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A monthly bulletin of agricultural news

AGRI Titbits

Spices
Research news
Biodiversity
Climate change
Organic farming
ICAR in print
IISR in print
General
Malayalam news

Agri Titbits is an effort to collect and preserve agricultural news, especially spices, appearing in news papers and online media. Published by Director, ICAR-IISR, Kozhikode; Compiled & prepared by Jayarajan K, ICAR-Indian Institute of Spices Research

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TURMERIC, CINNAMON, BLACK PEPPER OR CORIANDER: WHICH IS THE BEST SPICE FOR YOUR HEALTH?

March 14, 2024 <https://indianexpress.com/>



In the culinary world, spices are not just aromatic additives but also powerful agents with a plethora of health benefits. From enhancing flavours to promoting overall well-being, spices have been integral to traditional

cuisines worldwide. However, like any ingredient, they come with both advantages and drawbacks, making it crucial to understand their role in our diets. Recently, nutritionist Apurwa Agarwal listed down some of the most potent spices in an Instagram post.

Turmeric aka haldi

Dr Priyanka Rohatgi, chief nutritionist at Apollo Hospitals, told indianexpress.com that turmeric contains the powerful antioxidant curcumin, which provides anti-inflammatory and antimicrobial properties. “Research shows turmeric can help treat arthritis, digestive issues, and cardiovascular disease. The vibrant yellow pigment may also protect brain function,” she added.

Additionally, Dr Sangeeta Tiwari, clinical Nutritionist, Artemis Lite, NFC, Delhi, said that some studies also suggest that turmeric may have anticancer properties, potentially hampering the growth of cancer cells and even enhancing the effectiveness of chemotherapy.

However, she pointed out that turmeric at high doses or over long periods could potentially worsen existing kidney or gallbladder problems in some individuals.

Additionally, those with blood clotting conditions require medical guidance before consuming curcumin.

Black pepper aka kaali mirch

Dr Rohatgi explained that black pepper — the ‘King of Spices’ — not only has antioxidant and antibacterial properties but also aids nutrient absorption and enhances curcumin bioavailability. Adding to this, it helps the secretion of digestive enzymes.

Despite these benefits, Dr Tiwari said that its excess consumption may lead to gastrointestinal discomfort in some people, like heartburn or irritation. Furthermore, people with certain gastrointestinal conditions like gastroesophageal reflux disease (GERD) may need to limit their intake to avoid exacerbating symptoms.

Cinnamon aka dalchini

Since potent antioxidant, anti-inflammatory, and antimicrobial properties are present in cinnamon, Dr Rohatgi said that it lowers heart disease risk factors such as high blood pressure, glucose, and LDL cholesterol.

However, Dr Tiwari said that consuming large amounts of cinnamon, especially the Cassia variety, which contains high levels of coumarin, may pose risks, including liver damage. Therefore, she suggests consuming cinnamon in moderate amounts and choose Ceylon cinnamon whenever possible, as it has lower coumarin content.

Coriander aka dhaniya

Coriander leaves and seeds alleviate digestive discomfort, improve cholesterol levels, and enhance immunity partly through rich antioxidant content, said Dr Rohatgi.

However, she explained that topical or respiratory allergic reactions can occur. It may also mildly reduce blood sugar, so dosage may need adjustment if an individual is taking diabetes medication.

Which one is the best for your health?



According to Dr Rohatgi, turmeric is arguably one of the most powerful medicinal spices due to the incredible antioxidant and anti-inflammatory activity of its curcumin compounds. “As long as kidney or gallbladder problems are absent, turmeric is extremely safe and beneficial for most people.”

Cinnamon also flaunts robust qualities, said Dr Rohatgi, explaining that it lowers blood sugar, improves cholesterol markers, enhances immunity, and reduces chronic inflammation associated with nearly every disease. “With mindful cassia cinnamon intake, hepatotoxic risks are largely minimal,” she added.

Beyond the individual spices, experts recommend synergistic approaches. “Pairing black pepper’s bioenhancer properties with anti-inflammatory, immune-boosting turmeric, and diabetes-fighting cinnamon offers advantages of all three spices in one powerful punch. Coriander also harmonises well for additional digestive and antioxidant support,” Dr Rohatgi said. She recommends focusing on variety and moderation to safely extract optimal wellness from spices. “Leveraging spices’ innate healing gifts through inclusive, evidence-based combinations may elicit the greatest health protections and benefits over any single spice alone.”

CAN HERBS AND SPICES INFLUENCE THE HEALTH OF THE GUT MICROBIOME?

March 18, 2024 <https://www.medicalnewstoday.com/>

Scientists researched whether polyphenols found in foods, herbs, and spices in one’s regular diet can affect gut health.

Polyphenols are compounds found in some plant-based foods that can work as antioxidants in the body and provide protection against some diseases.

Their findings showed that the polyphenols from herbs and spices may be responsible for an increase in beneficial gut microbes.

Researchers based at the National University of Natural Medicine in Portland, Oregon recently conducted a study on whether polyphenols found in foods, herbs, and spices used in a healthy person's typical diet could have a positive impact on gut health.

They utilized data from the International Cohort on Lifestyle Determinants of Health (INCLD HealthTrusted Source) to conduct their analysis.

The researchers learned that certain beneficial microbes such as Lactobacillus showed an increase if participants consumed more polyphenols, and some harmful bacteria were less present in participants with a higher polyphenol intake.

Polyphenols and gut bacteria

As researchers look more into how the gut impacts overall health, studies Trusted Source show that having a healthy gut microbiome is important due to its role in digestion, immune function, skin health, and much more.

According to the National Institutes of Health Trusted Source, the "microbiome is the collection of all microbes, such as bacteria, fungi, viruses, and their genes, that naturally live on our bodies and inside us."

Trillions Trusted Source of organisms live in the gut, and some things that influence the makeup of one's gut include the environment they live in, the foods they consume, and the medications they take.

There are both good and bad types of bacteria that live in the gut. Good gut bacteria promote a healthy gut microbiome, and people can improve their good bacteria by eating fermented foods or taking probiotics.

Bad bacteria can occur in the gut, too, including bacteria such as Salmonella, which can make someone sick.

With this in mind, the authors were curious about other ways to boost gut health and took a closer look at polyphenols.

Food sources of polyphenols

Polyphenols Trusted Source occur in many plant-based foods such as tea, fruit, vegetables, and chocolate and are connected to reduced risk of diseases such as stroke and diabetes.

The authors note that prior studies show polyphenols can be beneficial in helping create a healthy gut but say other studies have not researched whether people can get such benefits from their standard diets.

Using data from the INCLD Health study, the researchers selected a participant pool of 96 healthy adults. To qualify for inclusion, participants needed questionnaires on their eating habits and an rRNA microbiota analysis on file.

The researchers excluded people for some of the following reasons: current use of antibiotics, inflammatory bowel disease, celiac disease, or history of an autoimmune disease.

The majority of the participants were white (around 78%) and female (84.4%). Additionally, 88.5% of participants were non-smokers, and 60% reported minimal alcohol use (from 0 to 3 times per month).

The researchers measured 29 herbs and spices higher in polyphenols but noted that the participants only consistently consumed six. The herbs and spices they focused on were: black pepper, onion, garlic, cinnamon, ginger, turmeric.

Only one of the spices – cinnamon – fell into the category of the highest polyphenol count at equal to or greater than 3,000 mg/kg DW. The most frequently used spice was black pepper, which had a midlevel category polyphenol count of 1,000-1,999 mg/kg DW.

Participants reported higher intakes of garlic and onion, but both were categorized in the lower level of polyphenol counts, less than 1000 mg/kg DW. The scientists next placed the participants into groups based on their estimated polyphenol exposure through the foods they reported consuming. The groups include low-consumer, medium-consumer, and high-consumer.

More good gut bacteria with higher polyphenol intake

The researchers then analyzed the 16s rRNA microbiota gene sequencing data extracted from microbial DNA from participant stool samples.

According to the researchers, they “first explored potential microbial biomarkers of polyphenol exposure and then used these identified biomarkers in more targeted statistical comparisons.”

After identifying microbial taxa connected to polyphenols, the researchers examined the microbial communities of each polyphenol exposure group to see what connections they could make.

The analysis showed that microbial diversity was consistent amongst all groups regardless of whether the participants were in low or high-consumption groups. However, the researchers did note some differences with specific microbial taxa. With the bacterium *Lactobacillus*, they saw a connection between the groups with higher polyphenol intake and an abundance of these good bacteria. *Lactobacillus* helps prevent intestinal damage.

The scientists also noted a reduction in harmful bacteria in the high-consumption group and noted “opportunistic and pro-inflammatory bacteria are represented in a lower relative abundance.”

“Our results suggest that higher quantities of habitual polyphenol consumption may support an intestinal environment where opportunistic and pathogenic bacteria are represented in a lower relative abundance compared to those with less potentially virulent qualities,” write the authors.

While the scientists need to further research polyphenols consumed in a typical diet, the study findings show that it is possible certain spices and herbs can positively influence the gut microbiome, which can lead to improved health.

CINNAMON HOLDS POTENTIAL AS REMUNERATIVE INTERCROP, SAY EXPERTS

March 04, 2024 <https://www.thehindu.com/>



India imports 30,000 tonnes of cassia and 1,200 tonnes of true cinnamon (*Cinnamomum verum*), a medicinally important tree species of subtropic regions, annually costing a foreign exchange of 850-

1,000 crore rupees. With a view to tap the potential of true cinnamon cultivation as an intercrop in coffee plantations of lower Palani hills and coconut gardens on the foothills of western ghats, a one-day conference was organised at Horticultural Research Station, Thadiyankudisai on the Kodaiknal hill range, in Dindigul district under the Mission for Integrated Development of Horticulture (MIDH) scheme on February 29.

J.Rajangam, Dean, Horticultural College and Research Institute, Periyakulam, who inaugurated the conference, said India produced only 57 tonnes of cinnamon against 3.7 lakh tonnes of global production. Cinnamon can be raised as one of the remunerative companion crops of coffee to yield additional income for farmers. Advanced cultivars suitable for coconut and coffee growing tracts. He also pointed that, timely

adoption of improved techniques for bumper cropping and scope for export.

nder way at Horticultural Research Station, Thadiyankudisai, on the Kodaikanal hills. | Photo Credit: HANDOUT

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Adoption of improved techniques for bumper cropping and scope for export.

S.Senthil Kumaran, Assistant Director, Spices Board, Bodinayakkanur, said that though India exported cinnamon valued at Rs. 67.40 crore during 2022-23, the imports were valued at Rs.72.16 crore. He highlighted the scope of cinnamon cultivation and export promotional activities offered by the Spices Board of India.

M. Jayakumar, Deputy Director of Regional Coffee Research Station, Thandikudi, spoke on the importance of cinnamon in profitable coffee farming under multi-tier cropping system.

SPICING UP DIABETES MANAGEMENT: MEDITERRANEAN DIET'S AROMATIC HERBS LOWER BLOOD SUGAR

Mar 10 2024 <https://www.news-medical.net/>



In a recent study published in the journal *Nutrients*, researchers from Spain investigated the influence of aromatic herbs and spices in the Mediterranean diet (MedDiet) on the glycemic profiles of patients with type 2 diabetes mellitus (T2DM). They found that black cumin, cinnamon, ginger, curcumin, and saffron significantly lowered fasting blood glucose levels. Further, they found that black cumin and ginger significantly improved glycated hemoglobin (HbA1c) levels in T2DM patients, while cinnamon and ginger significantly lowered insulin concentration.

Background

T2DM is a critical healthcare concern, affecting 460 million people globally. Its prevalence has surged in the past four decades, contributing to three or more comorbidities in 60% of patients ten years after diagnosis and causing 6.7 million annual deaths. Various risk factors, including genetics, metabolism, and the environment, influence the disease. While non-modifiable factors like ethnicity and family history play a role, addressing the modifiable risk factors such as lack of physical activity, obesity, and an unhealthy diet can potentially prevent T2DM. Dietary guidance is essential for improving patients' lifespan and quality of life. MedDiet emphasizes high consumption of extra-virgin olive oil, low-glycemic-index carbohydrates, and moderate fish, poultry, and dairy intake. Additionally, it limits the intake of red meat and alcohol. Evidence suggests that MedDiet can

positively impact metabolic syndrome and T2DM, as demonstrated by lowered diabetes risk and improved glycemic profiles. The diet incorporates various aromatic herbs and spices, such as black cumin, clove, parsley, saffron, thyme, ginger, black pepper, rosemary, turmeric, basil, oregano, and cinnamon, known for potential health benefits, including antitumor, antioxidative, anti-inflammatory, and cholesterol-lowering properties. Therefore, researchers in the present study aimed to examine the effect of all these aromatic spices and herbs on the glycemic profiles of T2DM subjects.

About the study

For the present systematic review and meta-analysis, databases including Web of Science, PubMed, and Scopus to identify peer-reviewed articles and interventional studies. Case studies, commentaries, letters, conference papers, narrative reviews, and studies not conducted in humans or those involving children were excluded. The systematic review included 77 studies, while the meta-analysis included 45 studies (3050 participants).

The studies involved varying dosages of the spices and herbs and assessed their effect on glycemic profiles. The primary outcomes included fasting glucose, insulin, and HbA1c alterations, while secondary outcomes included variations in body weight and body mass index (BMI). Statistical analysis involved the determination of changes in means and standard deviation and the use of Cochrane Q and Higgins I² tests. The risk of publication bias was assessed using Egger plots. The quality of the included trials was assessed using the methodology described by Kmet et al.

Results and discussion

Cinnamon supplementation significantly reduced fasting glucose in six out of eleven studies. The meta-analysis indicated a reduction of 18.67 mg/dL compared to placebo, but the difference was not statistically significant in considering predictive value. Curcumin supplementation in seven studies showed a significant reduction in fasting glucose ($p < 0.001$) compared to placebo, with a significant difference including predictive value. Ginger

supplementation in ten studies demonstrated a reduction in fasting glucose (17.12 mg/dL, $p = 0.0004$) compared to placebo, with no significant difference, including predictive value. Black cumin supplementation in eight studies resulted in a significant reduction in fasting glucose ($p = 0.0001$) compared to placebo, with no significant difference in considering predictive value. Using saffron supplementation resulted in substantially lowering glucose, an effect more pronounced when combined with physical activity. Overall, black cumin demonstrated the most substantial reduction in fasting glucose, followed by cinnamon and ginger.

Further, only ginger and black cumin exhibited a significant improvement in HbA1c, and cinnamon and ginger significantly decreased insulin levels. Among the analyzed aromatic herbs and spices in the MedDiet, ginger stood out as the sole contributor to significant decreases in all three examined outcomes: HbA1c, fasting glucose, and insulin level.

The quality of studies selected for the review (mean score 0.54) was lower than the quality of studies selected for the meta-analysis (mean score 0.68). Despite the large scale of the study, the findings are limited by the lack of consideration of body weight and lifestyle changes affecting fasting glucose levels, alongside challenges posed by varying study quality, inadequate statistical analyses, and the absence of standardized herb dosage information.

Conclusion

In conclusion, the present study could identify the potential therapeutic benefits of various aromatic herbs and spices in MedDiet for diabetes management. Further research is needed to determine optimal dosages and assess the impact of active components of the herbs and spices, facilitating their application in targeted interventions for glycemic control in T2DM patients.

RESEARCH PAPER WARNS AGAINST NATIONWIDE SWITCH TO NATURAL FARMING WITHOUT PROPER STUDIES

March 03, 2024 <https://www.thehindu.com/>

An academic paper published by the National Bank for Agriculture and Rural Development (NABARD) and the Indian Council for Research on International Economic Relations (ICRIER) has cautioned the Centre against “a complete switch” to natural farming, on the ground that it can hamper national food production.



The paper is titled ‘Zero Budget Natural Farming (ZBNF): Implications for Sustainability, Profitability, and Food Security’.

The paper found “sheer disparity” in the two studies on ZBNF conducted by the Centre for Economic and Social Studies (CESS) and the Institute for Development Studies Andhra Pradesh (IDSAP), as well as by the Indian Council of Agricultural Research (ICAR) and the Indian Institute of Farming Systems Research (IIFSR). It has hence recommended long-term experimentation before declaring ZBNF a nationwide agriculture practice.

Niche markets

The paper said that while organic farming and related practices like natural farming are successful in niche markets where a premium price can compensate for the returns from lower yields, a complete switch to organic mode can hamper national food production. “Resilient supply chain networks for the farm inputs required in natural farming are a prerequisite to transitioning towards natural farming,” said the paper, authored by Sandip Das, Mahima Khurana and Ashok Gulati.

Prime Minister Narendra Modi, Finance Minister Nirmala Sitharaman and several other Ministers had spoken in favour of ZBNF, which is done using cow dung, cow urine and leaves.

The paper noted that in Andhra Pradesh, the study by the CESS and the IDSAP on six main crops of the State (paddy, groundnut, cotton, Bengal gram, black gram, and maize) suggested low expenditure on biological inputs and lower paid-out costs for the ZBNF farmers in comparison with non-ZBNF farmers. “The expenditure on inputs for ZBNF practitioners was 3.54% to 74.63% lower than the non-ZBNF practitioners, and the paid-out costs were 9.08% to 35.97% lower than non-ZBNF, for a majority of ZBNF crops, indicating higher savings in the ZBNF method. “Interestingly, the yield was also higher in most ZBNF crops than the non-ZBNF crops, ranging between 0.94% and 23.4%,” the paper

The findings of ICAR-IIFSR, on the other hand, were in complete contrast with the CESS-IDSAP results. ICAR-IIFSR tested ZBNF over basmati rice-wheat cropping system at Pantnagar (Uttarakhand), Ludhiana (Punjab), Kurukshetra (Haryana), and Modipuram (Uttar Pradesh) for three years. “The study revealed that despite the low input cost, returns for ZBNF farmers could not improve due to low yields under the ZBNF system. The rice had 22.6% and wheat had 18.2% lower cost of cultivation in ZBNF than integrated crop management (ICM); the returns fetched were also 58% lower in ZBNF,” the paper said. “The yield outcomes for basmati were 37% and for wheat were 53.9% lower than ICM after the second year. The study also predicted a 32% decline in basmati rice yields and a 59% decline in wheat yields from the current levels if ZBNF is adopted on a large scale.

Lesson from Sri Lanka

The paper said since scientists are apprehensive of the impact ZBNF concoctions can pose on the environment and output sustainability, long-term research and third-party surveillance are needed on the methodology adopted in Andhra Pradesh before amplifying that experiment across all the States. “Moreover, the

Sri Lankan crisis [food shortage] acts as a lesson for the entire world to take preparatory actions like educating the farmers and consumers about the likely impact of the switch: creating adequate infrastructure such as availability of inputs for the new farming method and maintenance of supply chains before banning the utilisation of inorganic fertilizers; and spreading awareness among the populace about the potential benefits,” it added.

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STUDY INDICATES TURMERIC'S POTENTIAL IN IMPROVING GUT MICROBIOTA

March 13, 2024

<https://www.theweek.in/>



Researchers at the University of Western So Paulo (UNOESTE) and So Paulo State University have discovered a potential link between curcumin, the main ingredient in turmeric, and the enhancement of beneficial bacteria in the guts of mice.

The study, published in the International Journal of Pharmaceutics, revealed that a solution containing curcumin, in the form of a nanoemulsion, was associated with a 25% increase in the abundance of Lactobacillus bacteria in the treated mice compared to the control group. Lactobacillus bacteria are commonly found in probiotic-rich foods like yogurt and are known for their positive impact on gut health.

Lead researcher, Lizziane Kretli Winkelstrter Eller, a professor at UNOESTE, explained the significance of their findings, stating, "The nanoemulsion changed the gut microbiota of mice by enhancing the presence of beneficial bacteria, effectively improving the bioavailability of curcumin."

The research team's development of a nanoemulsion aimed to address the low bioavailability of curcumin, particularly in patients with inflammatory conditions such as Crohn's disease and ulcerative colitis. By administering the curcumin nanoemulsion orally for 14 days to mice with induced intestinal inflammation, the researchers observed promising results in terms of improved gut microbiota and enhanced bioavailability of curcumin.

While the nanoemulsion did not lead to a significant improvement in intestinal inflammation, the relative abundance of Lactobacillus bacteria was notably higher in the mice treated with curcumin nanoemulsion compared to the control group.

The study authors emphasized the importance of developing innovative formulations to maximize the efficacy of curcumin in preventing and treating inflammatory bowel disease, positioning it as a promising alternative to existing treatments that are both costly and associated with significant side effects.

This study sheds light on the potential of curcumin in fostering gut health and offers hope for the development of improved treatments for inflammatory intestinal disorders.

PLANT ROOT SENSORS AND FLU RESEARCH: NEWS FROM IMPERIAL

01 March 2024 <https://www.imperial.ac.uk/>



From a new tool to monitor the chemistry of plant roots' environments, to research that might explain why we lose weight when we are sick, here is some quick-read news from across Imperial.

Plant sensors

Imperial researchers have developed a new low-cost sensor platform, named TETRIS, that measures the chemistry of plant roots' environments in real time.

Measuring the soil around plant roots is important for predicting and maintaining plant health, which is crucial for food security. However traditional ways to measure plants' environments fail to capture ever-changing parameters like continuous temperature, salinity and pH.

This new system uses electrochemical sensors to collect environmental data and a machine learning model uses the data to predict nutrient uptake rates. The researchers say that with further testing, the platform could help to ensure food security through the development of robust plants in the face of challenges brought by the climate crisis and overfarming.

They tested the platform by measuring pH changes, ion uptake and H₂O₂ (hydrogen peroxide) in kale, tomato, and rice seedlings, and used it to detect differences between nutrient and heavy metal ion uptake. The researchers say the platform is an important step in developing sensors for whole plants, as not many sensors for roots or seedlings exist presently.

They then demonstrated that the data collected using TETRIS can help to build machine learning models that predict the rates of uptake of salts.

The researchers intend the platform to be used to guide the development of new stress-resistant crops that can better withstand pathogens and fluctuating conditions such as temperature, salinity, and pH.

First author Philip Coatsworth, PhD candidate at Imperial's Department of Bioengineering, said: "Our sensing platform is a key step towards the full sensing of plants in real-time. Through expanding the range of sensors in the near future, we believe TETRIS could predict stress and disease response in plants, accelerating the development of new resistant plant varieties."

Senior author Dr Firat Güder from the Department of Bioengineering said: "Most biological plant experiments are performed in single, one-off

measurements. Time carries a lot of information which is lost in these single measurements. Continuous monitoring of the chemistry around the roots of plants with TETRIS will help us perform a range of new experiments that could not have been performed before. These new experiments will help us answer new biological questions related to plants. ”

BIODIVERSITY

NILGIRIS: WATER SHORTAGE AND CLIMATE CHANGE POSE THREATS TO BIODIVERSITY AND LIVELIHOODS

05/Mar/2024 <https://thewire.in/>

Vasanthan Panchavarnam came to Coonoor 30 years back on a transfer from Chennai as a physician. The hilly district stole his heart and he decided to make it his permanent home. When some friends who he hung out with became interested in exploratory walks, “We picked up the binoculars and started going around. The change we have observed is tremendous,” he told IndiaSpend.

Nilgiris is situated in the northwestern part of Tamil Nadu and the Western Ghats between 900-2,636 metres above mean sea level. More than half (56%) of its total area is under natural vegetation.

Thirty years back, when Panchavarnam relocated, it was a quiet town with a flourishing local ecology. The rolling grasslands, dense woods and cool climate captured the hearts of nature lovers. But once it started attracting tourists and businesses, leading to landscape alteration and subsequent warming, the town started to lose its biodiverse verdancy, native flora, and wildlife.

Temperatures rise, rainfall becomes erratic

Temperature fluctuations in the Nilgiris have been observed for the last two centuries and several references to it are found in books and hunters’ journals,

Panchavarnam tells us. The Neilgherries, a popular travelogue published in 1857 detailing the travels of medical superintendent Robert Baikie in the district, says that between 1831 and 1833, the mean temperature was 16.8 degree Centigrade (now Celsius). Between 1901-06, it was 13.8 degree Centigrade and in 2016, the mean was 24.1 degree Centigrade.

The British had begun exploiting the land over two centuries ago. “The three major towns in the geographical domain from Kodanaadu to Naduvattam namely Coonoor, Kotagiri and Ooty were exploited with buildings and plantations,” says Philip K. Mulley, a septuagenarian resident, pastor at the local church, and long-time chronicler of the Nilgiris.

Over the last five decades, the rainfall pattern has been changing in Nilgiris; there have been short, intense spells with drop in average rainfall in particular years, says S. Vishwanath, a water expert and educator based in Bengaluru. As per the department of Horticulture and Plantation in Nilgiris, the average rainfall for the district is 1,522.7 mm per annum.

“The aquifers are not recharged and so the springs do not flow,” Vishwanath told IndiaSpend. “If the springs do not flow, reservoirs do not fill up. Then, there is shortage of water both for nature and living beings. The springs affect the wetlands and bogs which in turn impacts the grasslands also. Moreover, with the recharge zones being altered, there is a chance of forest fires since the soil moisture is deficient. Temperature also increases because there is not enough humidity.”

In 1850, the British planted Tasmanian Blue Gum (*Eucalyptus globulus*) and Black Wattle (*Acacia Mearnsii*) for the purpose of getting firewood. The weed species *Lantana Camara* also came into the hills at the time, as part of ornamental plantation. These invasive species spread across the pristine habitat of the Nilgiris, altering its properties and making it vulnerable, says Panchavarnam.

“It started spoiling the grazing grounds and teak plantations in Teppakkadu. Sandalwood also encountered a rare disease because of *Lantana*. Wherever forest

cover is disturbed, there is Lantana in Nilgiris. From a diverse ecosystem, it has created an alternate one, with structural, nutritional and species simplification. The loss of diversity is further adding a block to mitigating the impact of climate change,” he explains.

Loss of native species

“Shola” is a name used across South India to refer to swathes of montane grasslands and shrublands – biomes, as per World Wildlife Fund classification. Shola habitats in the marshlands of Nilgiris comprise stunted evergreen trees and undulating meadows. These have moisture retention properties and act as carbon sinks. When it rains, the Shola grasslands absorb the water, preventing surface run-off. With its deep roots that go seven feet under, it retains the water underground. The Shola ecosystem supports the growth of native species that are endemic to the region.

“These habitats are now filled with Eucalyptus, Acacia and tea, as also Lantana, none of which have soil-binding root systems,” says Panchavarnam. “The result is that the run-off is heavier, and the resulting soil erosion degrades the marshlands. With the dams taking over whatever is left of the marshlands, the drastic landscape alteration and the increase in temperature have led to the loss of certain native bird species. Thousands of migrant bird species have stopped coming to the region. Woodcock or game bird that are marshlands-dependent are rare now. Egyptian vultures are extinct from the upper reaches, as is the Malabar civet. Recently, some lost species are re-colonising because of forest loss,”

Woodcutters, foragers, animal-grazers, and hunters add to the damage. The population of the Nilgiris is more than 700,000 and the area is experiencing rapid commercialisation. “Most of the wetlands are replaced by buildings within the urban limits of Kotagiri and Coonoor,” Mulley laments.

Climate-change impact

“Climate-change impact is felt both in loss of livelihoods and man-animal conflict. Last year, both monsoons failed and the district received heavy rainfall

up to 50 cm overnight. This resulted in landslides; all the vegetables ready for harvest were washed away in the heavy downpour,” says Azad Kamil, founder, Ongil Nature Trust, an NGO in Coonoor that works to spread awareness about nature conservation.

Except the native tribes viz. Kurumbars, Irulars, Todas, Paniyars and Kattunayakars, many locals have left their properties behind and migrated to the plains in search of reliable occupations. Meanwhile, in localities like Rambla that are dominant with tea estates, many gated communities have mushroomed. This area was habituated by species such as Sambar deer, rabbits, Leopard and leopard cats.

“Because of afforestation and encroachment, these do not have enough habitat to thrive. In fact, large carnivores are lesser in number now and so the population of herbivores such as bison and bears have become more and they are entering the towns and turning into a menace,” explains Panchavarnam.

“Usually cobras are not found in winters. But two Cobras were rescued last week in Kethi. Two years back, we rescued a 13-foot King Cobra in Kattery, located 3 km from Coonoor. Peacocks, abundant originally in Mudhumalai, are sighted in Coonoor. The most important is mosquitoes in the hills during winter,” adds Kamil.

Undoing the damage and restoring balance

The climate change being experienced in the Nilgiris is anthropogenic. Lantana, that is present everywhere except the upper reaches, cannot be removed totally, says Panchavarnam, because if even a small root is left, it grows and spreads rapidly. Also, because of the inedible nature of its leaves, herbivores cannot consume it. But the berries are edible and so the seeds get dispersed.

In order to conserve the remaining ecosystem and prevent soil erosion and water shortages, says Vishwanath, “A focus on spring protection and rejuvenation and identifying and conserving natural recharge zones is essential.”

In 2014, the Tamil Nadu Forest Department conducted a campaign to remove many exotic species in the Nilgiris biosphere reserve, such as *Acacia mearnsii*, and the native sholas planted in the region have started to reoccupy the canopy gaps, said Rekha R. Warriar, a scientist at the Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore. Being unique, the sholas require a long-term perspective and a socioecological landscape management process implemented in a participatory manner with Indigenous Peoples' communities interested in protecting their traditional values.

The findings of a case study that she conducted and reported as part of a working paper on forest and Landscape Restoration supported by the Food and Agriculture Organization of the United Nations in three selected shola pockets in Nilgiris suggest that these open patches should be fenced, and that native species should be reintroduced.

“Species able to establish in open landscapes, such as *Syzygium cumini*, can be beneficial in restoration initiatives. Of course, projected changes in rainfall patterns and temperature could endanger intolerant endemic species, due to their narrow genetic base and restoration of species with small population sizes is a challenge, and introduction from adjacent forest patches would be necessary to increase their genetic diversity,” she told IndiaSpend.

Public-led conservation efforts, in coordination with the district collector's office, are aimed at replanting Shola grass and remapping water resources to prevent further degradation.

The administrators need to bring strict rules and follow them diligently, feel residents. “The Nilgiris biosphere zone should be considered in isolation – the general conservation rules made for the state of Tamil Nadu can't be applicable here,” Mulley voices the collective view.

“Developing a carrying capacity and environmental management plan and most importantly, relooking at the Gadgil Committee report on the Western Ghats and implementing its recommendations,” concludes Vishwanath.

ACCOUNTING FOR THE DIVERSE VALUES OF NATURE TO INFORM BIODIVERSITY POLICIES

MARCH 05, 2024 <https://blogs.worldbank.org/>

Nature, which includes biodiversity and services provided by healthy ecosystems, is at the heart of critical development challenges like health, jobs, poverty, inequality, climate change, food security, and fragility. And yet nature is in decline, despite being the most precious asset that many countries have to tackle climate change, end poverty, and ensure sustainability. Nature loss impacts the poorest countries and communities the most.

These challenges cannot be effectively addressed unless we bring nature into the center of economic decision making. One effective approach is by assigning monetary values to nature's direct and indirect contributions to economies and human wellbeing through what's known as "natural capital accounting" to establish the economic case for protecting nature.

Understanding the Value of Nature

Natural capital accounting and policy analysis allows us to recognize and value the goods and services provided by nature. By accounting for the contribution of natural assets in monetary values, we can better understand their importance to people and economies. For example, the World Bank estimates that the collapse of select ecosystem services that nature provides for free – such as wild pollination, marine fisheries and timber from native forests – could lead to a global GDP decline of \$2.7 trillion annually by 2030. This decline will be felt in agriculture, fisheries, timber production, and climate impacts around the world. Proper valuation of the priced and non-priced benefits to humans from natural assets is key to ensure that economic policies and investment decisions will take the benefits from natural assets into account. Valuation and nature-aware policy analysis allows timely adjustments to protect and conserve nature that is essential for people and economies to thrive.

Guiding Policy Decisions

Ambitious programs and policies, such as subsidy reform, expansion of domestic and global forest-carbon payment schemes, and investment in agricultural research and development, are crucial for stopping and reversing nature loss. The landmark Global Biodiversity Framework agreed by countries around the world in 2022, sets targets for such programs, emphasizing the need for effective policies. Natural capital accounting, coupled with the UN System of Environmental Economic Accounts – Ecosystem Accounting (SEEA-EA) framework, provides essential data to assess policies and investments. Investments in ecosystem services should align with climate change mitigation and adaptation efforts, strengthening the case for action on both. When available, evidence on how nature is changing in a given location helps policymakers identify the right strategies.

Designing Effective Measures

Natural capital accounting offers critical data for devising investments, regulations, and monitoring systems that help address the drivers of nature loss – such as changes in land and sea use, overexploitation, climate change, pollution, and invasive species. Economic instruments, like repurposing subsidies and implementing payments for ecosystem services, can be more precisely targeted using detailed spatial information from natural capital accounts.

Mobilizing Finance for Nature

Implementing biodiversity programs requires substantial financial resources. The Global Biodiversity Framework estimates that \$200 billion needs to be raised by 2030 to finance goals “to halt and reverse biodiversity loss to put nature on a path to recovery for the benefit of people”. While most biodiversity finance comes from public sources, it is not enough to meet the growing needs. Sustainability-linked bonds and biodiversity credits offer opportunities for private sector involvement. However, the market for biodiversity credits and nature-linked carbon credits from REDD+ (Reducing Emissions from

Deforestation and Forest Degradation) is still relatively small. Developing high-integrity biodiversity credits and expanding the use of sustainability-linked bonds require both accurate data and evidence and the common metrics to measure changes on the extent and condition of affected ecosystems.

Natural capital accounting plays a vital role in mainstreaming nature into economic decision-making. It can serve as an input for nature- and climate-aware economic policy analysis for informing biodiversity policies and driving effective conservation measures. Placing real values on the diverse benefits of nature (including non-priced goods and services) to people and economies helps policymakers make informed decisions and prioritize actions to meet biodiversity targets. Furthermore, it facilitates the mobilization of finance from both public and private sectors. Understanding nature related risks, impacts and opportunities for businesses could help identify policy options to attract and enable private investment for biodiversity.

Embracing natural capital accounting is therefore essential for embedding nature into economic planning and decision-making. Doing this will help to safeguard our planet's natural assets and secure a more livable planet and sustainable future for all.

OCEAN ECOSTRUCTURE: PROMOTING BIODIVERSITY WITH BLUEINVEST

25 March 2024 <https://oceans-and-fisheries.ec.europa.eu/>

Ocean Ecostructure, a Spanish company from Barcelona, is addressing pressing environmental challenges related to the loss of biomass and biodiversity. The company creates panels that facilitate marine life growth, creating micro-reefs and enhancing biodiversity in ports, on oil platforms, and other offshore structures.

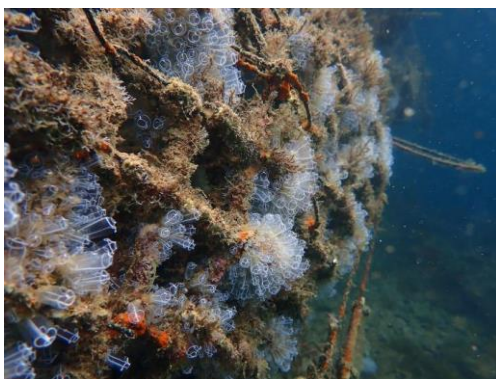


Their participation in the BlueInvest Readiness Assistance Programme in 2023 has helped them to grow.

Ignasi Ferrer, Co-Founder of Ocean Ecostructure, states: "We are very grateful for the invaluable coaching provided by

BlueInvest, which proved instrumental in closing our inaugural round of investments."

Smart panels that promote biodiversity



Ocean Ecostructure's innovation is threefold and comprehensive:

a calcium carbonate-based panel

a robotic data gathering element, and

a commitment to social engagement as the data is publicly accessible.

This ensures not only the creation of artificial marine habitats but also the accessibility of crucial data to the public for informed conservation efforts.

Ignasi Ferrer, Co-Founder of Ocean Ecostructure: "It is fascinating to see how you only need to give the ocean an opportunity and then it multiplies it."

Ocean Ecostructure's innovative technology is inspired by biomimicry, replicating the surfaces where marine organisms naturally attach and thrive, such as coral reefs and rocky shores. By emulating these natural habitats, the panels encourage the settlement and growth of marine species, promoting biodiversity and biomass creation.

Each live posting unit is uniquely coded and geolocalised, allowing for precise monitoring. These panels collect a diverse range of data, including CO2 levels, oxygen levels, acidity, levels of chlorophyll, and water temperature.

This data is stored in the cloud and accessible via a platform called iOceans. This enables customers to monitor the evolution of marine environments over time.

Predictive models offer insights into future trends, empowering proactive decision-making.

Moreover, the data is made accessible to the public through Ocean Ecostructure's app, fostering transparency and social engagement in marine conservation efforts.

From ports to the deep sea

Initially targeting ports, marinas, offshore wind, and oil platforms, Ocean Ecostructure's market has expanded rapidly. The company's innovative approach has garnered attention, leading to significant market growth projections, estimated at €5 million by 2026.

Ocean Ecostructure plans to scale their operations and product offerings.

Currently, they are deploying 150 units, with 700 in the pipeline with new worldwide clients.

With ongoing R&D efforts, they are developing new products targeting further market diversification and growth. For 2025, they are planning on launching new coastal protection systems and deep seabed solutions.

BlueInvest in action

BlueInvest has been crucial for Ocean Ecostructure's journey. Their participation in the Readiness Assistance Programme in 2023 served as a cornerstone. It provided them invaluable guidance, opening doors to prestigious affiliations with entities like the Spanish Port Authorities, Norrskan, and Repsol Foundation. These partnerships not only enhanced the company's profile but also expanded their operational horizons.

With a seed investment round of 1.6 million successfully secured by year-end, the company attributes much of this achievement to the insights garnered from BlueInvest.

About BlueInvest

BlueInvest is an EU initiative that aims to boost innovation and investment in sustainable technologies for the blue economy. It offers assistance to access

financing for early-stage businesses, SMEs and scale-ups. BlueInvest is enabled by the European Maritime and Fisheries Fund.

BlueInvest Readiness Assistance is an exclusive coaching programme. It targets high potential EU startups and SMEs with innovative and sustainable products and solutions for the blue economy. Businesses and projects selected for investment readiness assistance will receive coaching packages tailored to their readiness levels and business objectives. The programme is impact-driven, with a clear focus on providing business support to help startups and SMEs build capacities for growth and attract investment.

CLIMATE CHANGE

SCALING SUSTAINABLE FOOD PRODUCTION IN FACE OF CLIMATE CHANGE IS THE DEFINING CHALLENGE OF OUR TIMES

13 March 2024 <https://www.downtoearth.org.in/>



In July 2023, Dasra, a strategic philanthropy organisation, along with think tank Observer Research Foundation (ORF) launched a report titled *Our Uncommon Future: Intersectionality of Climate Change and SDGs in the Global South*, which explores

the impact of climate change on Sustainable Development Goals and on food insecurity and malnutrition.

The report found that there is a critical need today to not only treat food insecurity as a humanitarian crisis but to also address how climate change is reducing agricultural productivity by precipitating the frequency of extreme weather events.

The report by Dasra and ORF also recommended nature-based solutions and adaptation to address the impact of climate change. This approach could not only help us protect our environment and preserve natural resources but also explore sustainable ways to uplift traditionally marginalised farming communities.

Links between traditional agriculture, biodiversity and economy

Does organic farming automatically amount to sustainable food production?

During my PhD fieldwork, while researching how traditional agriculture in Odisha's Koraput plateau influenced local biodiversity, I found that the answer to this question had many dimensions.

For example, while farming in the area was being carried out using traditional organic methods, whenever market prices fell, smallholder farmers felt pressured to intensify production to meet their basic needs. Most lacked the capital to invest in intensification using fertilisers, so they simply brought in more land under cultivation, sometimes by clear-cutting adjoining forests.

So, while the produce could technically still be deemed as organic, there were environmental costs that were not immediately apparent. Such complexities need to be acknowledged when we talk about sustainability in food production.

Another lesson learned was how indigenous crops could significantly augment food security. Tubers and millets are great examples of crops grown with traditional methods in localised geographies whose aggregated effect on bolstering global food security is well-established.

Popular among farmers due to cultural affinity and relative ease of growing, they will gain more prominence on account of their climate-hardiness and nutritional benefits.

Agrobiodiversity is at the core of traditional agriculture, considering how different heirloom seeds and cultivars are needed to suit a variety of locales and microclimates. In this sense, localised agriculture enhances global food security by preserving the seed diversity required to give us alternatives in cases of pesticide resistance and disease outbreaks in monoculture farming.

Local agriculture initiatives for promoting climate resiliency

Local agriculture initiatives also strengthen global food systems by shortening farm-to-fork distances. This is not inimical to global commerce, as during COVID-19 when the global food supply system was disrupted, people could only buy what was available locally.

That showed us that no matter how strong or resilient the global food production system might seem to be, in the era of extreme natural disasters and climate change, we need a combination of global and local food production systems to create food resilience.

Speaking of climate-resilient local crops, here is a success story. Last year, Food and Agriculture Organization of the United Nations designated 2023 as the International Year of Millets. This was the culmination of a decades-long effort by multiple regional and local organisations to highlight the climate-adaptive and nutritional benefits of millets.

But long before this, Odisha government had also officially launched the Odisha Millet Mission to promote millets in farms and on plates. This resulted in a multi-stakeholder coordinated synergy to better understand these climate-resilient, nutritionally, environmentally and ethically good crops and identify gaps in their cultivation and distribution.

All this goes on to show how far we have come in terms of local agricultural efforts gaining mainstream acceptance. However, it is too early to say that these efforts have already transformed global food systems significantly. What we see for now is a lot of promise and potential to create more sustainable food systems, which is our collective challenge to meet.

Another intrinsic challenge to sustainable food systems has less to do with agriculture and more with consumption. Let's take the case of tuber crops or millets again. As their popularity grows globally, competition will drive their prices down. There might then be pressure on stakeholders in the supply chain

to further reduce prices, which at the farm level often leads to the externalisation of environmental costs.

These super crops have the same potential to be grown unsustainably as any other crop. This has been an inherent challenge in scaling sustainable agricultural initiatives.

Tackling environmental variables with technology

Scaling successful models in farming has been tricky because of the sheer number of environmental variables, due to which no single solution fits all contexts. Farmers in Jharkhand may not be able to grow a certain variety of sweet potatoes with the methods that have proven successful for Koraput farmers in southern Odisha. Methods must be customised based on soil, elevation and many other parameters.

In my experience, what works best is to streamline and democratise information flow amongst all stakeholders. For instance, at our food production company, Mati Farms, we achieved this by bringing far-flung farmers from different geographies who were growing the same crop under one umbrella and creating WhatsApp groups.

After a few cycles, farmers learn what works best for them; we only provide information connected to weather data and soil analysis that they cannot access. Historically, farmers from a particular geography have coordinated and exchanged knowledge. Technological innovations that can mimic this at a macroscale and integrate climate analysis will help to deal with climate extremes in the future. Climate-smart agriculture will go a long way towards augmenting food security.

Now, however, scaling food production sustainably to meet global demand is the defining challenge of our times and one we must meet quickly. The UN, in fact, projects that more than 600 million people worldwide will be facing hunger by 2030.

It is important to underscore here that regenerative farming is not the only answer to global food insecurity, which has been increasing at an alarming rate since 2015. It can help mitigate damage to ecosystems, not restore them entirely.

To care for our planet's health and eradicate hunger decisively, we need a sustained commitment to the SDGs. It is also a holistic strategy to empower farming communities with knowledge and tools to tackle climate change with smart and adaptive solutions.

CLIMATE CHANGE BREWS TROUBLE FOR TEA INDUSTRY, BUT CIRCULAR SOLUTIONS AWAIT

14 March 2024 <https://news.mongabay.com/>



In its many varieties, tea is renowned as one of the world's most consumed beverages, second only to water.

Like many other agricultural crops, tea production impacts the environment: Production in tropical countries is

implicated in deforestation, pollution and impacts on fragile biodiversity.

Climate change imperils the tea industry, threatening to reduce yields and hammer millions of smallholder farmers who derive their livelihood from the crop.

Experts say circular solutions can help build resilience in tea production against climate change, while at the same time lessening its environmental impact.

It's estimated that we drink around 5 billion cups of tea every day. Producing this vast quantity of leaves to quench global thirst for black, green and other varieties is an industry that spans more than 60 tropical and subtropical countries and largely depends on smallholder farmers.

Globally, agriculture plays a large part in driving our planet's "triple crisis": climate change, biodiversity destruction and releasing chemical pollution into oceans and waterways. Like many other agricultural crops, tea has an impact, implicated in deforestation of tropical areas (both historic and present), and heavy use of chemical pesticides and fertilizers that harm soils and rivers and add to climate change. On top of these environmental issues, farmers and tea workers face deeply embedded human rights and gender issues, such as low wages and poor working conditions, exacerbated by globally low prices, according to experts.

Sabita Banerji, founder and CEO of The International Roundtable for Sustainable Tea (THIRST), says the tea sector is in many ways akin to "a 19th-century industry that's now struggling to survive in the 21st century," as it faces a host of sustainability challenges, both social and environmental.

"It needs to grow and adapt to the current times," she adds.

While the tea industry is contending with its environmental and social problems, human activities driving climate change threaten to hammer tea-producing countries and farmers who depend on the crop for their livelihoods.

"The tea sector faces daunting economic challenges stemming from climate impacts, low tea prices, rising production costs, pests and pesticide use, shifts in worker availability and more," says Christopher Whitebread, the tea sector lead at the Rainforest Alliance.

Experts say that solutions to reducing tea's environmental footprint would also build resilience against waves of droughts, erratic rainfall and rising temperatures caused by our rapidly heating world. Many of these follow circular economy principles that aim to reuse waste, boost renewable energy sources and switch to alternative farming methods, ultimately benefiting farmers and biodiversity.

World's second favorite tipple

The world is hooked on tea, which comes from the *Camelia sinensis* plant, and the beverage is renowned as the second most consumed drink globally, only tipped by water. Globally, the U.N. Food and Agriculture Organization estimates that in 2021, farmers grew 6.5 million metric tons of tea, with China producing nearly half, followed at some distance by India, Kenya and Sri Lanka. The tea industry employs an estimated 13 million people, with around 9 million smallholder farmers growing roughly 60% of the world's tea.

Often grown in large-scale monocultures, tea production relies heavily on large amounts of fertilizers and pesticides, which can harm workers, the environment and soils, and further fuel climate change.

Studies, for example, indicate that a lack of personal protective equipment and exposure to pesticides on farms is widespread in some areas of the world, posing health concerns for workers, many of whom are women.

“On the clinics on tea estates, they very often see respiratory problems and skin problems caused by pesticides,” Banerji says. At the other end of the supply chain, researchers also warn of the possibility of a “bitter side” to tea consumption: residue sampling of tea leaves indicates some may be contaminated with pesticides, leading to health concerns for tea drinkers.

Similarly, this overuse of chemicals can have implications for wildlife. Around Uganda's Kibale National Park, tea plays an important role as a buffer zone, warding off potential wildlife conflict. But studies show that species, such as endangered primates, can be exposed to a chemical cocktail including pesticides and flame retardants. Researchers are working to parse out the details of where these come from and how harmful they may be to wildlife.

Once tea is plucked it must go through various stages of processing, including withering and drying: energy-intensive processes that often use vast amounts of wood or, in some cases, fossil fuels such as coal. This not only results in CO₂ emissions, but also has the potential for “hidden deforestation” for wood to burn,

according to experts such as Rachel Cracknell, environment and climate lead at the Ethical Tea Partnership.

“As global tea demand grows by over 2% annually, the pressure on land for cultivation may lead to increased deforestation and greenhouse gas emissions, further intensifying the impacts of climate change,” Whitebread adds.

PROTESTS STRESS NEED FOR CLIMATE-SMART AGRICULTURE

01 March 2024 <https://www.dailypioneer.com/>



There is a pressing need for proactive measures aimed at protecting both farmer livelihoods and national food security

The ongoing farmer protests that began on February 13th have already claimed five lives and resulted in Delhi bearing the brunt of

economic losses to the tune of 300 crores as nearly five lakh traders who did regular business in Delhi from adjoining states suspended their businesses given the unrest. Since 2020, farmer protests have unfortunately assumed a regular frequency not only in Delhi and Punjab but across India. According to consultancy firm Verisk Maplecroft estimates, India has accounted for the biggest global share of farmer protests in the past three years.

The farmer protests 2.0 again highlight the fault lines in India’s agricultural viability and this time the farmers are demanding conclusive government action. The protesting farmers want a firm minimum support price (MSP) that is backed by a legal guarantee for all crops. Another demand is to implement the recommendations of the MS Swaminathan committee on agriculture which will enable increasing MSP to 50 per cent above the weighted average cost of production. Other demands include better sugar cane prices and a pension of Rs 10,000 a month for every farmer above the age of 60.

The government is engaged in feverish negotiations with the farmer unions to break the impasse. However, a breakthrough achieved may be short-lived, as the government would have only successfully attended to the symptoms and not to the problem itself. India's agri sector contributes only 15 per cent to the GDP but engages 58 per cent workforce. This lopsided proportion is made worse by the fact that 85 per cent of the farmers operate in less than five acres of land half of which in many parts of India may be dry and barren. This translates to low yields, low earnings and high debt and when combined with increasing challenges of climate change on agriculture, the problem assumes a much larger and ominous proportion.

Climate change whether it is unseasonal rain, hailstorms, floods, or drought, India's agri-sector has seen it all. The lingering uncertainty due to environmental issues keeps the farmers on their toes leading to income insecurity and mounting debt. An example is the casualty in the current protests of a marginal farmer whose 8-acre agricultural land had 8 lacs of debt on it, making it virtually impossible for the farmer to pay it off and continue with another crop. Climate change-driven issues such as these have made the farmers demand an MSP law to act as a safety net for the time, effort and risk they invest in farming.

The perennial shortage of water resources is the first symptom of climate change's impact on the agri sector. According to Rainfed Atlas, it is estimated that between 52% and 55% of the farming community have no means of irrigation and are dependent on rain-fed agriculture.

But due to climate change temperatures are spiralling and rainfall has become more erratic, with longer dry spells resulting in droughts and shorter periods of more intense rainfall causing floods. This results in a domino effect whereby crop yield is adversely impacted while high Co₂ levels cause low nutritional value of crops. This translates to low marketability of the produce therefore causing financial distress and rising debt for the farmers.

The impact of climate change on the agri-sector and the sluggish government response in managing its fallout has come as a double whammy for the farmer community. The lack of robust insulation measures that seek to protect the sector from the vagaries of climate extremities is now having a telling impact on productivity. The cereal crop productivity of most cereals is slated to decrease due to an increase in temperature and CO₂ levels, and the decrease in water availability. According to estimates, there will be a projected loss of 10-40% in crop production by 2100 if no climate change adaptation measures are taken. A one-degree Celsius increase in temperature may reduce yields of major food crops by 3-7%. Given these troubling projections, the government must extricate the agri-sector from the clutches of climate change. This alone can ensure the best interests of farmers, safeguard national food security and protect livelihoods.

An audit of the agri-sector at the micro-level is essential to identify and remove processes that are detrimental to natural resources. This will ensure weeding out of inefficient water-intensive practices and allow optimal use of the precious resource. Similarly, best farming practices need to be promoted across the sector to ensure climate change adaptation and mitigation in the sector. For example, the raised-bed planting of wheat in the Indo-Gangetic plains enables 20-25% savings in irrigation water and also helps in reduced herbicide use. Measures such as these combined with water accounting methodologies can build long-term sustainability, efficiency and resilience of the agri-sector besides immensely benefiting the marginal farmers.

The government must also initiate climate-smart agriculture strategies which aim at adapting agriculture to climate change. This can be done by implementing technologies that help farmers plan crops by considering the climate specifics of their area through easy-to-use apps on their smartphones. This can be done by prioritising botanical research to develop crop species that are more tolerant to water deficiencies and extreme temperatures. Additionally, ecologists can evolve

effective soil management methods that reduce the depletion of topsoil, promote carbon sequestration, and reduce chemical application. Advanced farm irrigation technologies can also help proper water saturation levels in the soil, prevent water flooding, and help avoid top-soil runoff.

The government must focus on specially developed software solutions for agriculture that can help in real-time monitoring of the crops and allow farmers to accurately calculate the required inputs, which reduces costs in the short term and protects nature in the long term. Technology-assisted cover crops for instance can not only help prevent soil erosion, and promote water retention and nitrogen fixation but also serve as organic manure for fodder. Smart agri-software can help farmers implement differentiated applications of fertilisers which can help decrease soil pollution and increase crop nutrient levels. The software can also have in-built weather-related tools that provide timely alerts of extremities, elaborate weather forecasts to schedule farming events and enable prediction of general climate change tendencies by analysing historical weather data.

Currently, the agri-sector problems and farmer grievances are dealt with on a reactive basis; this is evident in the form of chronic farmer agitations that come back every year. The government must realise that a lasting solution is only possible if actual problems, including the impact of climate change on agriculture, are addressed with the participation of all stakeholders of the sector. The collaboration of farmers, policymakers, environmentalists, botanical scientists and technology experts can help chalk out long-term strategies and solutions and ensure a robust agri-sector that is resilient against climate change onslaughts. Farmer protests are a symptom of climate change's impact on agriculture. Protecting the sector from adverse impacts will automatically ensure farmer well-being and prosperity.

CLIMATE CHANGE WIDENS INCOME GAP FOR RURAL WOMEN IN INDIA: UN REPORT

06 Mar 2024 <https://www.newindianexpress.com/>



A new report by the United Nations Food and Agricultural Organisation (FAO) underlined that rural women's income in India has been disproportionately affected due to extreme weather events as India is one of the worst affected regions by

drought and heat stress in the world. However, the study finds rural people and their climate vulnerabilities are barely visible in national climate plans.

In female-headed rural households, people live in poverty and older populations suffer significantly greater financial loss than men-headed families as their capacity to react and adapt to extreme weather events is unequal.

The report 'Unjust Climate' analyses India as one of the most exposed regions of the world with drought, heat stress and extreme precipitation. It impacts on an average, especially female-headed households losing 8 per cent more of their income due to heat stress and 3 per cent more due to floods compared to male-headed households.

This translates to a per capita reduction of USD 83 due to heat stress and USD 35 due to floods, totalling USD 37 billion and USD 16 billion respectively across all Lower Middle-Income Countries (LMICs).

FAO further analysed that if the average temperatures were to increase by just 1°C, these women would face a staggering 34 per cent greater loss in their total incomes compared to men. Considering the significant existing differences in agricultural productivity and wages between women and men, the study suggests that if not addressed, climate change will greatly widen these gaps in the years ahead.

FAO analysed socioeconomic data from over 100,000 rural households (representing more than 950 million people) across 24 LMICs including India.

The Data shows that impacts differ not just by gender but by socioeconomic status. Heat stress, or overexposure to high temperatures, exacerbates the income disparity between rural households classified as poor, who suffer a 5 per cent greater loss (USD 17 per capita) than their better-off neighbours, and the figures for flooding are similar.

Extreme temperatures, meanwhile, worsen child labour and increase the unpaid workload for women in poor households.

The report analysed the decade-old data between 2010 and 2019, which shows that India experienced 111 days of cumulative duration of consecutive dry days in the given period. In the same period, India also experienced a large number of days as extremely hot days.

The study finds rural people and their climate vulnerabilities are barely visible in national climate plans. It finds only 6 per cent of climate action plans proposed mention women, 2 per cent explicitly mention youths, less than 1 per cent mention poor people and about 6 per cent refer to farmers in rural communities.

ORGANIC FARMING

MADHYA PRADESH: THE RISE AND FALL OF AN ORGANIC FARMING VILLAGE IN KHANDWA

22 Mar 2024 <https://www.newsclick.in/>



Olfactory discomfort is at its peak as the strong, sickening odour of pesticides and the earthy smell of cow dung waft through Malgaon in Khandwa district of Madhya Pradesh. Not a single farm in this village with 447 houses and

2,488 residents is fully organic, but that was not the case over 20 years ago.

At that time, the family of Deepak Patel (37) was among the first to switch to organic practices by building three Nadep structures at their farm and another three on the premises of their house using their own resources. The family dumped organic waste in these earthen structures throughout the year to make compost.

“Our farm was fully organic for only four years. Due to climate change and rising pest attacks, we were forced to switch to pesticides,” Deepak tells 101Reporters, while acknowledging that organic farming is the best option, provided farmers get better prices for their produce. He wants to move away from chemical-based farming, so 40% of the total pesticides used in his farm are organic now.

Temikala-based Jagannath Kanade (75) has been a farmer for the last 60 years. He says predicting even the next day’s weather is a difficult task these days. “It sometimes looks like summer, then suddenly it rains or fog spreads. All these have increased pest attacks in crops. We have no option but to resort to pesticides to keep them in check.”

According to Kanade, farmers now spend three times more money on their crops than earlier because chemical-based farming is very expensive. In fact, more money is being spent on fertilisers and pesticides than seeds, ultimately taking away soil fertility.

Even the weather forecast app is not to their aid. Durgaram Patel (35) says farmers used to get weather information on the app, but there was a problem. “The app would be showing a clear weather, but it will be raining outside. Tell me how can we decide anything in such a situation,” he asks.

Durgaram’s fields used to deliver 20 sacks of wheat earlier. But in the last five years, he has been getting only five to seven sacks. “If this situation prevails, farmers will have to find other means to earn their livelihood,” he warns.

Farmers are fully aware that the continuous application of pesticides will make their land barren in future, but they say they do not have an option. “We have harmed ourselves by leaving organic farming. Going back to organic methods is

difficult now. Farmers are trying to include some organic practices, like using 20% organic inputs. A complete switch is not easy, but it will be required to save our land,” says Kamlesh Patel (36), a farmer from Temikala.

Malgaon farmer Hukumchand Patel (57) tells 101Reporters that the village did only organic farming from 2000 to 2005. “People from far and wide used to come here to learn about organic farming. I also followed organic farming during that period and got good results. Later, production decreased and the weather did not cooperate. Since the village is situated at a higher altitude, there was a water shortage. We filled this deficiency with pesticides. Within no time the situation changed and chemical-based farming increased in the entire village,” he recalls. Rajesh Gupta, the then chief executive officer of district panchayat, had taken special interest in developing Malgaon as an organic village and Torani as a water village. Late Hukumchand Patel was the first farmer to initiate organic farming in the village. He also informed other villagers about its long-term benefits and inspired them to do the same. Patel started using the waste from his fields and house to make organic fertiliser by layering it with cow dung.

In 2002, when Malgaon was a fully organic village, works to conserve water were initiated. Rainwater and nutrients flowing from flat land were stored in 7,000 water pits around the village fields. When these pits overflowed, the excess water was diverted towards the village wells. To ensure water efficiency during irrigation, drip irrigation and sprinkler methods were adopted.

Earlier, even a good rainfall could not save the place from water shortage due to the high altitude and rocky ground. At that time, 505 hectares were under cultivation. There were 275 irrigable wells, but only 20 held adequate water. The severe drought between 1998 and 2000 made farmers aware of the need to change their farming practices. They understood the special role of humus and compost in retaining soil moisture, which made them turn to organic farming.

Big farmers of the village set up biogas plants in their homes and gave connections to their neighbours and relatives. Five big and 12 small biogas plants

were built in the village in 2002. In 2012, another 218 biogas plants were built by people of the village at subsidised rates. Considering the decrease in cattle population in the village, household toilets were also connected to the plant.

Close to 10 tonnes of organic fertilisers could be obtained from cow dung biogas, 8.9 tonnes from Nadep and 10.12 tonnes from vermicompost. To ensure composting in Nadep structures, 25 collection centres were set up in the village with panchayat help. Due to these efforts, Malgaon received the Nirmal Gram Puraskar in 2009.

However, with cattle rearing decreasing further and people switching back to chemical fertilisers for agriculture, the biogas structures have faded away. Biogas plants have remained buried under cow dung and garbage, while not a single Nadep structure can be seen here. Now farmers collect cow dung in the open and convert it into manure. Today, only two biogas plants are operational in the village.

As per an estimate, 806 quintals of urea, 407 quintals of super phosphate, 125 quintals of potash and 446 quintals of diammonium phosphate (DAP) are annually used in Malgaon. Pesticides to kill caterpillars and other insects are also used.

“The time for caution has passed, now we should start saving what is left. High amounts of pesticides are sprayed in the fields of Khandwa. This indiscriminate use works as a tool to spoil the weather,” Dr Saurabh Gupta, meteorologist, Bhagwantrao Mandloi Agricultural College, Khandwa, tells 101Reporters.

Dr Satish Parsai, an entomologist at the same college, warns that pests have become so powerful that it is difficult to kill them even with pesticides. Hence, traditional methods are more suited.

“If farmers are still not alert and do not return to old methods, the future of agriculture will be even more challenging.”

Malgaon Sewa Sahkari Samiti distributes the government-approved urea, DAP and potash to farmers. In view of the deteriorating health of fields and soil, the

government has launched nano fertiliser in the market. The society provides this also to most farmers.

“Over 500 hectares are irrigated in the village. As many as 105 farmers are registered with the samiti, which distributes 320 bags of urea, 400 bags of DAP, 150 bags of phosphate and 70 bags of potash to them. The remaining farmers in the village have to buy fertilisers from the market at a price that is four times higher,” says Krishnakant Sohni, a clerk at the cooperative society.

NEW RESEARCH SHOWS UNINTENDED HARMS OF ORGANIC FARMING

MARCH 21, 2024 <https://phys.org/>



Organic farming is often touted as a more sustainable solution for food production, leveraging natural forms of pest control to promote eco-friendly cultivation.

But a new study published in *Science* on Thursday finds that expanding organic cropland can lead to increased pesticide use in surrounding non-organic fields, offsetting some environmental benefits. These harmful "spillover effects" can be mitigated if organic farms are clustered together and geographically separated from conventional farms, the researchers found.

"Despite policy pushes to increase the amount of organic agriculture, there remain key knowledge gaps regarding how organic agriculture impacts the environment," said lead author Ashley Larsen, of the University of California, Santa Barbara.

Although organic agricultural practices generally improve environmental conditions such as soil and water quality, the trade-offs aren't very well understood.

For example, organic fields could harbor more beneficial species that prey on insects, such as birds, spiders and predatory beetles and fewer pests. Or, the lack of chemical pesticides and genetically modified seeds could mean they harbor more pests.

To find out, Larsen and colleagues analyzed data on some 14,000 fields in Kern County, California, across seven years.

Kern County produces high-value crops including grapes, watermelons, citrus, tomatoes, potatoes and much more, making it one of the most valuable crop producing regions in the United States.

The team paired digitized maps of fields and the crops grown on them with records of pesticide applications and whether a field had an organic certification. "Surrounding organic agriculture leads to an increase in pesticide use on conventional fields, but also leads to a larger decrease on nearby organic fields," said Larsen, with the effect manifesting primarily in insecticides, which specifically target insects.

The level of pesticides in conventional fields decreased the further away they were from organic fields.

But the situation could be completely remedied if organic fields were grouped together, the researchers found, based on a less-detailed national level analysis they also carried out.

"Spatially clustering organic fields and spatially separating organic and conventional fields could reduce the environmental footprint of both organic and conventional cropland," the team concluded.

Writing in a related commentary, Erik Lichtenberg of the University of Maryland said that the authors had shown farmers' decisions about pesticide are influenced by the presence of nearby organic fields—but it's not fully clear why.

The value of the crops, their susceptibility to pests, and farmers' personal risk tolerances likely all play roles.

"Which mobile pests are involved, where they originate in the landscape, or how and why they move across the landscape are poorly understood," said Lichtenberg, calling for more research in this area.

ORGANIC FARMS CAN HAVE MIXED EFFECTS ON PESTICIDE USE DEPENDING ON THEIR NEIGHBORS

March 21, 2024 <https://news.ucsb.edu/>



Organic agriculture may be as old as dirt, but that doesn't mean its impacts are fully understood. A team of scientists in the United States and Canada are doing their part to change that.

Researchers at UC Santa Barbara, University of British Columbia, and University of Colorado Boulder discovered that organic farming significantly affects the amount of pesticide used in neighboring fields. The study, published in *Science*, found that the impact depends on the density and spacing of organic and conventional fields, and clustering organic fields together could provide the most benefits for all farmers.

"We find that organic cropland generally leads to a decrease in pesticide use on nearby organic fields," said lead author Ashley Larsen, an ecologist at UCSB's Bren School of Environmental Science & Management. "In contrast, organic agriculture leads to a small, but significant, increase in pesticide use on nearby conventional fields." The authors suspect that the different responses reflect different reliance on natural pest control methods, although they admit the mechanisms are difficult to test with their data.

There's been a push to increase organic production in the U.S., which begs the question of how this will affect pests and pest control for other farms. Most pesticide studies have focused on the field level, Larsen said, comparing metrics like biodiversity, soil health and pesticide use between organic and conventional

fields. However, agricultural pests and their predators move beyond field boundaries. So the group sought to understand these interactions between fields, which they call “spillover effects.”

Precisely why this is the case is unclear but, the researchers said, it may have to do with how the pest-control measures taken by organic farms affect the larger ecosystem. “Organic fields leverage the benefits of natural enemies that reduce the number of pests on their fields, like birds and bugs that eat smaller problematic pests,” said co-author Claire Powers, a former graduate student at Bren now pursuing her doctorate at CU Boulder. These predators and pests then venture into neighboring fields for shelter and food.

Organic farmers can benefit from a greater abundance or persistence of their pests’ natural enemies, which can be harmed by chemical pesticides in conventional fields. Thus, organic farmers could benefit from clustering together. On the other hand, an influx of insects from organic fields could drive up the use of chemical pesticides in conventional fields, since these fields have smaller, less effective populations of those beneficial species.

Unfortunately, when organic and conventional farms are distributed evenly, both kinds of farmers often lose out. “Clustering organic fields concentrates the pest control benefits to organics and reduces the costs to conventional fields,” Larsen said. And, as the share of organic agriculture increases, the beneficial effect of organic fields on one another starts to dominate.

“The big takeaway from this research is to stack organic fields next to organic fields and conventional fields next to conventional fields,” added Powers. Doing so could reduce pesticide use overall, benefitting both the environment and farmers’ bank accounts.

These pithy conclusions are the culmination of an involved process. The authors faced major challenges even finding usable data. “You have to be able to identify specific fields in a spatial data format, link that spatial data to each field’s pesticide-use rates, and also determine which fields are organic and which are

conventional,” Powers explained. This information comes from several sources that can be tough to combine. What’s more, agricultural spatial data and pesticide use aren’t particularly well tracked, especially outside of California.

Fortunately, Larsen, Powers and co-author Frederik Noack, of the University of British Columbia, found one region that kept detailed records and made them publicly available: Kern County, California. As far as the authors were concerned, it was the golden ticket of the Golden State. “Kern County has annual spatial data for their agricultural fields that can be linked to the two other crucial datasets — pesticide use and organic-crop producer IDs — which is really rare,” Powers said.

This is only the latest pesticide research to come out of Larsen’s lab. She previously found that less diverse croplands led to greater variability in pesticide use, as well as higher peak pesticide application. And she hopes to extend this latest analysis beyond Kern County, to California as a whole. She, Noack and colleagues also have a project evaluating how the adoption of genetically modified crops impacts bird diversity in the U.S.

As many regions consider policy initiatives to increase organic cropland, it will be crucial to account for the spillover effects. Clustering organic fields could be an effective way to mitigate the unintended consequences organic farming has on pesticide use on conventional agriculture.

ICAR-CTCRI SECURES PATENT FOR SMART FARMING E-CROP IOT DEVICE

14 March, 2024 <https://krishijagran.com/>



e-Crop simulates crop growth in real-time and provides precise nutrient and water management advice, revolutionizing agricultural practices for higher yields and sustainability. Thiruvananthapuram-based ICAR-Central Tuber Crops Research Institute (CTCRI) has achieved a significant milestone in the area of agricultural

technology with the development of the Electronic Crop (e-Crop), an innovative IoT device designed for smart farming. Recently, the Indian Patent Office granted a patent for this groundbreaking invention, marking a crucial moment in the agricultural sector. The e-Crop device serves as an electronic crop simulator, revolutionizing traditional farming practices by harnessing the power of real-time data analytics. By integrating data on weather patterns, soil moisture levels, and nutrient status, the device offers farmers invaluable insights into crop growth dynamics. Utilizing a sophisticated crop simulation model, e-Crop calculates precise nutrient and water requirements, empowering farmers to make informed decisions at a daily time scale.

Dr. Santhosh Mithra, a respected principal scientist at ICAR-CTCRI, is the inventor of this innovative device. Dr. Mithra's innovative approach has paved the way for a new era of precision agriculture, characterized by enhanced efficiency and sustainability.

Field demonstrations of the e-Crop-based smart farming (e-CBSF) initiative have yielded promising results across various crops, including cassava, sweet potato, elephant foot yam, and banana. Farmers participating in these

demonstrations have reported significant increases in yield while simultaneously reducing nutrient and water usage by up to 50%. This achievement can be attributed to the device's ability to manage spatial and temporal variabilities in soil and plant properties effectively.

Beyond its immediate benefits to farmers, e-Crop holds the potential to address broader environmental challenges. By narrowing the yield gap and improving nutrient use efficiency, the device contributes to reducing the carbon footprint associated with agricultural practices. Furthermore, the generic nature of the technology enables its adaptation to a wide range of field crops, offering scalability and versatility in its application.

Collaborative efforts involving various stakeholders, including the Kerala State Department of Agriculture and Farmers Welfare, ICAR institutes, IIT Palakkad, Digital University Kerala, and the Rubber Research Institute of India (RRII) Kottayam, are currently underway to further refine and deploy e-Crop technology. These partnerships underscore a collective commitment to harnessing innovation for the betterment of agricultural practices and sustainability.

ICAR SIGNS MOU WITH DHANUKA AGRITECH TO PROVIDE NEW FARM TECHNOLOGY TO FARMERS

Mar 20, 2024 <https://www.zeebiz.com/>

Indian Council of Agricultural Research (ICAR) has signed an initial pact with agro-chemical firm Dhanuka Agritech Ltd for providing new technology to farmers and also promoting natural farming. According to an official statement, ICAR and Dhanuka Agritech have signed a Memorandum of Understanding (MoU) on Tuesday.

ICAR Deputy Director General (Agricultural Extension) US Gautam and Dhanuka Agritech Chairman RG Aggarwal signed this MoU on behalf of respective organisations.

Gautam said the objective of this agreement is to utilise the efficiency of both institutions to deliver new technology to farmers, according to the statement.

He said there are more than 14.5 crore farmers across the country, out of which most of the farmers have small land holdings.

Dhanuka Agritech will provide training related to agricultural production to these small farmers by associating with the central institutes, ATARIs (Agricultural Technology Application Research Institute) and KVKs (Krishi Vigyan Kendras).

Gautam said the whole world currently is facing the challenges of climate change and India is no stranger to it. In such a time, he said, there is a need for both institutions to work together on a new method of agricultural production which is climate-friendly.

The aim of this MoU is to promote natural farming in the changing environment, he added.

Aggarwal said the company will provide advisory service and train farmers in collaboration with ICAR-ATARI and KVKs.

On this occasion, Assistant Director General of ICAR, Directors, senior scientists, and senior officers of ICAR headquarters were also present.

PATENT FOR SIZE-BASED CHINESE POTATO GRADER DEVELOPED BY CTCRI

March 22, 2024

<https://www.thehindu.com/>



Medium (20.1 - 30 mm)
Grade III

Large (30.1 - 40 mm)
Grade II

Grading Chinese potatoes (koorka) based on their size has for long been a major headache to farmers, given the time and labour charge involved in it. Now, the Central Tuber Crops Research Institute (ICAR-CTCRI) in

Thiruvananthapuram has been granted a patent for a power-operated, size-based Chinese potato grader and a method of grading.

The grader, which cuts down labour and cost significantly, works on the principle of rotating motion of the unit through a prime mover. It sorts the tubers into four different size classes; small (below 20 mm diameter), medium (20.1-30 mm), large (30.1-40 mm) and very large (above 40 mm), according to the CTCRI, an institute under the Indian Council of Agricultural Research (ICAR).

The patent has been granted by the Indian Patent Office.

“Farmers resort to manual grading which requires 50 man days of labour for sorting tubers harvested from one hectare. This machine needs only two man days for sorting the same quantity,” T. Krishnakumar, the CTCRI scientist who is the lead inventor of the technology, said. Other scientists involved in its development are M.S. Sajeev, Principal Scientist, C. Pradeepika, Scientist, R. Muthuraj, Principal Scientist, and D. Jaganathan, Senior Scientist.

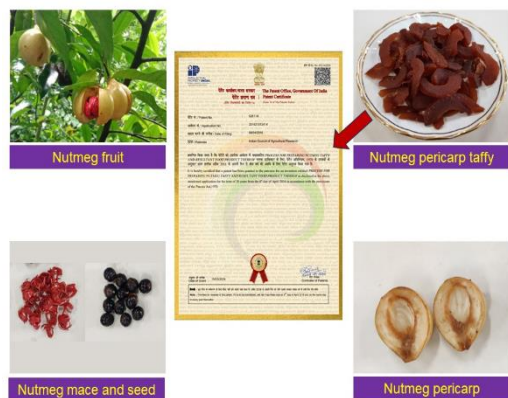
CTCRI took up this project based on a needs-assessment survey of Chinese potato growers considering the very high expenditure on manual grading which significantly reduces the profit of the growers who are mostly resource-poor people concentrated in the districts of Tenkasi and Tirunelveli in Tamil Nadu and Thrissur, Palakkad and Ernakulam in Kerala.

The machine can grade/sort one tonne of tuber in an hour for which the average cost including labour is ₹150 whereas manual grading of the same quantity costs ₹1,500. The grader consumes 0.75 kW per hour electricity, with an average power cost of ₹5 per hour, the CTCRI said.

CTCRI has commercialised the technology by issuing a non-exclusive license to M/s Stoneheat Technologies, Rajapalayam, Tamil Nadu.

ICAR-CCARI GOA'S 'NUTMEG TAFFY' INVENTION PATENT GRANTED

30 MAR 2024 [HTTPS://PIB.GOV.IN/](https://pib.gov.in/)



The invention titled "Process for preparing Nutmeg Taffy and resultant food product thereof," spearheaded by Dr. A. R. Desai and the team at the ICAR-Central Coastal Agricultural Research Institute (ICAR-CCARI) in Goa, has been awarded Patent No. 528119 (Application No.

201621012414, dated 8th April, 2016).

Nutmeg, a vital spice crop in India, primarily cultivated for its nutmeg seed and mace, often leaves behind nutmeg pericarp after harvesting. Recognizing the untapped potential of this residual by-product, ICAR-CCARI, Goa has developed a solution - Nutmeg Pericarp Taffy, aimed at maximizing the utilization of nutmeg pericarp. This innovative product boasts significant nutritional value, constituting 80-85% of the fruit by fresh weight, and can be conveniently stored at room temperature for up to 12 months without the need for synthetic preservatives, making it a sustainable and cost-effective solution.

With the implementation of this pioneering technology, farmers stand to gain an additional annual income of Rs. 5,600 per tree, in addition to their yields from traditional nutmeg spice products. The simplicity of the process, coupled with its minimal equipment requirements and commercial viability, ensures widespread applicability across various sectors, including agri-entrepreneurship, self-help groups, small and medium-scale food industries, and agro-ecotourism centers.

The technology transfer of this invention has already seen successful commercialization with M/s Tanshikar Spice Farm, Netravali, Goa, and the Goa

State Biodiversity Board, Goa, marking a significant step towards harnessing the potential of agricultural innovation for socio-economic development.

The Institute Technology Management Unit of ICAR-CCARI, Goa, played a pivotal role in facilitating the patent application process, demonstrating the institute's commitment to fostering innovation and technology dissemination in the agricultural sector.

IISR IN PRINT

IISR, TATA TRUSTS SET TO STRENGTHEN SPICE VALUE CHAINS IN NEH REGION

March 14, 2024 <https://www.thehindubusinessline.com/>



IISR is working closely with the Centre for Microfinance and Livelihood (CML) and North East Initiative Development Agency, two associate organizations of Tata Trusts, for implementing the programme.

ICAR-Indian Institute of Spices Research, Kozhikode and Tata Trusts have come together to develop and support spice value chains in the North Eastern Hill region.

In a pilot study, the joint project with pan India coverage will focus on Assam, Nagaland and Mizoram in the NEH region for transforming ginger and turmeric value chain.

As part of the programme, a detailed baseline study has been completed in the project locations at Kamrup (Assam), Kiphire (Nagaland) and Aizwal (Mizoram). Field visits, farmer survey, market study and soil sample analysis

were conducted as part of the study aimed at understanding the constraints and designing intervention strategies suited for the region.

IISR is working closely with the Centre for Microfinance and Livelihood (CML) and North East Initiative Development Agency, two associate organizations of Tata Trusts, for implementing the programme.

R Dinesh, Director, IISR said the project will go a long way in catering to the technology needs of the region and play a facilitative role in developing the potential of the NEH region for spice production.

According to Chitore Guha Sarkar, Head Agriculture Development, Rural Upliftment Theme, Tata Trusts, the collaborative effort is expected to generate significant spread effects through farmer-to-farmer knowledge dissemination and capacity building.

The extant farming practices of ginger and turmeric in the project locations were not conducive for efficient production. Apart from varietal improvement, the scientists have also identified critical crop management components for improving productivity. The information from the baseline study will be used to develop location specific packages of practices for ginger and turmeric. The project also envisages master training programmes, front line demonstrations and farmer training for capacity building.

GENERAL

‘WE NEED TO ACT NOW ON REGENERATIVE AGRICULTURE’

05 MARCH 2024

<https://www.specialityfoodmagazine.com/>

“Had I known that regenerative agriculture was going to come along, I would have said ‘I’m going to be regenerative, aiming to be organic’ rather than full organic,” says William Kendall. This is



certainly an interesting perspective from someone who has been involved in the organic movement for nearly three decades.

William, who has a broad take on Britain's food and drink industry, being both a farmer, and a key player in businesses such as Cawston Press, is not alone in his thoughts though. As Penny Fagle, founder of the new Organic Cheesemakers Network recently said, consumers are questioning the value of organic, which is leading producers (especially those in dairy) to consider whether it's worth certifying, or putting their efforts into working in a different way.

William and his wife Miranda decided to dedicate their land at Maple Farm to organic methods when they set roots 25 years ago. It was something they felt (and still feel) very passionate about. At the time William had just bought Green & Black with colleagues, and there was an element of having to 'practice what you preach'.



“Organic was really taking off the UK at the time. I was slightly embarrassed that I wasn't organic farming,” he admits. “The only evidence back then that it was better was that it was good for biodiversity, and there were quick response times when you stopped using inorganic fertiliser. You got the bird life back, and the wildlife back. We like selling things, and felt the organic seal of approval gave us an opportunity to talk about what we were doing, and to not just be commodity farmers. Organic is the gold standard of farming. It doesn't have all the answers, but it definitely does have a few of them.” Times they are a changing

The organic movement has, says William, grown from a tiny niche to a significant minority within mainstream food and drink offerings. Organic products are still not, he believes, as widely available as they should be, largely due to consumer perception, fuelled by supermarkets – which are, of course, where the majority of the British public load up their trollies.

“Often organic is seen as a way of charging a premium to affluent shoppers, and the expectation is organic is expensive. It doesn’t need to be. There is more organic food available now than there was a generation ago.”

There are lots of brands he says, such as Green & Black’s, Yeo Valley and Godminster, that have built their entire business around being organic, but the ‘sustainable message’ has in many ways overtaken the conversation – all while manufacturers, buyers, retailers and consumers try to really pin down what ‘sustainable’ means today.

And this is an area where he’s seen the largest shift in the multiples driving change. “Cawston Press are a big supplier to supermarkets, and we are incredibly under pressure to reduce carbon emissions and to explain how we are doing more and more to benefit the planet rather than damage it. I know supermarkets are driving this across the supply base. Some argue it’s not fast enough, but they are doing it!”

It’s going to take more than encouraging business to work greener, to get shoppers to vote with their feet though.

More people than ever before are aware of the need to be environmentally mindful, but William’s experience is that end consumers don’t tend to put all their eggs into one basket in this regard. “They buy stuff because it’s delicious and it’s good for their families. Thinking about nutrient density and potential chemical contamination – I think this is much more where consumer interest is going to come from.” People worry about what they’re eating, he says. “The fact something was produced with renewable energy has to be a good thing, but for some, that won’t be enough.”

The challenge, William adds, for SMEs trying to do the right thing, is it can be difficult to achieve everything you want to unless you have the backing of investors, or it was part of your mandate when you started your company, as was the case with Green & Black’s. “It was all around buying organic cocoa and cacao. The raw material is one of the most sprayed agricultural crops in the

world. Setting up as organic, we were specifically dealing with that. It was niche, and a high-risk niche, but one that others have copied now.”

Industry moves too slowly, he says. “We need to act now on things like regenerative agriculture. It has a baseline that has to be better for the planet – but this has to be driven by the consumer.”

FIVE COMMON HERBS AND SPICES CAN LOWER RISK OF HEART DISEASE

12 MAR 2024

<https://www.dailypost.co.uk/>



A new study has found that five herbs from the Mediterranean diet can lower the risk of heart disease. The research revealed that black cumin, cinnamon, ginger, curcumin and saffron can significantly reduce fasting blood glucose levels.

This means they could help cut your risk of chronic health conditions like heart and kidney disease, and also lower blood pressure. The study, carried out by Spanish researchers, was published in the *Nutrients* journal.

According to Diabetes UK, as many as 4.3 million people are now living with a diagnosis of diabetes in the country. More than 2.4 million people are at high risk of developing type 2 diabetes in the UK.

For this review and meta-analysis, databases including Web of Science, PubMed and Scopus were used to find peer-reviewed articles and interventional studies. These studies looked at different doses of spices and herbs and their effect on glycaemic profiles, reports Wales Online.

The study found that cinnamon supplementation significantly reduced fasting glucose. Curcumin showed a significant reduction and ginger supplementation demonstrated a reduction in fasting glucose.

Black cumin supplementation displayed a significant reduction in fasting glucose. Saffron also resulted in substantially lower levels. Overall, black cumin demonstrated the most substantial reduction in glucose levels, followed by cinnamon and ginger.

The study has identified the potential therapeutic benefits of various aromatic herbs and spices in the Mediterranean diet for diabetes management and prevention. Further research is needed to determine optimal dosages, but the good news is you can easily incorporate them into your diet.

Black cumin, cinnamon, ginger, curcumin and saffron are all available online or at supermarkets. These herbs and spices, combined with the Mediterranean diet, which features plenty of fruit, vegetables, whole grains, legumes and lean meat, have the potential to manage, prevent and even get rid of type 2 diabetes.

ORGANIC GINGER'S RESPONSE TO PROPAGATION, FERTILIZER IN HIGH-TUNNEL

MARCH 12, 2024

<https://phys.org/>



Ginger is one of the world's leading spice crops, and is used for both its medicinal and flavor qualities. It grows well in tropical regions and its rhizomes mature in eight to nine months from planting. Rising consumer demands for organically grown

crops in the U.S. provide the opportunity to add locally grown organic ginger to certified crop lists.

Typically ginger is grown from rhizome pieces, but can also be produced from seedlings. No information is available on how the seedling method compares with the rhizome seed piece method in organic culture. Information on the growing of organic ginger on small farms in the mid-Atlantic region is lacking.

Some of the challenges include; limited knowledge on rhizome storage, types of propagation materials for planting in the field or high tunnel, acceptable organic fertilizers that will not increase the excess phosphorus currently polluting the Chesapeake Bay watershed, and the economics of using organic practices.

A study published in the journal HortScience assessed plant development, soil nutrients, and economic feasibility of organic ginger derived from different storage conditions and planting materials when grown in different nutrient sources in a high tunnel.

Ginger can be grown from rhizome pieces (called seeds), from seedlings from mature rhizomes, or from micropropagated seedlings from buds, with the latter type of propagule known to produce disease-free material.

The study consisted of three experiments done over 3 years on a certified organic site at the University of Maryland Eastern Shore (UMES) Agriculture Experiment Station in Princess Anne, MD, U.S. (lat. 38°12'N, long. 75°42'W). Year 1 (2018) entailed investigating the effects of planting materials and organic fertilizer types on ginger development, economics, and soil nutrients. Because of the high weight loss of the rhizomes before the 2018 planting, the study was modified in 2019 (year 2) with the addition of rhizome storage as another factor. The 2019 experiment was repeated in 2020 (year 3).

The type of plant material used for growing ginger in the high tunnel had significant effects on all parameters measured, with the MS seedlings producing the greatest rhizome yield, tallest plants, and the greatest number of tillers. Rhizome-derived seed plants were generally shortest, but they had comparable yield to the SS seedling-derived plants. The MS seedling plants had greatest BCRs and PIs and will be more profitable to use as planting materials in high tunnels compared with SS seedlings and rhizome seeds.

The findings showed that ginger grown from multiple shoot transplant (MS) seedlings produced the highest rhizome yield, Benefit cost ratio (BCR), and Profitability index (PI), the tallest plants, and had some of the highest tiller

numbers. These results showed that it would be more profitable to use MS seedlings as planting materials in high tunnel compared to the single shoot transplant seedlings and the rhizome seeds.

Furthermore, the lower phosphorus levels in the Nature Safe fertilized soils compared to the Phytamin soils, and higher PI suggest that using Nature Safe will be a better choice than Phytamin for growing organic ginger.

According to the author, "This research was prompted by the need for information on the optimum type of propagating material for producing high tunnel organic ginger in a short growing season as well as determining the types of fertilizer acceptable for growing them while following organic and nutrient guideline standards."

Dr. Marsh is a retired professor of Agriculture, previously associated with the Department of Agriculture, Food and Resource Science, University of Maryland Eastern Shore.

MALAYALAM NEWS

ശരിക്കും ഞെട്ടിച്ചു, ബിഹാനിൽ കർഷകൻ വിളയിച്ചെടുത്തത് 15 കിലോ വരുന്ന റാഡിഷ്

Mar 8, 2024 <https://www.asianetnews.com/>



കിലോയ്ക്ക് 30-35 രൂപയ്ക്കാണ് ഈ റാഡിഷ് വിൽക്കുന്നത്. ഇത്രയും വലിയ റാഡിഷുകൾ കാണാൻ നിരവധിപ്പേരാണ് ഹരിനാമിന്റെ കൃഷിയിടത്തിൽ എത്തുന്നത്. ബിഹാനിൽ

നിന്നുള്ള ഒരു കർഷകൻ കൃഷി ചെയ്തെടുത്തത് 11 മുതൽ 15 കിലോഗ്രാം വരെ ഭാരമുള്ള റാഡിഷ്. എല്ലാവരെയും അമ്പരപ്പിച്ചിരിക്കുകയാണ് ഈ ഭീമൻ റാഡിഷ്. സാധാരണ ഒരു റാഡിഷ്

40-45 ഗ്രാം ഒക്കെയാണ് ഭാരമുണ്ടാവുക. അവിടെയാണ് ഇത്രയും വലിയ നാഡിഷുകൾ വിളവെടുത്ത് കർഷകൻ ഞെട്ടിച്ചിരിക്കുന്നത്. ബിഹാറിലെ ഭരത്പുരയിലെ റുദ്രാവൽ പട്ടണത്തിലെ നിംബഹേര ഗ്രാമത്തിൽ താമസിക്കുന്ന ഹരിറാം ശർമ്മ എന്ന കർഷകനാണ് ഇത്രയും വലിയ നാഡിഷ് കൃഷി ചെയ്തത്. രണ്ട് മൂന്നടി നീളവും 11 - 15 കിലോ ഭാരവും വരുന്ന നാഡിഷാണ് തന്റെ കൃഷിയിടത്തിൽ വിളഞ്ഞിരിക്കുന്നത് എന്നാണ് ഹരിറാം പറയുന്നത്. ഇത്രയും വലിപ്പം ഉള്ളത് കൊണ്ടുതന്നെ രണ്ടുപേരുടെ അധ്വാനം വേണ്ടി വന്നു അവ മണ്ണിൽ നിന്നും പറിച്ചെടുക്കാൻ.

കിലോയ്ക്ക് 30-35 രൂപയ്ക്കാണ് ഈ നാഡിഷ് വിൽക്കുന്നത്. ഇത്രയും വലിയ നാഡിഷുകൾ കാണാൻ നിരവധിപ്പേരാണ് ഹരിറാമിന്റെ കൃഷിയിടത്തിൽ എത്തുന്നത്. വളഞ്ഞ രീതിയിലാണ് അതിന്റെ ആകൃതി. ഇങ്ങനെ രൂപം കൊണ്ടും വലിപ്പം കൊണ്ടും വ്യത്യസ്തമായ നാഡിഷ് ഇവിടെയുള്ള ആളുകൾക്ക് വലിയ കൗതുകമാണ് സമ്മാനിക്കുന്നത്.

ഈ നാഡിഷിന്റെ വലിപ്പത്തിനും ഭാരത്തിനും കാരണം ഹൈബ്രിഡ് വിത്തുകളുടെ ഉപയോഗമായിരിക്കാം. കൂടാതെ, തന്റെ കൃഷിയിടത്തിലെ ഫലഭൂയിഷ്ടമായ മണ്ണും വിളകൾ നന്നായി വളരാൻ സഹായിക്കുന്നു എന്നാണ് ഹരിറാം ശർമ്മ പറയുന്നത്. ഇങ്ങനെ വലിപ്പവും ഭാരവും മാത്രമല്ല അതിന്റെ പ്രത്യേകത, നല്ല രുചിയും ഈ നാഡിഷിനുണ്ട് എന്നും ഹരിറാം ശർമ്മ പറയുന്നു. സാലഡുകളിലും മറ്റും ഈ രുചികരമായ നാഡിഷുകൾ ഉപയോഗിക്കാം എന്നും അദ്ദേഹം പറയുന്നു.

കിലോയ്ക്ക് 300 രൂപ വരെ വില കിട്ടും, കേരളത്തിലും കൃഷി ചെയ്യാം; തിരക്കുകൾക്കിടയിൽ നഗരസഭാ കൗൺസിലറുടെ കൃഷി മോഡൽ

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തിരുവനന്തപുരം: 'കൃഷി ചെയ്യാൻ താൽപര്യമൊക്കെയുണ്ട് പക്ഷേ സമയമാണ് പ്രശ്നം'. കൃഷിയിൽ വിജയകരമായി അവിനവമേന്മയുള്ള രാജുവിനെ കുറിച്ചറിഞ്ഞാൽ ഒരാളും കൃഷി ചെയ്യാൻ സമയമില്ലെന്ന് പറയില്ല. തിരുവനന്തപുരം ആറ്റിങ്ങൽ നഗരസഭാ കൗൺസിലറാണ് 50കാരനായ രാജു.

വീടിനോട് ചേർന്നുള്ള 35 സെന്റ് പുരയിടത്തിലാണ് മെക്സിക്കൻ പഴവർഗമായ ഡ്രാഗൺ ഫ്രൂട്ട് കൃഷി ചെയ്യുന്നത്. നഗരസഭ പ്രദേശത്ത് വിദേശ പഴവർഗം കൃഷി ചെയ്ത മികച്ച കർഷകനുള്ള പുരസ്കാരവും രാജു കരസ്ഥമാക്കിയിരുന്നു.

കിലോയ്ക്ക് 300 രൂപ വരെയാണ് ഡ്രാഗൺ ഫ്രൂട്ടിന് വില. ഒരിക്കൽ കൃഷി ചെയ്താൽ വർഷങ്ങളോളം വിളവെടുപ്പ് നടത്താനാകും. ഇവയെല്ലാം മനസ്സിലാക്കിയാണ് കൃഷിയിലേക്കിറങ്ങിയതെന്ന് രാജു പറയുന്നു. വർഷങ്ങൾക്ക് മുൻപ് വാഗമണിലേക്ക് വിനോദയാത്ര പോയപ്പോഴാണ് ഡ്രാഗൺ ഫ്രൂട്ട് കൃഷി കാണുന്നത്. അത് നിർണായകമായ വഴിത്തിരിവായി മാറി.

അവിടത്തെ കർഷകരോട് വിവരങ്ങൾ ചോദിച്ച് മനസ്സിലാക്കിയ ശേഷം യൂട്യൂബ് ചാനലുകളിൽ നിന്ന് കൃഷിയെ കുറിച്ച് കൂടുതൽ പഠിച്ചു. പിന്നെ പതിയെ കൃഷിയിലേക്ക് ഡ്രാഗൺ ഫ്രൂട്ട് കൃഷിയിലേക്ക് ഇറങ്ങി. അമേരിക്കൻ റെഡ് എന്ന ഇനമാണ് കൃഷി ചെയ്യുന്നത്.

ആദ്യം 500 ചെടിയാണ് നട്ടത്. ഇപ്പോൾ ആയിരം തൈ ചെടികൾ കൂടി നടുന്നതിനായി പാകപ്പെടുത്തിയിട്ടുണ്ട്. ഓരോ തടത്തിലും മൂന്നും നാലും ചെടികൾ നട്ടിട്ടുണ്ട്. ഇവ ചാഞ്ഞു പോകാതിരിക്കുന്നതിനായി സിമന്റ് പൈപ്പുകൾ സ്ഥാപിച്ച് അതിൽ കെട്ടി നിർത്തി ബലപ്പെടുത്തിയിട്ടുണ്ട്.

നട്ട് ആറ് മാസം കഴിയുമ്പോഴേക്കും ചെടികൾ പൂവിടും. 25 ദിവസം മുതൽ 30 ദിവസത്തിനകം പാകമായ പഴങ്ങൾ ലഭിക്കും. രണ്ട് വർഷം മുൻപ് തുടങ്ങിയ കൃഷിയിൽ ആദ്യ വിളവെടുപ്പിൽ തന്നെ നൂറ് കിലോയിലധികം പഴങ്ങൾ ലഭിച്ചു. രണ്ടര ലക്ഷത്തോളം രൂപ ആദ്യ കൃഷിക്ക് ചെലവായി. ഭാര്യയും മക്കളുമാണ് രാജുവിന്റെ സംരംഭത്തിന് സഹായികൾ.

ഏലയ്ക്കയിട്ട് തിളപ്പിച്ച വെള്ളം കുടിക്കുന്നത് പതിവാക്കൂ, ഗുണം ഇതാണ്

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ഏലയ്ക്കിൽ അടങ്ങിയിരിക്കുന്ന പോഷക ഗുണങ്ങൾ ശരീരത്തിലെ മോശം കൊഴുപ്പിനെ അകറ്റുന്നതിന് സഹായിക്കുന്നു. എൽഡിഎൽ കൊളസ്ട്രോൾ, ട്രൈഗ്ലിസെർഡുകൾ തുടങ്ങിയ ശരീരത്തിലെ ചീത്ത കൊളസ്ട്രോളിന്റെ അളവ് കുറയ്ക്കുന്നതിന് ഏലക്ക ഫലപ്രദമാണ്. ഭക്ഷ്യ വിഭവങ്ങൾക്ക് രുചിയും മണവും നാം ഏലയ്ക്ക ഉപയോഗിക്കാറുണ്ട്. എന്നാൽ അതിന് മാത്രമല്ല ധാരാളം ആരോഗ്യ ഗുണങ്ങൾ അടങ്ങിയിട്ടുള്ള സുഗന്ധവ്യഞ്ജനമാണ് ഏലയ്ക്ക. പാനീയങ്ങളിലും മധുരപലഹാരങ്ങളിലുമെല്ലാം ഏലയ്ക്ക ഉപയോഗിക്കാറുണ്ട്.

ദിവസവും അതിരാവിലെ ഏലയ്ക്ക വെള്ളം കുടിക്കുന്നത് ശരീരത്തിന്റെ മെറ്റബോളിസം നിയന്ത്രണത്തിലാക്കാൻ സഹായിക്കുമെന്ന് വിദഗ്ധർ പറയുന്നു. ഏലയ്ക്ക വെള്ളം യും കൊഴുപ്പ് കുറയ്ക്കുന്നതിനും സഹായിക്കുന്നു.

അടിവയർ പോലുള്ള ശരീര ഭാഗങ്ങളിൽ കൊഴുപ്പ് അടിഞ്ഞുകൂടുന്നത് തടയാൻ ഏലയ്ക്ക സഹായിക്കുന്നു. കൊഴുപ്പ് ശരീരത്തിൽ അധികമായി അടിഞ്ഞുകൂടുന്നത് ഉപാപചയ പ്രവർത്തനത്തെ തടസ്സപ്പെടുത്തുകയും ഹൃദയസംബന്ധമായ പ്രശ്നങ്ങളെ വർദ്ധിപ്പിക്കുകയും ചെയ്യുന്ന ഒന്നാണ്. ഏലം പതിവായി കഴിക്കുന്നത് അടിഞ്ഞുകൂടുന്ന

കൊഴുപ്പിനെ അകറ്റുന്നതിന് സഹായിക്കുന്നു. നല്ല ദഹനം നടക്കുന്നത് വഴി ഉപാചയയെ പ്രക്രിയ മികച്ചതാകുകയും അത് വഴി ശരീര ഭാരം കുറയുകയും ചെയ്യുന്നു.

ഏലയ്ക്കിൽ അടങ്ങിയിരിക്കുന്ന പോഷക ഗുണങ്ങൾ ശരീരത്തിലെ മോശം കൊഴുപ്പിനെ അകറ്റുന്നതിന് സഹായിക്കുന്നു. എൽഡിഎൽ കൊളസ്ട്രോൾ, ട്രൈഗ്ലിസെറൈഡുകൾ തുടങ്ങിയ ശരീരത്തിലെ ചീത്ത കൊളസ്ട്രോളിന്റെ അളവ് കുറയ്ക്കുന്നതിന് ഏലക്ക ഫലപ്രദമാണ്.

രക്തത്തിലെ പഞ്ചസാരയുടെ അളവ് നിയന്ത്രിക്കാനും ഗ്ലൂക്കോസ് കൊഴുപ്പായി സംഭരിക്കുന്നതിനുള്ള സാധ്യത കുറയ്ക്കാനും ഇവ സഹായിക്കും. അതിനാൽ പ്രമേഹ രോഗികൾക്കും ദിവസവും ഏലയ്ക്ക വെള്ളം കുടിക്കാം. ആൻറി ബാക്ടീരിയൽ ഗുണങ്ങൾ അടങ്ങിയ ഏലയ്ക്ക വായ്നാറ്റം അകറ്റാനും സഹായിക്കും. അതിനാൽ ഭക്ഷണത്തിന് ശേഷം, ഏലയ്ക്ക വെള്ളം കുടിക്കുന്നത് വായ്നാറ്റം അകറ്റുന്നതിന് ഫലപ്രദമാണ്.