, where you buy it and bring it home. If you live in a city, after you enjoy your meal of fried tofu, the waste your body produces flushes down the toilet. If you live in a rural area, it goes into the septic system.

Struvite is a substance made by refining wastewater and recapturing the phosphorus. It can be used as a fertilizer, and recycles this important nutrient. Credit: Joanne Thiessen Martens



Thus, the life cycle of this illustrative phosphorus molecule shows a broken cycle. The molecule originates far away from its final resting place. Because of modern-day life, the phosphorus cycle that used to exist on farms is broken. The more urban society becomes, the more broken the phosphorus cycle is – unless scientists come up with answers to close the loops again.

Agricultural scientists are working with wastewater managers to develop ways to put those deserving phosphorus molecules back to work on the farm. "While most currently available phosphorus recovery technologies may not seem economically viable, the environmental and social benefits are important," says Schneider. "There are also other valuable products of phosphorus recovery, such as organic matter, other nutrients, and even water."

"Increasing phosphorus use efficiency in agroecosystems must be a priority to reduce reliance on fertilizer and to minimize the effects on the environment," says Schneider. "There are many possibilities for the agricultural system to improve the use of phosphorus. The outcome will be an agroecosystem that still feeds the world, while protecting the natural resources that help us grow our food and live healthy lives."

This article was recently published in a special section in the Journal of Environmental Quality called Celebrating the 350th Anniversary of Discovering Phosphorus—For Better or Worse.

Reference: "Options for Improved Phosphorus Cycling and Use in Agriculture at the Field and Regional Scales" by Kimberley D. Schneider ^a, Joanne R. Thiessen Martens^b, Francis Zvomuyab, D. Keith Reida, Tandra D. Frasersc, Derek H. Lynchd, Ivan P. O'Hallorane and Henry F. Wilson, 15 August 2019, Journal of Environmental Quality. DOI: 10.2134/jeq2019.02.0070

What are the implications of GM on UK agriculture?

New Food-02-Sep-2019

What are the implications of GM on UK agriculture?

The UK government is being urged to consider the wider implications before supporting the introduction of genetically modified food (GM) to UK agriculture.

According to Roger Kerr, chief executive at OF&G (Organic Farmers & Growers), who certify more than 50 percent of UK organic land, the use of genetically modified food (GM) could result in UK farm businesses becoming less profitable.

“A recent Twitter poll suggested 77 percent of farmers would want to use GM technology if it was available,” said Kerr. “And a large proportion of farmers see many benefits to GM, including increased resistance to pests and diseases, and drought resistance in the face of climate change.”



However, he further detailed how a survey at Countryfile Live revealed that many consumers are against the introduction of GM which puts UK agriculture at odds with a significant proportion of its own consumers.

Not only are there contrasting opinions, but Kerr added that there are also economic and scientific concerns to consider. “The economic issues with GM relate to scale and market access. If UK agriculture adopts GM then farmers will find they have to bring their costs of production in line with GM producers in the USA and China.”

UK agricultural output is equivalent to just a tenth of the USA’s and two percent of Chinese agricultural output, according to research from Worldbank Open Data. Kerr also noted that further competition in global markets will be introduced by Brexit as some of the largest agricultural operations in the world enter into the UK market.

“Some EU markets may be closed to GM products, so assuming a trade deal can be agreed, these higher margin opportunities will be closed to UK producers,” Kerr added.

Kerr described how, as GM is increasing, UK agriculture could eventually be considered as wholly GM as contamination is also increasing, with some cases being unavoidable. “This will have implications across the whole sector whether a farmer grows GM or not and will consequently create additional costs, not least with increased testing, impacting on producer returns.

“There’s a common fallacy that we need GM to produce more food so we can feed the growing world population, which is anticipated to be 9.7 billion by 2050. But around half the food we

produce is currently wasted, so if policies were found to avoid waste, we could feed 9.7bn now.”

Kerr said that the scientific and subsequent environmental implications of GM also need to be considered. “Post-Second World War, farmers were sold the message of efficiency and productivity through using chemistry. But are farmers achieving better profits as a result? Farms have certainly become bigger but not because of the economics of production – remove financial support and many farms would not survive.

“With more than 40 percent of insect species at risk of extinction over the next few decades and 75-98 percent of insect biomass already lost worldwide, the impact of chemical inputs on pollinators and the rest of the ecosystem have been significant.

“Yet with GM, we’re considering introducing insect and fungal resistant crops where potentially harmful genes could enter wild populations. We must ask whether we fully understand the consequences of this both environmentally and economically. What will be the cost of additional field operations needed to dispose of plant residues resistant to breakdown? Ultimately GM will neither save money, benefit the environment or make life easier.

“In the short-term, the introduction of GM will probably increase demand for organic as a significant percentage of consumers seek GM-free food. But there are long-term economic and environmental implications that could be significant across the whole of the UK agricultural sector, which need full consideration and modelling ahead of any decisions made by Government,” concluded Kerr.



Scientists of Bhabha Atomic Research Centre find an organic fix to treat sewage

The treated water through this technology can be safely let into lakes and other water bodies as it is based on a natural process, said scientists behind the invention.

(A image of the hybrid sewage treatment plant that is yet to get a patent |Photo- special arrangement)

CHENNAI: In a bid to ensure that the city does not face another water crisis, scientists of Bhabha Atomic Research Centre (BARC) have come up with a low cost, natural wastewater treatment methodology.

The Hybrid Granular SBR (sequencing batch reactor) process invented by them uses microbeads which simplifies separation of biomass from sewage water.



Explaining about the process to Express, Daniel Chellappa, a BARC scientist, said the beads containing carbon nitrogen and phosphorus is

mixed with sewage. “It brings the solid waste together. The solid particle settles down by gravity and waste water can be removed,” he said.

The scientist said this treatment plant is unique from the normal sewage treatment plant in many ways. This comes in various sizes depending upon requirements. “The SBR treatment plant occupies 75 per cent less space than the normal STP and costs 50 per cent less,” he said, adding that it can be set up in apartments, streets, roads or for a whole corporation zone.

A normal STP would require a secondary clarifier, meaning, a separate tank for aeration and sedimentation. In this, both happens in the same container. “Since it is a natural process, there is no sound pollution compared to the normal STP,” explained Chellappa, adding that the SBR also requires less mechanical equipment and only one person to maintain it.

Meanwhile, since the water is treated through natural process, it ideal for restoring lakes and other water bodies. “This process balances the biological and chemical oxygen demands bringing them less than 10 milligram/litre. Life can succeed and fish would quickly multiply too,” claimed Chellappa.

Apart from industrial use, this can also be used for organic farming. BARC has applied for a patent in April this year and is yet to be granted. “Granular SBR is a major turning point in water conservation and it can be implemented across the country,” said Chellappa.

Recently, Chennai Corporation announced that it has plans to set up a five MLD plant to let treated water in the Villivakkam lake. Chellappa said public, competent STP companies and engineers can apply in BARC website to apply for this technology. “Even saline water can be treated under this process and rivers such as Adyar, Cooum and Kosasthalaiyar can be restored too,” said Chellappa.

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MALAYALAM NEWS

ദിവസവും ഒരു നാല് ഗ്രാം ഇഞ്ചി കഴിക്കുന്നത് ആരോഗ്യ പ്രശ്നങ്ങൾ പരിഹരിക്കും

അനേച്ഛണം-06-Sep-2019

ധാരാളം ആരോഗ്യ ഗുണങ്ങളുള്ള ഒന്നാണ് ഇഞ്ചി. പ്രകൃതിയിൽ നിന്ന് ലഭിക്കുന്ന അത്ഭുതഭക്ഷ്യകൂട്ടാണ് ഇഞ്ചി. ഭക്ഷണത്തിൽ ഇഞ്ചി ചേർത്താൽ, ആരോഗ്യപരമായി ഏറെ ഗുണകരമാണ്. ദിവസവും ഇഞ്ചി ഭക്ഷണക്രമത്തിൽ ഉൾപ്പെടുത്തിയാൽ, അത് ഒട്ടനവധി ഗുണങ്ങൾ നമുക്ക് നൽകും.



മനംപുരട്ടൽ, ഛർദ്ദി തുടങ്ങിയവയ്ക്ക് ഏറെ നല്ലതാണ് ഇഞ്ചി. അതുപോലെ തന്നെ, ദഹനപ്രശ്നങ്ങൾക്കുള്ള ഉത്തമ പരിഹാരമാണ് ഇഞ്ചി. ദഹനക്കേട് കാരണം ഉണ്ടാകുന്ന വയറുവേദന, വയറിളക്കം, ക്ഷീണം എന്നിവ മാറാൻ ഇഞ്ചി കഴിച്ചാൽ മതി. ഇഞ്ചിയിൽ അടങ്ങിയിട്ടുള്ള നാരുകൾ ഉൾപ്പെടെയുള്ള പോഷകങ്ങളാണ് ദഹനം എളുപ്പമാക്കാൻ സഹായിക്കുന്നത്.

ദിവസവും ഒരു നാല് ഗ്രാം ഇഞ്ചി കഴിക്കുന്നത് ഇത്തരം പ്രശ്നങ്ങൾ പരിഹരിക്കാൻ സഹായിക്കുന്നു. ഗ്രീൻ ടീയിലോ കട്ടനിലോ ഒരു നുള്ളി ഇഞ്ചി കുടിച്ചാൽ മതിയാകും. ശരീരത്തിനുള്ളിലെ വിഷവസ്തുക്കൾ നീക്കം ചെയ്തു ശുദ്ധീകരിക്കാൻ ഇഞ്ചി സഹായിക്കും. ദിവസവും രാവിലെ ഇഞ്ചി വെളുത്തുള്ളിക്കൊപ്പം ചതച്ച് വെള്ളട്ടിലിട്ട് കുടിച്ചാൽ, ദിവസങ്ങൾക്കുള്ളിൽ അതിന്റെ ഫലം ലഭിക്കും.

ദിവസവും രാവിലെ ഒരു ചെറിയ കഷ്ണം ഇഞ്ചി കഴിച്ചാൽ, മലബന്ധം മൂലമുള്ള പ്രശ്നം പരിഹരിക്കാം. പേശികൾ ആയാസരഹിതമാക്കാൻ ഇഞ്ചി സഹായിക്കും. ഇത് ആർത്തവസംബന്ധമായ വേദന, വ്യാധാമത്തിനുശേഷമുള്ള പേശിപിരിമുറുക്കം എന്നിവയ്ക്ക് പരിഹാരമാണ്. തൊണ്ടയുടെ അസ്വസ്ഥത മൂലം ശബ്ദത്തിന് ഇടർച്ചയുണ്ടാകുന്നവർക്ക്, അത് പരിഹരിക്കാൻ ഏറ്റവും ഉത്തമമായ മാർഗമാണ് ഇഞ്ചി.

ഗോപിയുടെ മൾട്ടി റൂട്ട് ജാതിത്തോട്ടം കാണാൻ മന്ത്രിയെത്തി

malayalam.krishijagran.com 27 September, 2019

മൾട്ടി റൂട്ട് ജാതി തൈകളിലൂടെ ജാതി കൃഷിരംഗത്ത് വിപ്ലവമുണ്ടാക്കിയ ഗോപി ചെറുകുന്നേലിന്റെ ജാതിത്തൈനഴ്സറി കാണാൻ കൃഷി വകുപ്പു മന്ത്രി സുനിൽകുമാർ എത്തി. അദ്ദേഹം ഒരു മണിക്കൂറോളം ഗോപിയുടെ ജാതി ഫാമിൽ ചെലവഴിച്ചതിനുശേഷമാണ് മടങ്ങിയത്. നാടൻ ജാതി മരങ്ങളും കാട്ട് ജാതി മരങ്ങളും ഗ്രാഫ്റ്റ് ചെയ്ത് ഒന്നാക്കി വളർത്തിയെടുത്ത ശേഷം മേൽത്തരം അത്യുൽപാദനശേഷിയുള്ള മുകളും ബഡ്ഡ് ചെയ്ത് ഉൽപാദിപ്പിച്ച് ജാതി കർഷകരിൽ ഏറ്റെടുത്തിരിക്കുന്നത്.



എത്തിക്കുന്ന ദൗത്യമാണ് ഗോപി

ജാതിമരം കാറ്റിൽപെട്ട് കടപുഴകി വീഴുന്നതിന് പ്രതിവിധിയാണ് മൾട്ടിറൂട്ട് തൈകൾ. കഴിഞ്ഞ പത്ത് വർഷമായി ഗോപി സ്വയം വികസിപ്പിച്ചെടുത്തതാണ് മൾട്ടി റൂട്ട് എന്ന ആശയം. അഞ്ച് വർഷത്തെ പരിചരണത്തിനുശേഷം ആണ് തൈകൾ വില്പനയ്ക്കായി തയ്യാറാക്കുക. കൃഷി വകുപ്പിന്റേയോ, കാർഷികസർവകലാശാലയുടെയോ മറ്റ് ഏജൻസികളുടെ സഹായമൊന്നുമില്ലാതെ ശാസ്ത്രീയമായി ഫാമും നഴ്സറിയും പരിപാലിക്കുന്ന ഗോപിയെ മന്ത്രി അഭിനന്ദിച്ചു.



ജാതി കൃഷിരംഗത്ത് തന്റേതായ വ്യക്തിമുദ്ര പതിപ്പിച്ച ഗോപി നിരവധി അവാർഡുകളാണ് വാരിക്കൂട്ടിയത്. കേരളത്തിനകത്തു നിന്നും, പുറത്തു നിന്നും നിരവധി കർഷകരാണ് ഗോപിയുടെ മൾട്ടിറൂട്ട് ജാതിത്തൈകൾ വാങ്ങുന്നതിനായി എത്തുന്നത്. അത്യുൽപാദനശേഷിയും വരൾച്ചയെയും രോഗകീടങ്ങളെയും പ്രതിരോധിക്കാനുള്ള കരുത്തും മൾട്ടിറൂട്ടിന്റേ പ്രത്യേകതകളാണ്. നേന്ത്രവാഴ കൃഷിയിൽ ക്വിൻറ്റ് വാഴക്കുല ഉൽപാദിപ്പിച്ചാണ് ഗോപി കേരളത്തിലെ കർഷകർക്കിടയിൽ ശ്രദ്ധേയനായത്. സർക്കാർ സ്ഥലത്തിൽ എല്ലാവിധ സഹായങ്ങളും മന്ത്രി ഉറപ്പുനൽകിയെന്ന് ഗോപി പറഞ്ഞു.



ഐ.എ.എം.ഇ.സംസ്ഥാനതല ശാസ്ത്ര മേള മലപ്പുറത്ത് കേന്ദ്ര സുഗന്ധവിള ഗവേഷണ കേന്ദ്രം ഡയറക്ടർ ഡോ. നിർമൽ ബാബു ഉദ്ഘാടനം ചെയ്യുന്നു. ഫോട്ടോ: കെ.ബി. സതീഷ്കുമാർ.

ജൈവമാണ് സർവതും... തോമസച്ചൻ പറയുന്നു ...

മാതൃഭൂമി-07-Sep-2019

ജൈവമാണ് സർവതും... തോമസച്ചൻ പറയുന്നു കൃഷിവിശേഷം

Sep 7, 2019, 01:17 PM IST

A | A | A

81-ാം വയസ്സിലും എന്താണ് കൃഷിയോടീത്ര താൽപര്യമെന്ന് ചോദിച്ചാൽ മറുപടി ഇത്രമാത്രം 'കോഴിക്കോട് കോടങ്ങേരിയിലെ ഒരു കർഷക കുടുംബത്തിൽ ജനിച്ചതുകൊണ്ടായിരിക്കാം'



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EMAIL
COMMENT

63 ശിവസമയം വിനിയോഗിക്കാൻ തുടങ്ങിയ തോമസച്ചന്റെ കൃഷിത്തൊട്ടത്തിൽ ഇന്ന് ഒരു അടുക്കളയിലേക്ക് വേണ്ട എല്ലാവിധ പച്ചക്കറികളുമുണ്ട്. തോട്ടം കാണാൻ എത്തുന്നവർക്കും കിട്ടും കൈനറയെ പച്ചക്കറിയും വിത്തും. കാഞ്ഞിരപ്പള്ളി സമന്വയ ജന്മസ്ഥലം ഹൗസിലെ ഫാ. തോമസ് കപ്പോരുമലയിലാണ് മൂന്ന് വർഷമായി ജൈവകൃഷിയിൽ സജീവമായിട്ടുള്ളത്.

81-ാം വയസ്സിലും എന്താണ് കൃഷിയോടീത്ര താൽപര്യമെന്ന് ചോദിച്ചാൽ മറുപടി ഇത്രമാത്രം 'കോഴിക്കോട് കോടങ്ങേരിയിലെ ഒരു കർഷക കുടുംബത്തിൽ ജനിച്ചതുകൊണ്ടായിരിക്കാം'. ഒപ്പം വിഷരഹിത പച്ചക്കറി ഉൽപാദിപ്പിക്കുക എന്ന ലക്ഷ്യവും.

വെണ്ട, വഴുതന, തക്കാളി, പയർ, മുളക്, ചീര, ചീനി, ചേന, വാഴ, കപ്പ, റംബട്ടാൻ, മാംഗോസ്റ്റിൻ തുടങ്ങിയവയൊക്കെയാണ് കൃഷി ചെയ്തിരിക്കുന്നത്. വാഴത്തൊട്ടത്തിൽ പൂവൻ, മൈസൂർ പൂവൻ, ചുണ്ടില്ലാക്കണ്ണൻ ചെങ്കുളി, ഏത്തവാഴ എന്നീ ഇനങ്ങളാണ് നട്ടിരിക്കുന്നത്. ഓണത്തിന് വിളവെടുക്കുവാനായി കുലകൾ വിളഞ്ഞുകിടക്കുന്നുണ്ട്.

ആനക്കൊമ്പൻ വെണ്ടയാണ് മറ്റൊരു കാഴ്ച. സാധാരണ വെണ്ടയെക്കാൾ വലിപ്പമുള്ളതാണ് ഈ ഇനം വെണ്ട. പൂർണ്ണമായും ജൈവവളങ്ങളാണ് ഉപയോഗിക്കുന്നത്. ചാണകമാണ് പ്രധാനവളം. കീടങ്ങളെ തുരുത്താൻ കൃഷിഭവനിൽനിന്നുള്ള കീടനാശിനിയാണ് പ്രയോഗിക്കുന്നത്. ഇക്കൊല്ലത്തെ മഴ കാരണം കൂടുതൽ പച്ചക്കറി വിളവെടുക്കാൻ കഴിഞ്ഞില്ലെന്ന് തോമസച്ചൻ പറയുന്നു. ഒരു ദിവസം രണ്ടര മണിക്കൂർ കൃഷിയിടത്തിൽ ചെലവഴിക്കും.

1974-ൽ പുരോഹിതനായ തോമസച്ചൻ ഇന്ത്യക്ക് പുറത്തും സേവനം ചെയ്തിട്ടുണ്ട്. അഞ്ച് വർഷമായി കാഞ്ഞിരപ്പള്ളി ജന്മസ്ഥലം ഹൗസിൽനിന്നാണ് സേവനം ചെയ്യുന്നത്. മാന്തറ, ചീറ്റടി, മുണ്ടക്കയം എന്നിവിടങ്ങളിലെ പള്ളികളിൽ ശുശ്രൂഷയും ചെയ്യുന്നുണ്ട്.

Content Highlights: Organic Vegitabe Farming Of A Priest

പോഷകാഹാരത്തില് ഗവേഷണവുമായി ഡോ. ഷീബ ...

മാതൃഭൂമി-09-Sep-2019



ഭക്ഷ്യപദാർഥങ്ങളിൽ വ്യത്യസ്ത പരീക്ഷണങ്ങളുടെ ഡോ. ഷീബ വെളുത്തൂർ. രോഗപ്രതിരോധശേഷി കുറഞ്ഞവർക്ക് ഏറെ സഹായകമാകുന്ന പോഷകമൂല്യമുള്ള 'പ്രോ ബയോട്രിക്സ്' ഭക്ഷണമാണ് ഇവർ നിർമ്മിക്കുന്നത്. മനുഷ്യശരീരത്തിന് ആവശ്യമായ ബാക്ടീരിയകളെ വളർത്തിയാണ് ഇത്തരം പോഷകാഹാരങ്ങൾ നിർമ്മിക്കുന്നത്. കോമ്പൂച്ച, മിൽക്ക് കെഫിർ, വാട്ടർ കെഫിർ തുടങ്ങിയ പാനീയങ്ങളാണ് ഇവരുടെ പരീക്ഷണകേന്ദ്രമായ 'കാർവാലീസിൽ' നിന്ന് വിപണിയിലെത്തുന്നത്. വിദേശത്തൊക്കെ ഏറെ ആവശ്യക്കാരാണ് ഇത്തരം പോഷകാഹാരത്തിനുള്ളത്. മികച്ച പാനീയങ്ങൾ വിലക്കുറവിൽ സാധാരണക്കാരിൽ എത്തിക്കുകയാണ് ലക്ഷ്യമെന്ന് ഡോ. ഷീബ പറയുന്നു.

ഓർഗാനിക് കെമിസ്ട്രിയിൽ പോസ്റ്റ് ഡോക്ടറേറ്റ് ചെയ്തുകൊണ്ടിരിക്കുന്ന സമയത്ത് ഇറ്റലി, ഫ്രാൻസ്, പാരീസ് എന്നിവിടങ്ങളിലായി പത്തു വർഷത്തോളം ഇവർ താമസിച്ചിരുന്നു. ഈ സമയത്താണ് മൈക്രോ ബയോളജിയിൽ താല്പര്യം തുടങ്ങുന്നത്.

തുടർന്ന് നാട്ടിലെത്തിയ ഇവർ സ്വന്തമായി ഒരു സംരംഭം തുടങ്ങുകയെന്ന ലക്ഷ്യത്തോടെ നല്ലും ചെറുക്കിട വ്യവസായ വില്ലേജിൽ സ്ഥലമെടുക്കുകയായിരുന്നു. ബയോ ഫാർമസ്യൂട്ടിക്കൽ തുടങ്ങാനായിരുന്നു ലക്ഷ്യമെങ്കിലും സാങ്കേതികകാരണങ്ങൾ അതിനു തടസ്സം നിന്നു. ഞെളിയൻ പറമ്പിനു സമീപമുള്ള പ്രദേശത്തായതിനാൽ പ്രദേശവാസികളുടെ ആവശ്യപ്രകാരമാണ് കുടിവെള്ള പരിശോധനാലാബ് ആരംഭിക്കുന്നത്.

തുടർന്നാണ് കൂടുതൽ വിപുലമായുള്ള ഗവേഷണം ആരംഭിക്കുന്നത്. രോഗികൾക്കും ശരീരത്തിൽ പോഷകക്കുറവ് അനുഭവിക്കുന്നവർക്കും ഉപകാരപ്രദമാകുന്ന ഭക്ഷ്യോത്പന്നങ്ങൾ നിർമ്മിക്കുന്നതും. കൂടാതെ തേമ എന്ന ബ്രാൻഡ് പേരിൽ ഒമ്പതിലധികം സുഗന്ധ ഉത്പന്നങ്ങളും ഇവർ വിപണിയിലെത്തിക്കുന്നുണ്ട്. നല്ല ഉറക്കം കിട്ടാനായി ഏലത്തിന്റെയും ഗ്രാമ്പൂവിന്റെയും സുഗന്ധമുള്ള സ്പ്രേയാണ് ഈയടുത്തായി ഇവർ വിപണിയിലെത്തിച്ചത്.

'നാച്ച്' എന്ന പേരിലാണ് തലയിണ സ്പ്രേ വിപണിയിലെത്തിച്ചിരിക്കുന്നത്. കേന്ദ്ര സുഗന്ധവിള ഗവേഷണകേന്ദ്രത്തിന്റെ സഹായത്തോടെയാണ് ഇതുണ്ടാക്കിയത്. കുടിവെള്ളവും ഭക്ഷണപദാർഥങ്ങളും കുറഞ്ഞ നിരക്കിൽ ടെസ്റ്റ് ചെയ്തു നൽകാനുള്ള സൗകര്യങ്ങളും ഇവർ ചെയ്യുന്നുണ്ട്.

എൻ.എ.ബി.എൽ (നാഷണൽ അക്രഡിറ്റേഷൻ ബോർഡ് ഓഫ് ലാബ്) അംഗീകാരവും ലാബിനുണ്ട്. അതു കൊണ്ടുതന്നെ ചെറുക്കിട വ്യാപാരികൾക്കായി അവർ നിർമ്മിക്കുന്ന ഭക്ഷ്യവസ്തുക്കളുടെ പ്രിസർവേറ്റീവിന്റെ അളവ്, നിർമാണത്തിയതി, കാലാവധി, നിർമാണത്തിനുപയോഗിച്ചിരിക്കുന്ന വസ്തുക്കൾ എന്നിവയും ലാബിൽനിന്ന് പരിശോധിച്ചു കൊടുക്കും. ബിരുദാനന്തര ബിരുദ വിദ്യാർഥികൾക്ക് ഗവേഷണത്തിനും ഷീബ ലാബിൽ സൗകര്യമൊരുക്കുന്നുണ്ട്.

മാതൃഭൂമി-20-Sep-2019

മഞ്ഞൾ ഗ്രാമമാവാൻ വെള്ളാറ്റുഞ്ഞൂർ

മനോരമ ലേഖകൻ
SEPTEMBER 25, 2019 02:41 PM IST



വെള്ളാറ്റുഞ്ഞൂർ ഗ്രാമത്തിൽ കർഷക കുട്ടായ്മ ആരംഭിച്ച മഞ്ഞൾ കൃഷി



വേലൂർ • മഞ്ഞൾ കൃഷിയിൽ വിപ്ലവം സൃഷ്ടിക്കുകയാണു വേലൂർ പഞ്ചായത്തിലെ വെള്ളാറ്റുഞ്ഞൂർ. വെള്ളാറ്റുഞ്ഞൂർ സഹകരണ ബാങ്കിന്റെ നേതൃത്വത്തിൽ 400 കർഷകർ കുട്ടായ്മയൊരുക്കിയാണു മഞ്ഞൾകൃഷി ചെയ്യുന്നത്. ഒരു കാലത്ത് വൻതോതിൽ മഞ്ഞൾ കൃഷി ഇവിടെയുണ്ടായിരുന്നതാണ്. ആ പ്രതാപം തിരികെകൊണ്ടുവരാനാണു ശ്രമമെന്ന് ബാങ്ക് പ്രസിഡന്റ് എ.എൻ. സോമനാഥൻ പറഞ്ഞു.

പ്രതിദിനം എന്ന ഇനം ഹൈബ്രിഡ് വിത്ത് 4000 കിലോഗ്രാം കർഷകർക്കു സബ്സിഡി നിരക്കിൽ നൽകി. ബാങ്കിനു സഹായത്തോടു 60 സെന്റ് സ്ഥലത്തും കർഷകരുടെ തെങ്ങിൻ തോട്ടത്തിലും വാഴത്തോട്ടത്തിലും വീട്ടുപറമ്പുകളിലും ഇട വിളയായാണു നട്ടിരിക്കുന്നത്. കർഷകർക്ക് ലൈവ രീതിയിൽ മഞ്ഞൾ കൃഷി ചെയ്യുന്നതിന് പരിശീലനം നൽകിയിരുന്നു.

വിളവെടുക്കുന്ന മഞ്ഞൾ മുഴുവൻ ബാങ്ക് തന്നെ ന്യായ വിലയ്ക്കു സൂക്ഷിക്കും. ഗ്രാമ ചന്ത എന്ന പേരിൽ പ്രാദേശിക കർഷകരുടെ ഉൽപ്പന്നങ്ങൾ എല്ലാ ശനിയാഴ്ചകളിലും ശേഖരിച്ച് വിൽക്കുന്ന ബാങ്കിന്റെ പദ്ധതി വിജയമാണ്.

അധിക മഴ: ഉൽപാദനം കുറഞ്ഞ് കാർഷിക വിളകൾ

മലയാള മനോരമ ചുറ്റുവടം-14-Sep-2019

അധിക മഴ: ഉൽപാദനം കുറഞ്ഞ് കാർഷിക വിളകൾ

മനോരമ ലേഖകൻ
SEPTEMBER 15, 2019 07:42 AM IST

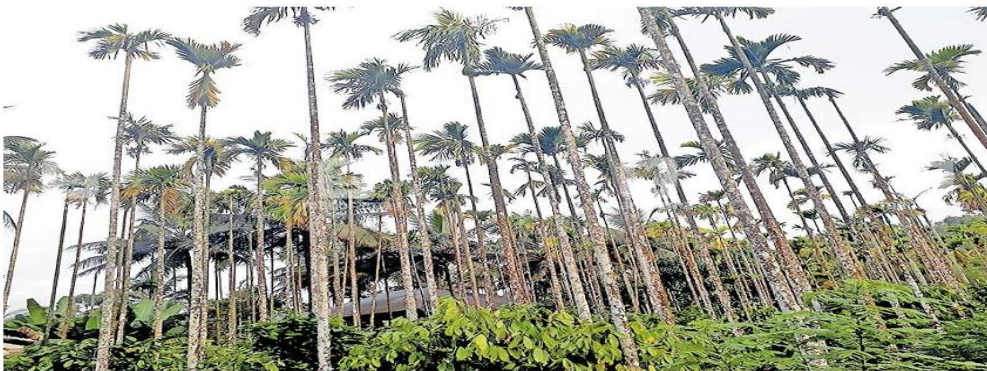


കാപ്പിക്കുരുവിന് അഴുകൽ രോഗബാധയുള്ള കാപ്പിക്കുപ്പടി.



കൽപ്പറ്റ • കാലവർഷത്തിലെ അധിക മഴ കാർഷിക വിളകളുടെ ഉൽപാദനത്തെ തളർത്തുന്നു. പ്രധാനമായും കാപ്പി, അടയ്ക്ക, കുരുമുളക് എന്നിവയ്ക്കാണ് തിരിച്ചടിയേറ്റത്. ഓഗസ്റ്റ്, സെപ്റ്റംബർ മാസത്തെ മഴയാണ് ഇക്കൂറി ബാധിച്ചത്. വിളവെടുപ്പിന് മാസങ്ങൾ മാത്രമുള്ളപ്പോഴാണ് കാപ്പിതോട്ടങ്ങളിൽ അഴുകൽ രോഗം ബാധിച്ചുള്ള കൊഴിച്ചിൽ. 2 മാസം കൂടി കഴിഞ്ഞാൽ ജില്ലയിൽ കാപ്പി വിളവെടുപ്പിന് പാകമാവും. കാപ്പിക്കായകൾക്ക് ചീയൽ, ഞെട്ട് ചീയൽ തുടങ്ങിയ രോഗങ്ങളാണ് കൂടുതൽ. തുടർച്ചയായുള്ള മഴ കാരണം മണ്ണിലെയും അന്തരീക്ഷത്തിലെയും ഈർപ്പം കൂടുന്നതും ചെടികളിലെയും കാപ്പിക്കുരുവിലെ ജലാംശവും ആണ് രോഗബാധ കൂടാൻ കാരണം. കഴിഞ്ഞ വർഷവും തുടർച്ചയായി ഒന്നര മാസത്തോളം നീണ്ട മഴയും മണ്ണിടിച്ചിലിലും വെള്ളം കയറിയും ഉൽപാദനത്തിൽ 30% കുറവുണ്ടായിരുന്നു.

ഇത്തവണ കാപ്പി പുത്തതിന് ശേഷം വേനൽ മഴയ്ക്കൊപ്പമുണ്ടായ ആലിപ്പുഴം വിഴ്ചയിൽ തന്നെ കുറേയൊര നശിച്ചിരുന്നു. ഉൽപാദനത്തിൽ തന്നെ കഴിഞ്ഞ വർഷത്തേതിൽ നിന്ന് കുറവുണ്ടാകുമെന്ന നിഗമനത്തിൽ രോഗബാധ കൂടി ആകുമ്പോൾ ഉൽപാദനത്തിൽ വലിയ വ്യത്യാസമുണ്ടാകും. പല സ്ഥലത്തും വെള്ളം കയറിയും ഇത്തവണയും കൃഷി നശിച്ചിട്ടുണ്ട്. കാലവർഷക്കെടുതിയിൽ മാത്രം കാപ്പി കൃഷി നശിച്ചതിന് 62 കോടി രൂപയുടെ നഷ്ടം കൃഷി വകുപ്പ് കണക്കാക്കിയിട്ടുണ്ട്. അതിന് ശേഷമാണ് രോഗബാധ കാരണമുണ്ടാകുന്ന നഷ്ടം. അടയ്ക്കയുടെ അവസ്ഥയിൽ വ്യത്യസ്തമല്ല. കഴിഞ്ഞ വർഷം അടയ്ക്ക വിളവെടുക്കാൻ കഴിയാത്ത വിധം നശിച്ച തോട്ടങ്ങളായിരുന്നു അധികവും.



അടയ്ക്ക കൊഴിഞ്ഞ കുമ്പക് തോട്ടം.

ഇത്തവണയും മഴയ്ക്ക് ശേഷം വലിയ രീതിയിലുള്ള കൊഴിച്ചിലാണ് കുമ്പക് തോട്ടങ്ങളിൽ. കുമ്പക് കൃഷിക്കും കാലവർഷത്തിൽ 36 കോടി രൂപയുടെ നഷ്ടമുണ്ടായെന്നാണ് കണക്ക്. മഞ്ഞളിപ്പാണ് കുരുമുളകിനെ ബാധിക്കുന്നത്. വേരുകൾക്ക് ചീയൽ ബാധിച്ച് ഇലയും തണ്ടും വളളികളും പഴുത്ത് വാടുകയാണ്. നട്ട അധിക വർഷമാവാത്ത ചെടികളും വർഷങ്ങളായി വിളവെടുപ്പ് നടത്തുന്ന വളളികൾക്കും രോഗം ബാധിച്ചിട്ടുണ്ട്. കാലവർഷക്കെടുതിയിൽ കുരുമുളക് കൃഷി നശിച്ച കണക്കിൽ 7.5 കോടി രൂപയുടെ നഷ്ടമുണ്ടായിട്ടുണ്ട്. ഇതിന് പുറമെയാണ് തോട്ടങ്ങളിലെ കുരുമുളക് കൃഷിക്കുണ്ടാകുന്ന രോഗബാധ. തുടർച്ചയായ 2 വർഷവും കാലവർഷം കാരണം വിളകൾക്കുണ്ടാകുന്ന നഷ്ടം ഉൽപാദനത്തെ മാത്രമല്ല ജില്ലയുടെ സാമ്പത്തികാവസ്ഥയെയും ബാധിക്കുന്നതാണ്.

കൃഷിഭവനുകൾ സ്മാർട്ട് ഓഫീസുകളാക്കും : കൃഷിമന്ത്രി

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സംസ്ഥാനത്തെ മുഴുവൻ കൃഷിഭവനുകളും അടുത്ത വർഷം അവസാനത്തിനകം സ്മാർട്ട് ഓഫീസുകളാക്കി മാറ്റുമെന്നു മന്ത്രി വി.എസ്. സുനിൽകുമാർ. കൃഷിവകുപ്പ് പൂർണ്ണമായി മാർച്ച് 2020-നകം ഇ-ഓഫീസ് സംവായനത്തിലേക്ക് മാറുകയാണ്. അതുപോലെ അടുത്ത ഡിസംബറിന് മുമ്പായി തീർപ്പാക്കാതെ കിടക്കുന്ന മുഴുവൻ ഫയലുകളും ഒത്തുതീർപ്പാക്കുകയും ചെയ്യുമെന്ന് മന്ത്രി വ്യക്തമാക്കി. കൃഷി വകുപ്പിലെ തിരുവനന്തപുരം നിശാഗന്ധി ഓഡിറ്റോറിയത്തിൽ സംഘടിപ്പിച്ച ഏകദിന ശില്പശാല മിഷൻ 2020 ഉദ്ഘാടനം ചെയ്യുകയായിരുന്നു അദ്ദേഹം.

കർഷകരുടെ സേവനമാണ് മന്ത്രി ഉൾപ്പെടെ വകുപ്പിലുള്ള സകല ജീവനക്കാരുടെയും പ്രഥമ കർത്തവ്യം. കർഷകരാണ് നമ്മുടെ യജമാനൻമാർ. അവരുടെ ഉന്നമനം മാത്രമായിരിക്കണം ലക്ഷ്യം. അഴിമതിക്കാരെ വകുപ്പിൽ വച്ചുപൊറ്റിക്കുകയല്ല. പൊതുവെ അഴിമതി കുറഞ്ഞ വകുപ്പാണ് കൃഷിവകുപ്പ്. എന്നാൽ അങ്ങും ഇങ്ങും മാറിതിരിഞ്ഞ് പ്രത്യക്ഷപ്പെടുന്ന അഴിമതിക്കാരണുതാനും. ഇത്തരക്കാരെ വകുപ്പിന് ആവശ്യമില്ല. പ്രളയശേഷം ദ്രുതഗതിയിലുള്ള അതിജീവന നടപടികൾ കൈക്കൊള്ളുവാൻ ജീവനക്കാരുടെ ആത്മാർത്ഥമായ സഹകരണം കൊണ്ട് വകുപ്പിന് സാധിച്ചിട്ടുണ്ട്. പ്രളയ നാശനഷ്ടങ്ങളുടെ കണക്ക് അതാതുദിവസം തന്നെ റിപ്പോർട്ട് ചെയ്ത് ശേഖരിക്കുവാൻ കഴിഞ്ഞിട്ടുണ്ട്. അതിശയകരമായ തിരിച്ചുവരവ് കാർഷികമേഖലയിൽ കൈവരിക്കുവാൻ കഴിയുമെന്നാണ് വിശ്വാസം. പ്രതികൂല സാഹചര്യത്തിലും സംസ്ഥാനത്തിന്റെ കാർഷിക വളർച്ച 3.64 നിരക്കിലെത്തുവാൻ സാധിച്ചത് അഭിമാനാർഹമായ നേട്ടം തന്നെയാണെന്നും മന്ത്രി പറഞ്ഞു.

ജീവനക്കാർക്ക് വിവിധ വിഷയങ്ങളെ ആസ്പദമാക്കിയുള്ള ചർച്ചക്ലാസുകളും നടന്നു. കൃഷിവകുപ്പ് ഡയറക്ടർ ഡോ. രത്തൻ യു .വേൽകർ സ്വാഗതം പറഞ്ഞു. കാർഷികോത്പാദന കമ്മീഷണർ ഡോ. ദേവേന്ദ്രകുമാർ സിംഗ് അദ്ധ്യക്ഷത വഹിച്ചു. കൃഷിവകുപ്പ് - അനുബന്ധ പൊതുമേഖലാ സ്ഥാപനങ്ങളിലെ ഉദ്യോഗസ്ഥർ എന്നിവരും ചടങ്ങിൽ സംബന്ധിച്ചു.