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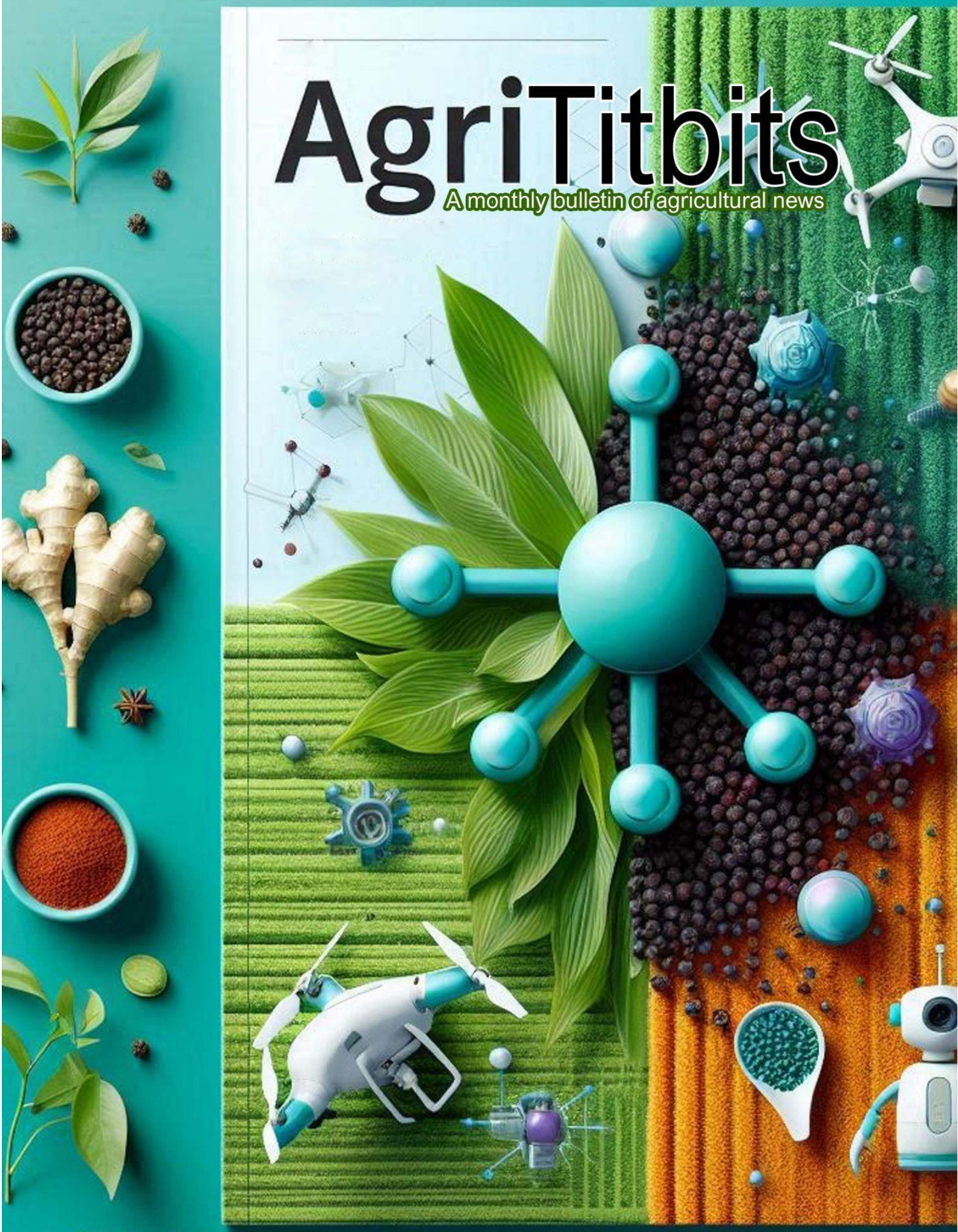

Agri Titbits is an effort to collect and preserve agricultural news, especially spices, appearing in newspapers and online media.
Published by Director, ICAR-IISR, Kozhikode
ICAR - Indian Institute of Spices Research

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SPICES

Black pepper spices up income of Adivasi coffee farmers in Andhra Pradesh

https://www.thehindubusinessline.com/ September 02, 2025

Venkataiah, a veteran coffee farmer at Chinabarada village, has noticed his peer next door has just earned Rs 30,000 by selling a bag full of black pepper. “Oh! Did they earn so much on a single bag? It acted as a great attraction not just to me but to my fellow farmers as well,” he says.

“If three bags of pepper come, those three bags bring them a lakh rupees, even after deducting expenses, there will be 50,000 in hand,” he says.

Pepper, which is being grown as an inter-crop with coffee plantation, is spicing up the income of Adivasi farmers in the Eastern Ghats. Though it is a normal practice in other coffee-growing areas to grow black pepper as an intercrop, the Adivasi farmers in coffee are just realising how important the spice crop is to augment their revenues.

Their interest in this crop has increased over the last three to four years, following a significant rise in its price. The pepper prices are ruling around ₹650 a kilogram as against the coffee’s ₹450. Though not quite enthusiastic about this crop till recently, farmers have seen its potential as the prices are shooting up over the last two to three years. From about ₹400 a kg in 2023, the price now rules at ₹650, significantly increasing the farmers’ incomes.

Farmers say pepper turned their prospects around as it yields around 150-200 kg an acre, ensuring good financial support. P Kannababu, a 51-year-old farmer from Pedabarada village, which is 110 km away from Visakhapatnam, has factored in black pepper as an inter-crop crop right from day one on his new one-acre coffee plot. Showing the coffee plants, grown under the shadow of silver oak trees, which are ripe for harvest later this year.

Satyanarayana D, a veteran Adivasi farmer from the same village, manages five acres of coffee and pepper, with an average annual income of ₹2 lakh per acre from coffee and an additional ₹60,000 each from pepper.

Organic certification

Kalpana Kumari, Managing Director of Andhra Pradesh Girijan Cooperative Corporation (GCC), has said that black pepper will be the second crop after coffee to get the Organic Certification. “As it grows in the coffee plantations that are certified as organic, it becomes easy for black pepper on the same field to get that tag,” she said. This move towards organic certification is expected to fetch higher prices for farmers.

The GCC, however, doesn’t procure this spice crop as there is enough appetite for it in the market. Tata Consumer Products Limited, which has agreed to purchase 10 tonnes of organic Araku Coffee from the GCC, has also expressed interest in procuring black pepper and other products as soon as it receives the organic certification, Thanga Srinivasa Rao, Senior Manager (Coffee) of GCC, said. Out of the total area of 2.5 lakh acres of coffee in the Agency area, about 6,000 acres of coffee plantations received the organic certification. The GCC is planning to expand the organic certification coverage for the entire coffee area over the next few years.

Top 10 Spice-Producing Countries in the World (2025)

https://www.jagranjosh.com/ Sep 24, 2025

Spices are an important part of Indian food. Learn about top 10 spice-producing countries 2025. Discover leading spice exporters, spice production, chili, black pepper, cardamom, cinnamon, cloves, ginger, and vanilla. Spice-Producing Countries: Spices have been an essential part of human culture, cuisine, and trade for centuries. They not only enhance the flavour of food but also provide medicinal, preservative, and aromatic properties. In 2025, certain countries dominate spice production globally, growing a wide range of spices such as black pepper, cardamom, turmeric, chilli, cloves, and vanilla. These countries play a crucial role in the

global spice market, supporting exports, livelihoods, and international culinary traditions. Keep reading more about top spice-producing countries in the world.

Top 10 spice-producing countries in the world

1. India

India remains the largest spice-producing country in the world. It grows over 75 types of spices, with chilli being the most cultivated. Other major spices include black pepper, cardamom, turmeric, cumin, and coriander. States like Kerala, Karnataka, Tamil Nadu, and Andhra Pradesh are the top spice-producing regions. India's spices are highly sought after worldwide, and the country dominates global spice exports, supplying markets across Asia, Europe, and North America. Spice farming in India supports millions of farmers and has a long-standing history dating back thousands of years.

2. China

China ranks second in global spice production, with ginger as its leading spice. The country also produces large quantities of star anise, Szechuan pepper, and cinnamon. Key cultivation areas include Guangxi, Yunnan, and Sichuan provinces. Chinese spices are essential ingredients in Asian cuisine and are widely exported, making China one of the top spice exporters globally. The government invests in modern farming methods and research to improve spice yield and quality.

3. Vietnam

Vietnam is the largest producer and exporter of black pepper in the world. Provinces like Dak Lak and Gia Lai in the central highlands provide optimal conditions for cultivation. Black pepper is Vietnam's most important spice, and it supplies a significant portion of global demand. Vietnam has modern spice farming techniques and quality control measures to ensure its spices meet international standards. Vietnamese black pepper is highly valued for its pungency, aroma, and consistency.

4. . Indonesia

Indonesia is globally recognized for cloves, which are its top spice. The country also produces nutmeg, cinnamon, and pepper. Key cultivation regions include the Maluku Islands and Sumatra. Indonesia's spices have played a historic role in global trade, and the country continues to be a major player in the international spice market. Spice cultivation in Indonesia supports local communities and contributes significantly to export revenue.

5. Sri Lanka

Sri Lanka is famous for Ceylon cinnamon, regarded as one of the finest varieties in the world. Other spices include black pepper, cardamom, and cloves. The country's spices are prized for their aroma, flavor, and quality. Sri Lanka remains a key spice exporter, with

cinnamon and cardamom leading global markets. Traditional cultivation practices combined with modern processing ensure high-quality spice production.

6. Thailand

Thailand's top spice is chilies, followed by garlic and white pepper. Regions like Chiang Mai, Lampang, and northern provinces are major spice-growing areas. Thai spices are essential for local cuisine and are widely exported. Thailand is one of the leading spice-producing countries in Asia, with spice farming contributing significantly to its agricultural economy. The country continues to expand production using sustainable farming practices.

7. Egypt

Egypt produces garlic as its main spice, along with chili and coriander. The fertile Nile Delta and Upper Egypt provide ideal soil and climate for spice cultivation. Egyptian spices are exported to Europe, the Middle East, and Asia. Egypt's spice industry has grown steadily, making it one of the top spice-producing countries in Africa. Spice farming also supports local employment and traditional agricultural practices.

8. Brazil

Brazil's most cultivated spice is black pepper, with chili, paprika, and nutmeg also grown. Key regions include Bahia and Pará. Brazil's tropical climate allows for high-yield spice production, and the country exports spices to international markets. Brazilian spice cultivation is expanding with modern techniques and quality control measures, strengthening its position in the global spice market.

9. Myanmar

Myanmar's top spice is ginger, with turmeric and chili also widely grown. Traditional cultivation methods are combined with modern approaches in some regions to improve quality and yield. Myanmar's spices are increasingly exported to neighboring countries and beyond, contributing to the nation's spice export industry. Ginger from Myanmar is valued for its flavor, aroma, and medicinal properties.

10. Madagascar

Madagascar is famous for vanilla, which is its most important spice. Cloves are also produced in significant quantities. The island's unique soil and tropical climate produce high-quality spices that are highly sought after internationally. Madagascar remains a major player in the global spice market, particularly for natural vanilla, which is essential for food, cosmetics, and fragrance industries.

Interesting Facts About Spices

1. India Leads Global Spice Production

India produces the highest variety of spices worldwide, with chili as the most dominant crop. It remains the top supplier in the global spice market.

2. Indonesia’s Historical Importance

The Maluku Islands, or “Spice Islands”, were central to historic spice trade and remain major producers of cloves and nutmeg.

3. Vietnam Dominates Black Pepper

Vietnam produces over 30% of the world’s black pepper, making it the largest exporter globally.

4. Sri Lanka’s Premium Cinnamon

Ceylon cinnamon from Sri Lanka is considered the finest due to its aroma, flavor, and oil content.

5. Global Spice Trade Growth

The international spice market is growing steadily, driven by demand for organic spices, natural flavours, and international cuisine.

Patented nutmeg helps farmer crack dipping yield curve

https://www.newindianexpress.com/ 19 Sep 2025

The decline in yields was proving a difficult nutmeg to crack. That’s when Pushkaran T M began the search for high-quality varieties. He investigated, interacted and experimented with various species over three decades. And, his efforts paid off in the form of a patent from the central government for a variety he developed – the thottanal jaathi.

The Adimaly farmer developed his nutmeg 25 years ago through cross-pollination. “We are organic farmers and do not use chemical fertilisers or pesticides. However, though we tried several varieties of nutmeg, including hybrid, the result was not good. It took many years to develop a new variety. We met hundreds of farmers across the state and collected the data of thousands of nutmeg trees. The new variety was developed by cross-pollinating two to three varieties,” recounted Pushkaran.

The thottanal variety has high-weight fruit (more than 15 grams) and seed (over 7 grams) – the average seed weight is 3-3.5 grams.

“It is easy to remove the seed of the thottanal variety from the fruit and it does not break. The variety’s flower petals attract a 25-45% higher price in the market. The tree grows well up and sideways. The branches are distanced from each other, which allows to be exposed to good wind and sunlight. It is also easier to harvest the crop. The branches grow well sideways and are strong and healthy,” the 55-year-old added. He has planted around 40 more saplings of thottanal variety. Kerala is one of the primary producers of nutmeg in India, and production is higher compared to other spices. Total production of nutmeg in the state rose to 18,000 metric tonnes (MT) in 2024-25 from 14,911 MT in 2021-22. Pushkaran applied for a patent back in November 2017. However, procedures were delayed by Covid. “A team of experts visited the farm and inspected my nutmeg trees and seeds. We have been selling seeds in the local market. And we get a 20% premium on our produce. The patent was awarded last December. I now plan to develop more high-quality varieties,” he added.

New variety

The thottanal variety has high-weight fruit (more than 15 grams) and seed (over 7 grams) – the average seed weight is 3-3.5 grams The variety’s flower petals attract a 25-45% higher price in the market. Tree banches grow sideways and are strong and healthy

RESEARCH NEWS

Choudhury leading explainable AI project in agriculture

September 3, 2025 https://ianrnews.unl.edu/

University of Nebraska–Lincoln professor Sruti Das Choudhury is developing artificial intelligence that can give farmers the reasoning behind its answers. Scientists like Das Choudhury use farm data and artificial intelligence to recommend important farming decisions, but how can

farmers trust those decisions? Farmers can see the information entered into AI and can see the answer or recommendation AI spits out, but they cannot see how AI came to that decision or whether it is just hallucinating. Das Choudhury is leading two School of Natural Resources projects related to this, "Explainable AI for Precision Agriculture: A Data-Driven Approach to Crop Recommendation" and "Explainable Artificial Intelligence for Phenotype-Genotype Mapping Using Time-Series Data Analytics." In the first project, her team aims to make AI explain its decisions and what factors influenced those decisions most. For example, if AI is asked to recommend a crop to plant in a field and is fed about 50 pieces of information about the field, like pH level, rainfall and temperature range, explainable AI will reveal which factors influenced its decision most and to what extent. "We will have an answer, an explanation of the output of the model, and we can verify that explanation with the existing knowledge of the farmers," Das Choudhury said. Explainable AI has been used in other fields, but if Das Choudhury's two projects are successful, she will be one of the first to use it for neural-network-based phenotype-genotype mapping using a realistic time-series multimodal image dataset. She said she expects explainable AI to build farmers' trust in its answers. "That's the idea, like deeper insight into the predictions that AI model is doing, and if we can do that, that will make the model more transparent, interpretable and trustworthy and will adhere to the ethical aspects of AI," she said. Working with her on the project are Sanjan Baitalik and Rajashik Datta, two senior undergraduate students at the Institute of Engineering and Management in Kolkata, India. The team started the research in January 2025 and already has begun seeing results. "We achieved results quite fast, honestly," Das Choudhury said. "Like, we submitted a paper in early August because we did it at a rapid pace." All of the scientists have been working on the project as volunteers because they have been unable to secure funding. Das Choudhury said she hopes that once they have an established groundwork and preliminary results, that will strengthen their applications for funding. She has been seeking grants to compensate the students beyond the opportunity to learn from her. Baitalik said that although he had explored and studied different AI interpretability techniques in coursework before the project, he had not had the chance to apply them in real-life problems. In the project, he has been applying explainable AI techniques such as LIME and SHAP and working with a large agricultural dataset. "Applying these methods in a practical context helped deepen my comprehension of their utility and limitations," he said. "It also gave me the opportunity—thanks to Dr. Das Choudhury—to contribute to cutting-edge research." The other student on the project, Datta, has focused on developing and evaluating machine learning models for

crop classification and pattern recognition. She has used algorithms such as K-means, DBSCAN and Gaussian Mixture Models along with deep neural networks to better interpret patterns related to crops. She also used TensorBoard to visualize training and testing dynamics and clustering behavior. "Beyond technical growth, the project has improved my ability to communicate complex model behavior in ways that are interpretable to non-technical users, which is an essential skill in AI development for impactful applications," she said. Das Choudhury said her goal is to build a team of AI scientists to work on applying explainable AI in different fields such as agriculture. She has started four explainable AI projects in agriculture, including the one using AI to recommend crops to plant. She has developed a machine learning model to predict a crop's genotype from its phenotypes. She said she would like to use explainable AI to ensure the model is predicting the right output. Phenotypes are visible traits, like leaf shape and plant height, but a plant's genotype is its complete set of genetic material that can influence its phenotypes. Environment, nutrition and other factors can also influence phenotypes. Alongside this AI research, Das Choudhury has proposed a semester-long course, "Artificial Intelligence, Computer Vision and Data Analytics for Agriculture and Natural Resources," to be offered through the School of Natural Resources and the Department of Biological Systems Engineering. The course would include a couple of units on explainable AI. Das Choudhury said successful research of explainable AI in agriculture would be a novel contribution that would make AI's ethical aspects more apparent to users. "It would help farmers understand why an AI system makes certain predictions or decisions rather than having to just accept the decisions blindly," she said.

Do Small Farms Outperform Big Ones? A Study Reveals Changes Over 40 Years in India

In agriculture, bigger hasn't always meant better. Studies since the 1960s have shown that smaller farms are generally more productive than large farms in terms of yield per acre. This trend ran contrary to the industrial logic and puzzled researchers and policymakers. Globally, as smallholders and family farms hold nearly 90% of the agricultural land, this trend has been influencing both policies and investments in agriculture for decades.

Now, a new study by researchers at the Indian Institute of Technology Bombay (IIT Bombay) and the University of Hyderabad adds fresh nuance and a few twists to this age-old puzzle. The findings suggest that the inverse farm size-productivity relationship, where the productivity decreases as the farm size increases, was never as pronounced in the semi-arid regions of India. As agrarian distress dragged on in these regions, the productivity advantage of small farms had faded in the later years (2009-2014).

"The relationship between farm size and farm productivity in the developing world has been debated for several decades. What our findings show is that smallholders still matter greatly for food security and rural stability, but they are increasingly vulnerable due to monocropping and high input costs. We believe that the way forward is to strengthen the capacity of smallholders by improving their access to appropriate technologies, affordable credit, and reliable extension services," says Prof. Sarthak Gaurav from Shailesh J. Mehta School of Management, IIT Bombay and a coauthor of the study.

For the study, researchers relied on village-level studies from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) datasets spanning over four decades from 1975 to 2014. This extensive database is considered one of the world's longest-running agricultural panel studies from semi-arid tropics, as it tracks farming households across multiple decades. Despite the availability of rich panel data on villages in India's semi-arid tropics, researchers found that the understanding of the long-term dynamics of farm size and productivity was lacking.

Most non-coastal parts of peninsular India fall in the semi-arid tropics, a region that missed out on the early benefits of the Green Revolution. It is a region where farming depends heavily on erratic rains that typically range between 400 and 800 millimetres annually. While this belt spans multiple states, the ICRISAT data is mainly from three representative

zones: Akola, Solapur, and Mahabubnagar. The researchers explain that the unique agroecological and institutional conditions here make it an ideal setting to understand how productivity patterns changed in response to delayed but significant transitions in agriculture.

The new research is possibly the first study on the dynamics of the farm size and productivity in India's semi-arid tropics. The researchers faced their fair share of challenges analysing the vast ICRISAT datasets. Since the data was collected in different phases, they had to spend months merging household and cultivation data across survey waves. Given the long time frame, data inconsistencies necessitated adjustments to the methodology, including a shift from plot to household-level analysis. The study also relied on external sources, such as the India Meteorology Department's (IMD) gridded data, to fill the gaps.

The researchers found that small farms were indeed more productive, especially in the early years (1975–84). Earlier studies have offered various explanations for this inverse relationship between farm size and productivity. The most common explanation was that smallholder farmers tend to put in far more intensive family labour, give higher attention, and add more fertilisers per unit compared to larger landholders. However, the new study proves that even during those early years, the productivity scale was not as tilted towards small farms as previously thought.

The inverse advantage of small farms was, in fact, statistically insignificant once the team controlled for the amount of labour and fertiliser that went into each plot.

"Both labour and non-labour inputs, such as seeds, fertilisers, and machinery, had a strong positive association with land productivity. This suggests that what matters is not just the size of the land but how effectively that land is cultivated," explains Prof. Gaurav.

But, there's a catch. While input intensity boosts gross productivity, it doesn't necessarily improve profitability. Therefore, even though smallholder farmers may have seen higher yields per acre, the needle on profit per acre may not have moved either way. Furthermore, for small farmers, crop diversification often acts as an insurance against weather shocks and market volatility. But the study shows that it actually reduces both productivity and technical efficiency. These results challenge the long-held assumption that small farms are more productive, highlighting why they continue to struggle financially.

Another important result from the study is that the inverse pattern has weakened in recent years, but not fully reversed, despite extensive mechanisation.

"We expected that with rising farm mechanisation and better access to markets, the relationship might turn positive by the later years. But even by 2014, the relationship had

only shifted to an insignificant positive and had not fully flipped. That persistence tells us something important about how uneven or slow structural change can be in regions like the semi-arid tropics," emphasises Prof. Gaurav.

In a country where small farmers with less than two hectares comprise nearly half of the nation's farming population, the new study's findings have far-reaching implications in several aspects, including food security, poverty alleviation, sustainability, agriculture policies, and land reforms in the agricultural sector.

Among multiple policy insights, Prof. Gaurav recommends prioritising improvements in smallholders' collective capacity to access markets and inputs.

"Many of the challenges we observed were not just about farm size but about weak linkages to input and output markets, and limited access to knowledge or infrastructure. Helping smallholders organise into collectives or producer groups can enable them to pool resources, adopt agroecological practices, and negotiate better prices," explains Prof. Gaurav.

The study has its limitations, from its reliance on self-reported data from farmers to a limited focus on one particular agroecological zone. However, the findings prove that the farm size-productivity relationship is complex, context-dependent, and much weaker than previously thought. This doesn't mean small farmers are losing their edge, but underscores the crucial support they need to adapt. The challenge lies in preserving the benefits of small farms, such as employment generation and food security, while enhancing their economic viability.

From China to India: Can perennial rice rewrite water use in agriculture?

05 Sep 2025 https://www.indiawaterportal.org/

India's water crisis is inseparable from its rice fields. As the nation's most water-intensive crop, rice consumes nearly a quarter of irrigation withdrawals, pushing groundwater reserves to alarming lows in states like Punjab, Haryana, and Tamil Nadu. With climate change driving erratic monsoons and rising temperatures, India's dependence on conventional paddy farming is becoming increasingly unsustainable. Enter perennial rice—a scientific breakthrough that regrows season after season without replanting, drawing from deeper roots and demanding far less irrigation.

A new study, 'Perennial rice – An alternative to the 'one-sow, one-harvest' rice production: Benefits, challenges, and future prospects' by researchers Vijayakumar Shanmugam et al., published in Farming System, lays out the promise of perennial rice for India. It dives into its genetic foundation, environmental implications, and on-ground performance, offering an in-depth review of how perennial rice could potentially shift the nation's rice economy towards greater sustainability and resilience. But what makes perennial rice so radical?

What is perennial rice?

The study describes perennial rice as a cross between Oryza sativa (cultivated rice) and Oryza longistaminata (a wild, rhizomatous African species), bred primarily by scientists at the Yunnan Academy of Agricultural Sciences (YAAS). After years of molecular breeding and genetic selection, China released PR23 in 2018, which is a perennial rice variety that has since shown promising yield stability in various agroecological zones.

Unlike conventional rice, which needs to be replanted every season, perennial rice can regrow from the same root system for multiple years typically up to 5 seasons. Thanks to its rhizome-based regeneration, which means that once established, it doesn't require tilling, sowing, or nursery preparation between cycles.

Growing grain without draining groundwater

Ask any farmer in India what keeps them awake at night, and the answer often circles back to water. Rice, our staple grain, is also one of our thirstiest crops, demanding between 3,000 and 5,000 litres of water just to produce a single kilogram. Add to that the practice of puddling, where fields are deliberately flooded, and we're not just feeding rice, we're

bleeding water. So much of it vanishes through evaporation and seepage, while the soil beneath is left degraded and gasping methane into the air.

This is where perennial rice changes the story. Because it doesn't need replanting every year, farmers avoid the most water-intensive steps—nursery raising, transplanting, and repeated flooding. Instead, its deep, established roots tap into subsoil moisture, needing less frequent and lighter irrigation. It's not about drenching fields anymore; it's about steady, efficient watering that keeps crops alive while protecting groundwater. Early trials show the difference is dramatic—up to 30–40% less water use compared to conventional rice. For water-stressed states like Punjab, Haryana, and Tamil Nadu, where aquifers are sinking fast, that's not just a statistic. It could mean the difference between survival and collapse for future rice cultivation. Think of what happens when a paddy field is constantly flooded. The standing water doesn't just vanish into thin air—it evaporates, it seeps away, it carries nutrients down with it. Farmers lose precious moisture, soil fertility takes a hit, and weeds find their chance to flourish. Perennial rice offers a way out of this cycle. With no puddling and less standing water on the surface, these fields hold on to their moisture instead of losing it. The result? Less evaporation, fewer waterlogged patches, and soils that can feed plants more efficiently. And there's another layer that contributes to climate resilience. With deeper roots and better moisture retention, perennial rice weathers erratic rains and short droughts far more gracefully than conventional rice. That's crucial as India faces more unpredictable monsoons every year. No wonder researchers see a natural fit with national water programs like Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) and Atal Bhujal Yojana. If perennial rice is integrated into such efforts, it won't just save water—it could strengthen food security while building resilience into our farmlands.

Perennials as allies for water, biodiversity, and balance Other than this, perennial rice has the potential to solve several entrenched problems of Indian agriculture like:

Labour and cost savings: Paddy cultivation in India is extremely labour-intensive—especially during land preparation and transplanting. By eliminating the need to replant annually, perennial rice could reduce labour inputs by 50–60%, as well as cut costs for seeds, fuel, and irrigation. This is especially significant in eastern India, where outmigration has left behind labour-scarce rural areas. Soil health and carbon sequestration: Continuous tilling damages soil structure and accelerates organic carbon loss. With perennial root systems intact year-round, soil erosion is reduced, and organic matter builds up over time. Studies cited in the paper suggest increased microbial biomass and improved soil nutrient profiles in fields with perennial rice.

Climate resilience: India's climate variability that includes intense monsoon flooding, unseasonal droughts, and heatwaves is making annual cropping less predictable. The robust root systems of perennial rice improve water retention and allow plants to recover faster from stress events. With climate risks projected to increase, especially in states like Odisha, Assam, and Bihar, such resilience could be crucial. Biodiversity and agroecology: Perennial systems promote better ecosystem services—pollination, pest control, and biodiversity retention. Unlike monocultures that are cleared after harvest, perennial fields offer stable habitats for insects and birds. There's also reduced herbicide and pesticide use due to lower weed pressure in undisturbed soils.

Deep roots for resilience in a changing climate

Field trials in China show perennial rice yields of 6.8–7.5 tons per hectare in the first year and 5.4–6.3 tons in subsequent years. While slightly lower than top-performing hybrids, the cumulative yield across years without the cost of replanting, makes it economically superior. In comparative cost-benefit assessments, perennial rice cultivation saves up to 40% in total input costs over a three-year cycle. These include savings on seeds, fuel, irrigation, and fertilizers. While Indian trials are still in the early phase, pilot studies in Tamil Nadu and Odisha suggest similar trends. One farmer in Mayurbhanj who participated in an informal trial told researchers: "I could see the shoots come up even after I thought the crop was over. It was a surprise—and a relief, especially when my neighbour had to spend again on seeds after a flood."

Barriers and challenges

However, the perennial rice revolution is not without its complications.

Genetic instability and yield decline: Over successive seasons, the yield of some perennial rice varieties tends to decline. This is often due to the degeneration of tillers, pest buildup, or nutrient depletion. Researchers are still working to breed more genetically stable and pest-resistant lines for Indian conditions. Disease and pest pressure: Continuous cropping can attract pests and diseases that would otherwise be broken by seasonal fallows. Integrated pest management strategies would need to be tightly woven into perennial systems.

Seed market disruption: With fewer seed purchases each year, traditional seed markets—and their supply chains—could be disrupted. "Seed producers may see this as a threat," the paper warns, suggesting the need for new institutional models to manage perennial seed certification and distribution. Farmer training and extension: Transitioning to perennial rice requires a shift in agronomic practices. Extension agencies will need to train farmers on pruning, nutrient cycling, pest surveillance, and water management in perennial systems.

Policy support and incentives: Without institutional support, perennial rice may struggle to scale. Current input subsidies, crop insurance norms, and yield monitoring systems are tailored for annual crops. Policies must be adapted to accommodate perennial timelines and performance metrics.

Global context and India's role

The push for perennial grains has gathered momentum globally. In the U.S., The Land Institute has developed Kernza (a perennial wheat). In Africa, trials on perennial sorghum are underway. China has already brought over 15,000 hectares under perennial rice, with plans to scale up. For India, this could be a pivotal moment to lead South Asia in perennial grain research. The Indian Council of Agricultural Research (ICAR), the Central Rice Research Institute (CRRI), and state agriculture universities are ideally positioned to pilot region-specific trials and breeding programs.

A path forward

Perennial rice is not a silver bullet, but it could be a powerful piece of the sustainable agriculture puzzle. The authors advocate for a phased rollout:

Short term (0–3 years): Launch region-specific trials in five agro-climatic zones; initiate awareness campaigns and farmer field schools.

Medium term (3–5 years): Develop genetically stable and pest-resistant Indian cultivars; create pilot models for input savings and market linkages.

Long term (5–10 years): Integrate perennial rice into climate-resilient agriculture schemes, including PM-KUSUM and National Mission on Sustainable Agriculture.

At its core, the idea is to shift from extractive to regenerative agriculture. As the paper notes, "Perennial rice is not just a crop, it's a philosophy of farming that aligns with how nature actually works."

Perennial rice represents a powerful opportunity for India to rethink how food and water systems intersect. By cutting irrigation demand, reducing labour dependence, and enhancing resilience to climate extremes, it addresses some of the deepest cracks in India's agricultural model. Yet, its future hinges on more than agronomy. Farmer acceptance, supportive policies, and inclusive research will determine whether perennial rice can scale. Integrating it into national water conservation programs, crop insurance frameworks, and state-level extension systems could transform it from a scientific curiosity into a cornerstone of climate-smart agriculture. If nurtured carefully, perennial rice may do more than yield grain; it could restore balance between farming and water, ensuring India's fields thrive without draining its aquifers.

Resilient Harvests: The Promise and Debate Around India's Gene-Edited Rice

https://www.orfonline.org/ Sep 24, 2025

The Indian Council of Agricultural Research's launch of two climate-resilient, gene-edited rice varieties marks a scientific breakthrough for sustainable agriculture, but it also reignites debates over biosafety, ethics, regulation, and farmer access. In a notable milestone for India's agri-biotechnology sector, the Indian Council of Agricultural Research (ICAR) announced the development of two gene-edited rice varieties that display climate resilience and enhanced productivity, achieved without any introduction of foreign DNA. Despite marking a tremendous step towards sustainable agriculture and food security, the release sparked public debate over biosafety, ethics, and consumer acceptance, necessitating a nuanced assessment of gene-edited food crops in the Indian context.

Food Security and Climate Change

India is the largest producer of rice globally and relies on rice for its food and nutritional security. Rice cultivation, however, is hampered by low yield, drought, and soil salinity, which are ubiquitous in Indian farming regions, but exacerbated by climate change. States in the Indo-Gangetic Plains, which contribute to over 50 percent of India's agricultural production, face unpredictable rainfall patterns and drought conditions, damaging agricultural output. Reduced rice production led India to curb its rice exports in 2022 and 2023 and renewed calls to develop resilient varieties of rice, wheat, and millets for long-term sustainability. Conventional breeding is time-consuming, while genetically modified (GM) techniques are subject to intense regulatory and safety scrutiny. In contrast, gene-editing (GE) technologies enable an accelerated, precise, and affordable method for plant breeders. Several GE crops are in laboratory studies, field trials, or are approved for

commercial cultivation globally. Japan's Sanatech Seed's GABA-enriched tomato (GABA or γ-aminobutyric acid is a neurotransmitter that has health-promoting effects), which lowers blood pressure, was the first CRISPR-edited foodstuff to enter the market. Bayer, along with South Korean biotech company G+FLAS, is working on producing Vitamin D3-fortified tomatoes to address Vitamin D deficiency, while Corteva is developing waxy corn for the food manufacturing industry.

Scientific Breakthrough

The development of two GE rice varieties - RR Rice 100 (Kamala) and Pusa DST Rice 1 – was announced by ICAR in May 2025. Using a CRISPR/Cas9 gene-editing platform, scientists carried out precise gene edits through Site-Directed Nuclease-1 (SDN-1), enhancing yield and improving adaptation to salt, drought, and climate stressors. In contrast to GM crops, gene editing does not involve the introduction of foreign DNA but instead targets small changes in an organism's own DNA. The DRR Rice 100 (Kamala) variety, developed by ICAR-IIRR, is based on the popular Samba Mahsuri (BPT 5204). Gene-editing of cytokinin oxidase (OsCKX2), an enzyme that regulates plant growth, resulted in a variety that displays greater yield, early maturity, and reduced reliance on fertilisers. The Pusa DST Rice 1 variety, developed by ICAR-IARI, is based on MTU1010 and was engineered by knocking out the gene (DST) responsible for suppressing stress resistance. The edited crop displays salt and drought tolerance, with yield potentially increasing up to 20 percent. Researchers are already investigating the application of gene-editing technologies in other crops, including wheat, pulses, oilseeds, cotton, tobacco, tomato, banana, and tea.

India's GMO Legacy and Public Scepticism

The development of GE rice varieties in India is a significant stride in closing the gap between innovation and policy. However, the announcement sparked public debate and protest with concerns over biosafety, ethics, farmer access, and intellectual property rights (IPR). For these crops to be adopted and accepted by consumers, policies must address the issues that have complicated India's experience with GMOs to garner public trust.

Much of the scepticism stems from India's experience with GM crops. Since the release of Bt cotton in 2002, India's agri-biotechnology sector has been marred by controversy and policy uncertainty. Despite the widespread cultivation of Bt cotton, the moratorium on Bt brinjal in 2010, delays in the commercial cultivation of GM mustard, and the absence of a comprehensive national GM crop policy have created public mistrust. Dwindling private sector investment, reduced public sector momentum, and farmers - especially smallholders

- being left to face climate and pest infestation volatilities without access to the latest technologies have further deepened this mistrust.

Global Regulatory Landscape

Globally, the regulatory landscape of gene-editing technologies in agriculture is highly fragmented. Countries such as the United States (US), Canada, Japan, Australia, Chile, Brazil, Kenya, and Ecuador place crops modified through SDN-1 and SDN-2 outside the ambit of stringent GM regulations. This is because, molecularly, the gene edits that occur by SDN-1 and SDN-2 are indistinguishable from changes that would occur naturally or through conventional mutagenesis. Japan, a pioneer of GE food products, follows a similar framework but allows GE foods to be sold to consumers without any safety or environmental testing. Recognising the potential of gene-editing, India's Department of Biotechnology (DBT) issued guidelines in 2022 that distinguish SDN-1 and SDN-2 edits from GMOs, placing them on an accelerated regulatory pathway. Further, GE-crops developed using SDN-1 and SDN-2 are exempted from the stringent GM approval process put in place by the Food Safety and Standards Authority of India (FSSAI). Thus, India's GE rice varieties will now undergo extensive trials for multiple seasons across the country and will eventually be commercialised. In contrast, the European Union (EU), South Africa, and New Zealand continue to place GM and GE crops under strict GMO rules. However, this stance may change, with intense momentum in Europe and in New Zealand to reduce the regulatory oversight over GE crops, potentially enabling fast-tracked cultivation. Fragmented global regulatory guidelines on GE crops impede global trade, innovation, and competitiveness. While India permits only the cultivation of Bt-cotton and strict regulations do not permit the import of GMOs, the imports of GM soyabean and maize were central to India's ongoing trade spat with the US. This illustrates how agri-biotechnology regulations shape global trade, signalling that GE crops may soon be part of trade negotiations. Beyond India, China is heavily invested in adopting GE tools for food security and recently adopted new regulatory guidelines for GE crops, while the UK, in June 2025, introduced legislation permitting the release and marketing of GE crops.

Policy Coherence in India

There exists an urgent need for a comprehensive and transparent regulatory policy on GE crops in India. Political polarisation and weak science communication fuel public mistrust, often framing agri-biotechnology as a threat rather than an opportunity. For GE crops to achieve their full potential, stakeholders, including scientists, government regulators, farmers, civil society, intellectual property rights (IPR) experts, and academia, must responsibly communicate the science and regulatory aspects of GE crops. Transparency in

risk assessment data, field trial results, and biosafety considerations must be ensured to minimise the scope for misinformation. Public trust in biotechnology governance must simultaneously be fostered, and consumer awareness must be raised.

Safety and Environmental Considerations

Farmer unions and civil society organisations have voiced concerns that GE crops may out-compete native species, reduce biodiversity, or cause other ecological damage. Risk assessment measures would need to consider reproductive capacity, spread, and impact on native species and insects. Post-market environmental monitoring will also need to be conducted to assess long-term impacts.

India, Brazil launch joint agritech programme to boost farm innovation

https://www.business-standard.com/ Sep 22 2025

India and Brazil seek to strengthen their partnership in the agriculture sector with the launch of a programme that aims to promote technological innovation and exchanges of best practices.

According to an official statement on Monday, Indian Council of Agricultural Research (ICAR) has launched a second edition of the BrazilIndia Cross-Incubation Programme in Agritech (Maitri 2.0) here.

The event was graced by M L Jat, Secretary (DARE) and Director General (ICAR), and Kenneth Nobrega, Ambassador of Brazil to India, along with senior officials and representatives from leading Brazilian research and innovation institutions.

The ICAR DG noted that the programme is a two-way learning platform for co-creation between Indian and Brazilian innovators. "Bringing together innovators, startups, and institutions from both countries, the programme will help build resilient food systems and empower farmers. Maitri 2.0 aims to strengthen incubator linkages, exchange best practices, promote co-incubation, and open new opportunities in sustainable agriculture, digital technologies, and value-chain development," the statement said.

In his remarks, Jat highlighted about the 77-year-old partnership between India and Brazil and emphasised their shared role in global platforms like BRICS and G20, and the recent ICAREMBRAPA pact as a milestone for collaborations across the agri-food value chain.

He mentioned about ICAR's transformation from having 74 patents in 1996 to over 1,800 annually, supported by incubation centres and over 5,000 licensing agreements.

Nobrega underlined the strategic importance of creating synergies between the agritech ecosystems of India and Brazil. He emphasised that the programme reflects the broader BrazilIndia strategic partnership, aligning with the leaders' shared vision for cooperation in agriculture, emerging technologies, and food-nutritional security.

BIODIVERSITY

Insects are vanishing! Population drops by 72%, triggering biodiversity crisis

https://timesofindia.indiatimes.com/ Sep 19, 2025

Insects, the tiny creatures that quietly sustain much of life on Earth, are disappearing at alarming rates — even in landscapes far removed from direct human activity. A new long-term study led by researchers at the University of North Carolina at Chapel Hill has revealed that insect populations in a remote subalpine meadow in Colorado have plummeted by more than 72% over the last two decades. The research, which monitored flying insect abundance between 2004 and 2024, links this drastic decline to rising summer temperatures. The findings raise urgent concerns about global biodiversity, food webs, and the health of ecosystems that depend on insects for survival. Insects in untouched landscapes are rapidly declining

Associate professor Keith Sockman of UNC-Chapel Hill tracked insect populations over 15 field seasons in Colorado's high-altitude meadows, a site largely shielded from farming, pollution, or urban expansion. With 38 years of weather records available, the meadow provided a rare opportunity to study insect trends in a minimally disturbed ecosystem. The analysis revealed an annual average decline of 6.6% in insect abundance, accumulating to a staggering 72.4% loss across two decades. Rising summer temperatures emerged as the strongest driver of these declines, alongside changing precipitation patterns, habitat sensitivity, and potential disruptions to local food webs and ecosystem balance.

Why insects matter for ecosystems

"Insects have a unique, if inauspicious position in the biodiversity crisis due to the ecological services, such as nutrient cycling and pollination, they provide and to their vulnerability to environmental change," Sockman explained. These creatures are the foundation of terrestrial and freshwater ecosystems, supporting food chains, aiding in decomposition, and sustaining plant life through pollination. Their decline signals risks that extend far beyond the insects themselves, potentially destabilizing ecosystems that humans also rely on for agriculture, clean water, and climate balance.

Climate change as the hidden culprit of insect vanishings

While previous studies of insect decline often focused on human-dominated landscapes such as farms, cities, or forests near industrial zones, this research highlights that even remote, seemingly untouched environments are not immune. The strong correlation between hotter summers and insect losses underscores climate change as a key driver. Mountain ecosystems, which harbor high numbers of endemic species, are particularly vulnerable. If insect declines continue at this rate, biodiversity hotspots may face irreversible damage.

A global warning and warming

Sockman's findings align with reports of widespread insect losses across North America and Europe, but they add a critical new dimension: even ecosystems with minimal direct human interference are suffering sharp declines. This makes climate change a more universal explanation than previously thought. For conservationists, it highlights the need to monitor insect populations not just in altered environments but also in pristine regions to fully grasp the global scale of the crisis.

What comes next

The research underscores the importance of addressing climate change as part of biodiversity protection. More comprehensive monitoring programs are needed worldwide to track insect populations across varied landscapes. Without urgent action, the collapse of insect communities could accelerate ecosystem instability and threaten the services that

sustain human life.Insects may be small, but their disappearance carries enormous consequences. Protecting them means protecting the very systems that make Earth habitable.

Biodiversity strengthens pollinators and ensures stable yields, sunflower study finds

https://phys.org/ September 25, 2025

Improving biodiversity and maintaining yields at the same time? For many, this sounds like a contradiction in terms. However, a new study by the University of Würzburg shows that both are possible under the right conditions.

For their study, researchers from the University of Würzburg (JMU), together with the Bavarian State Institute for Agriculture, analyzed 29 sunflower fields in northern Bavaria—15 organically and 14 conventionally farmed. They wanted to know which factors influence wild pollinators and how this affects agricultural yields. They took into account both the conditions in individual fields and the structure of the surrounding landscape.

To determine the contribution of insects, they used a simple experiment: some sunflower heads were protected from pollinators with fine nets, others were left open. The result: On average, freely pollinated sunflowers achieved around 25% higher yields—regardless of whether they were grown on organically or conventionally farmed fields.

Different requirements, common benefits. The analysis showed clear differences between different pollinator groups: "Bumblebees, for example, benefited from a high proportion of organically farmed fields," explains Denise Bertleff, first author of the study and biologist at the Department of Animal Ecology. "We were able to show that if you increase the proportion of such areas from 10% to 20%, this almost doubles the bumblebee population."

The abundance of solitary bees, on the other hand, is based on the size of semi-natural habitats such as hedges, calcareous grasslands or orchards. "Our study shows that agriculture can be organized in a way that promotes biodiversity," says Bertleff. "A diverse landscape, for example by deliberately leaving weeds standing, makes harvests more stable and safeguards biodiversity."

Study provides recommendations for practical action

The researchers used their data to derive several recommendations for action for farmers, policymakers and nature conservation advisors:

Manage more land in a region organically: This strengthens the number of pollinators—even on conventional fields. Preserve semi-natural habitats such as hedges, calcareous grasslands and orchards: Such areas are essential for pollinators, especially for solitary bees. Allow moderate amounts of weeds: They provide important food sources for wild bees and hoverflies without necessarily reducing yields. Avoid excessively large flowering areas: If too many crops flower in one area at the same time, there is a risk of dilution effects because pollinators are spread over larger areas. This can reduce pollination performance in individual fields.

What is AI's role in financing biodiversity conservation?

12 September, 2025 https://www.lse.ac.uk/

Artificial intelligence (AI) has great potential to support the financing of biodiversity conservation. Concerns related to AI's negative impacts on climate and the environment should be acknowledged. However, AI can assist in the analysis of biodiversity data, reducing investment risks in the process. Furthermore, surging valuations of AI companies that rely on the natural world for inputs could encourage countries to include biodiversity data in their accounting frameworks, making the contribution of biodiversity more visible and promoting the need for conservation.

The context: why do we need to scale up biodiversity conservation finance?

Biodiversity is in decline, particularly in areas exposed to human activity. More than half of the world's GDP (US$44 trillion) is moderately or highly dependent on nature and ecosystem services — nature's contributions to people — and as a result is exposed to nature loss. Ecosystem services include the provision of food, energy and medicines, plus materials fundamental for wellbeing and maintaining culture; their degradation threatens our ability to maintain a good quality of life and economic prosperity. Today, governments provide about 82% of nature conservation funding, the total of which falls far short of what is required. It has been calculated that by 2050, annual investments in nature must quadruple (to US$737 billion) if they are to meet the nature-related targets set out in the Rio Conventions. Past biodiversity targets were missed and current ones are also unlikely to be attained unless investment is ramped up. Private sector finance, philanthropic grants and technology could help. Technologies that enable nature-based solutions — 'nature tech' — are already growing rapidly. AI in particular offers a range of opportunities. For example, it can assist in analysing biodiversity data, thereby reducing investment risks. Biodiversity also provides an essential input factor for training many AI models, a detail which can be drawn on to compel AI companies to fund conservation efforts and ensure future products can be developed based on previously unexploited biodiversity data.

How is AI already being used to analyse biodiversity data — and how can this impact financing? Conservationists and policymakers face a flood of complex data from satellites, sensors and fieldwork. AI enables them to analyse it more effectively and efficiently. For example, AI already plays a key role in biodiversity monitoring by enabling richer assessments that combine multiple metrics from a variety of data sources, like acoustic recordings, species distribution modelling, environmental DNA, or camera trap footage, in ways that were previously considered 'inconceivable'. AI can quantify some of the trade-offs between the different objectives of conservation projects. Consequently, AI can enable faster and more targeted responses by, for example, detecting ecosystem degradation or identifying potential poachers. These advancements contribute to making conservation efforts more efficient and targeted, ensuring that funding delivers greater impact per dollar spent. Further, biodiversity data assessments supported by AI that are easier to comprehend, more accurate and thus reduce investment uncertainties can enable increased financial flows. AI companies could pay directly for biodiversity conservation. A decision adopted in 2024 at the 16th meeting of the Biodiversity COP, the UN's biodiversity conference, proposes that companies that directly or indirectly benefit from the use of digital sequence

information (DSI) and meet specific economic thresholds make contributions to a new fund. Called the Cali Fund, this will channel financing to biodiversity protection projects. DSI is the digital data of an organism's genomic characteristics, such as its DNA and RNA. Although contributions to the fund are not mandatory, the decision could lead to companies operating in this area, like Google DeepMind (which has developed an AI system called AlphaFold that uses DSI), contributing 1% of their profits or 0.1% of their revenue to actively conserving biodiversity through the Cali Fund.

The Cali Fund is the first fund of its kind to rely on the private sector as the principal contributor. Fund payments will be distributed to eligible Parties to the Convention on Biological Diversity to support the implementation of the Kunming-Montreal Global Biodiversity Framework to halt and reverse loss of biodiversity by 2030. At least 50% of its resources will be allocated to the self-identified needs of indigenous peoples and local communities, including women and youth, who are the stewards of the vast majority of the world's most critical ecosystems and the custodians of biodiversity. However, although some companies have indicated an intention to pay into the fund in the future, as of early August 2025 no contributions had been received.

Surging AI valuations could speed up inclusion of biodiversity data in accounting frameworks. The digital economy continues to evolve and gain importance and AI companies have been raising significant capital based on eye-catching valuation figures. Access to data is a cornerstone of this AI-driven economic growth, with the market capitalisation of the 'Magnificent Seven AI wonder stocks' (seven especially high-performing, dominating stocks) valued at around US$12 trillion. AI startups combining machine learning and gene synthesis, such as LabGenius, Curve Therapeutics and Healx, closed notable funding rounds in 2024. In 2025, Isomorphic Labs, an AI drug-discovery platform, raised US$600 million and was valued at US$3.6 billion. Such synthetic or digital biology companies rely on biodiversity as a source of genetic data that they can use in AI models to develop products such as pharmaceutical drugs and therefore have an interest in supporting biodiversity conservation.

As national accounts focus on 'values' where a transaction price can be directly assigned, such as the market price, for many resources this focuses only on their value once they have been harvested or extracted from the environment. However, AI companies that rely on biodiversity data benefit from the protection of biodiversity, rather than its exploitation. This could lead to improved inclusion of the values of biodiversity data in 'natural capital accounts', that measure the contributions of natural resources to economic development.

Furthermore, making the economic contributions of biodiversity data more visible can help governments prioritise conservation in budgetary and policy decisions. Progress on accounting practices at the national level can, in turn, influence the way companies account for the value of nature and make financial decisions. It can also improve transparency around companies' dependence on biodiversity data, which is information that investors need for understanding and managing risks associated with potential biodiversity collapse. Providing this information should ultimately help channel more funding towards biodiversity protection across industry sectors as the dependence becomes more visible.

AI-accelerated product development based on biodiversity information could spur investments to protect it. The use of AI has grown significantly, particularly in product and service development. AI can aid the crucial transition away from fossil fuel-based products by accelerating the discovery of new genomes, enzymes and other synthetic biological assets used to develop commercial products. In agriculture for example, alternatives to nitrogen fertiliser like bio-based fertiliser are gaining importance. Overall, this creates investment opportunities across multiple sectors, as AI-driven innovation can unlock new commercial growth while increasing incentives to conserve biodiversity as a valuable input to future products.While AI models rely heavily on data such as DSI on genetic resources for product development, access to the underlying physical protein structures of organisms remains essential for many companies that use this to create products. For companies with long-term innovation strategies that depend on AI and biodiversity, it is therefore in their business interests to support biodiversity conservation. Protecting biodiversity is crucial not only to preserve existing data sources and product inputs but also to enable future discoveries that could provide data or other inputs. While 'free-rider' issues persist, where companies benefit from the conservation support others provide, there are international agreements that provide a legal foundation to address parts of this challenge. For example, the Nagoya Protocol sets out that companies accessing physical genetic resources need prior informed consent or to negotiate mutually agreed terms with the source country's government to ensure fair compensation for the biodiversity the country conserves.

A city biodiversity evaluation spotlights the

need to conserve urban natural resources

9 Sep 2025 https://india.mongabay.com/

Chennai's municipal body, the Greater Chennai Corporation (GCC), in collaboration with sustainability consultant ICLEI South Asia, released the country's first City Biodiversity Index in August, in an effort to evaluate and benchmark Chennai's biodiversity conservation efforts.

The value of biodiversity in urban areas is often undermined, the Union Ministry of Urban Affairs (MoUA) said in a 2020 document on urban biodiversity. The level of biodiversity in an urban setting is not only an indicator of ecosystem health, but aids in the provision of services ranging from pollution mitigation to climate resilience, the MoUA said.

The city of Chennai hosts a variety of ecological landscapes – including a coastline, estuaries, wetlands such as Pallikaranai and Singanallur, and hills. It is also home to the Guindy National Park, a protected area hosting more than 350 species of plants. The City Biodiversity Index developed a "natural asset map" mapping these resources and creating a baseline for future study. Most urban green spaces are found on college campuses, government gardens, parks and private lands in the city of Chennai. The index is scored across three broad parameters – the city's native biodiversity, the ecosystem services provided, and the governance of urban biodiversity. The city scored a total of 38 points out of 72 across 18 indicators, excluding five due to a lack of a baseline. Indicators include the proportion of the city's protected natural areas, the proportion of alien species invasion, climate regulation and cooling provided by biodiversity, recreational and educational services, and institutional measures and policies conserving biodiversity, among others.

The city scored best in indicators capturing its native biodiversity, "indicating that portions of its natural habitat represented by its wetlands and natural vegetation support biodiversity." However, the city scored below average in the ecosystem services provided by such biodiversity. Scores for biodiversity governance were average, indicating that biodiversity matters are being considered to some extent by the Greater Chennai

Corporation. The area most urgently in need of improvement is maintaining and expanding ecosystem services provided by the city's natural resources, the index said.

"Due to this loss of marshlands across Chennai and the blockage of numerous creeks, the city has been experiencing a series of flooding events," the index said, adding, "if dumping of waste is banned and water channels rejuvenated, around 60% of Chennai's wetlands can be saved. GCC can take steps in this direction."

CLIMATE CHANGE

Snakebite crisis in India: Climate change expands risk to new states

Sep 05, 2025 https://timesofindia.indiatimes.com/

India's snakebite crisis is entering a dangerous new phase, and climate change is playing a decisive role. What was once a rural health emergency confined to limited regions is now spreading into new states, exposing millions to deadly risks. A 2025 study published in PLOS Neglected Tropical Diseases found that the habitats of India's "Big Four" venomous snakes, the Indian cobra, Russell's viper, common krait, and saw-scaled viper, are expanding due to rising temperatures and shifting rainfall patterns. By 2080, areas that never faced this problem may experience surging snakebite cases.This finding is especially alarming because India already records nearly half of the world's snakebite deaths every year. Without immediate action, such as stronger healthcare systems, climate adaptation measures, and local awareness campaigns, the situation could spiral into a full-blown public health crisis. The snakebite crisis in India is no longer just about rural villages; it is a nationwide challenge linked directly to our warming climate.Rising temperatures accelerate snake activity and reproduction, while erratic rainfall alters their migration patterns. Flooding often drives snakes into human settlements, while prolonged heatwaves push them into homes, barns, and farmlands in search of cooler shelter.The study in PLOS Neglected Tropical Diseases

highlights that states such as Madhya Pradesh, Rajasthan, and parts of Northeast India could become new hotspots by 2080. These regions were not traditionally considered high-risk, but the changing climate is reshaping where venomous snakes thrive. This means millions of people who are unfamiliar with snakebite risks may suddenly face life-threatening encounters.

New snakebite hotspots in India

Traditionally, states like Uttar Pradesh, Bihar, West Bengal, and Andhra Pradesh reported the highest number of snakebite deaths. However, the study warns that climate change is pushing snake habitats into new zones. By 2080, dry regions of western India and certain hill states could face intensified risks.This expansion of hotspots is dangerous because healthcare systems in many of these states are not fully prepared for the surge. Rural clinics often lack antivenom supplies, and awareness about first aid is limited. As a result, even a modest increase in snakebites can lead to a significant rise in deaths and disabilities.

Healthcare challenges in managing the snakebite crisis in India

One of the biggest barriers to managing the snakebite crisis in India is the healthcare gap. While the government has recognised snakebite as a neglected tropical disease, antivenom distribution remains uneven. Many rural areas do not have reliable access to trained doctors or stocked hospitals.The study notes that climate-driven expansion of snake habitats will strain healthcare systems even further. If new hotspots emerge in states with limited infrastructure, delays in treatment could prove deadly. Moreover, current antivenoms are not always effective against regional snake species variations, which complicates the treatment process.

Preventing snakebites in the new risk states of India

As the crisis spreads, prevention becomes just as important as treatment. Communities in emerging hotspots need awareness campaigns on simple safety measures. Keeping grass trimmed around houses, using bed nets, storing food properly, and wearing footwear in fields can significantly reduce risks.At the same time, schools and local groups should educate people on what to do immediately after a bite, such as staying calm, immobilising the limb, and reaching a hospital quickly, instead of relying on harmful traditional remedies. These basic steps can save lives when medical help is far away.

Climate adaptation strategies for the snakebite crisis in India

The broader challenge is that snakebites are now a climate change issue. Adaptation measures must go hand in hand with healthcare reforms. This includes better flood management systems, improving rural housing to prevent snakes from entering, and training local health workers to handle cases efficiently.Policymakers also need to focus on research

for region-specific antivenoms and ensure affordable availability. Partnerships between government, NGOs, and local communities can create a stronger safety net against this climate-linked health crisis.The snakebite crisis in India is no longer confined to the same old hotspots. Climate change is reshaping where venomous snakes live and increasing human exposure in new areas. The 2025 PLOS study makes it clear that without urgent adaptation strategies, India could see a surge in snakebite deaths and disabilities in the coming decades.By strengthening healthcare systems, raising awareness in vulnerable states, and addressing the root cause of climate change, India can prevent thousands of needless tragedies. The crisis is real, but it is not inevitable. With the right steps, the country can protect its people from both the fangs of snakes and the heat of a changing climate.

68% of India's farmland drought-prone, south worst hit: Climate experts warn

Sep 20, 2025 https://timesofindia.indiatimes.com/

A stark warning on India's agricultural future rang out at the national conference on the impact of climate change on vegetable crops in Mulugu district, where experts revealed that nearly 68% of the country's sown land is vulnerable to drought.The presentation underscored how climate stress is reshaping vegetable productivity across regions, with Telangana placed in the second tier of yields at 20 tonnes per hectare, while neighbouring Andhra Pradesh leads the charts with 25-30 tonnes per hectare.The eye-opening findings came from Rajesh Kumar, director of the Indian Institute of Vegetable Research, Varanasi, who presented at the conference on impact of climate change on horticulture. The event is being jointly organised by Sri Konda Laxman Telangana Horticultural University, the department

of horticulture, Nabard, the Rajendra Prasad Central Agricultural University, and the ministry of earth sciences. Kumar's presentation highlighted that 68% of India's net sown area faces drought risk, with severity ranging from moderate to severe. The most adversely hit regions include the Deccan Plateau, Central India, Rajasthan, Gujarat, eastern Uttar Pradesh, and parts of Tamil Nadu, Maharashtra, Karnataka, Andhra Pradesh, Odisha, and Telangana.

Google's AI Supporting Farmers Through Climate Change

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38 million farmers are set to receive weather forecasts in advance, supporting climate resilience and incomes by using Google AI model NeuralGCM

Accurate monsoon forecasting has presented one of agriculture's enduring challenges for decades, especially for farmers across tropical regions who rely on timely predictions of seasonal rains for their livelihoods. Google Research is aiding climate resilience by reaching 38 million Indian farmers through a partnership with the University of Chicago, delivering AI-powered monsoon forecasts that are instrumental in determining planting strategies.

This advancement is crucial not just for sustaining the agricultural economy but for bolstering climate resilience. The AI model requires only a single laptop to provide precise forecasts, bypassing the need for conventional supercomputers typically used in weather predictions.

Integrating AI into weather prediction

The initiative employs NeuralGCM, a machine learning model from Google Research, combining AI with traditional physics-based approaches to weather modelling. Olivia Graham, Product Manager at Google Research and Stephan Hoyer, Engineer at Google Research say in a Google blogpost: "For years, weather and climate models have been costly and complex, often requiring a supercomputer to run.

“Our teams at Google Research wanted to see if we could build these models more efficiently and more accurately, leading to the creation of NeuralGCM.” By tackling computational limitations, NeuralGCM democratises weather forecasting, making it accessible to regions that previously lacked the resources for the technology. Rather than relying solely on hard-coded equations, NeuralGCM uses decades of historical weather data to learn and forecast future patterns.

Ensuring forecast accuracy

The University of Chicago team vetted various AI weather models before adopting NeuralGCM for predicting the Indian monsoon. The model’s ability to accurately predict monsoon onset up to a month in advance, alongside models like the European Centre for Medium-Range Weather Forecasts’ Integrated Forecasting System, enhances its reliability. The model's success was evident when it predicted an unusual dry spell during the monsoon, showcasing its potential in identifying weather anomalies critical for agricultural planning. Providing forecasts a month in advance allows farmers to align their activities with the expected weather, aiding in their adaptive capacity. These predictive capabilities have shown to nearly double the annual income of farmers involved in the projects, demonstrating the economic as well as ecological benefits of accurate forecasting.

Sustainable collaboration in action

In collaboration with India’s Ministry of Agriculture and Farmers' Welfare, the University of Chicago devised a method to deliver lean, precise weather forecasts to farmers via SMS. This collaboration is vital, given that the agricultural sector employs nearly half the Indian workforce. Forecasts provided during the summer growing season proved invaluable in adjusting to a delayed monsoon, empowering farmers to adopt sustainable farming practices through timely and informed planting decisions. The development of NeuralGCM as an open-source model means it can be integrated with existing systems, fostering collaboration without the constraints of licensing costs. This accessibility shows AI's role in addressing challenges related to climate adaptation and sustainable agriculture, aiding communities globally in building climate resilience. Olivia and Stephen say that this represents “a powerful example of how foundational AI technology, born from research, can serve real-world use cases, ultimately helping communities around the world build climate resilience.”

Nagaland wins global recognition for organic farming initiatives

Sep 11, 2025 https://www.indiatodayne.in/

Nagaland has received the Distinguished Holistic Organic Developments Award 2025 at the Organic Festa Asia, held in Shanghai, China, from September 3 to 5. The event, organised by IFOAM-Organics Asia in partnership with Messe Düsseldorf, highlighted the state's efforts in promoting sustainable farming and organic produce. The award was accepted on behalf of the state by officials from the Departments of Industries & Commerce and Horticulture. It acknowledged Nagaland's progress under the Mission Organic Value Chain Development for the Northeast Region (MOVCDNER) and ongoing state-led initiatives to strengthen organic agriculture. Entrepreneur and organic farming advocate Lanuakum Imchen played a pivotal role in securing this recognition. Founder of Cold Mountain Organics and head of multiple organic initiatives in food processing, marketing, and farmer welfare, Imchen also serves as Director of Cooperation and Networking (India) for IFOAM-Organics Asia and Co-Chair of the Young Organics Global Network.

Nagaland has taken significant steps to align with global organic movements. Under Chief Minister Neiphiu Rio's leadership, the state signed an MoU to join the Asian Local Governments for Organic Agriculture (ALGOA) in 2022, strengthening cooperation with international organic networks. Contributions from Nagaland Organic Konnect (NOK), led by Dr. Akali Sema with Imchen as a founding member, were instrumental in securing this membership. The state has also partnered with Cold Mountain Organics through a special purpose vehicle (SPV) to boost branding and marketing of organic food products. Officials from the Industries & Commerce Department recently represented Nagaland at the 3rd Organic Districts World Congress in Shanxi Province, China, further expanding its international engagement. At Organic Festa Asia, Nagaland showcased its organic enterprises under the Nagaland India Pavilion. Participants included government

departments, cooperatives, and youth-led organisations such as Cold Mountain Organic Farmers Welfare Foundation, YouthNet, Barn's Vision Foundation, Agricool Refrigeration, and Ilandlo. The 15-member delegation from Nagaland benefited from field visits and exposure trips arranged by IFOAM-Organics Asia, with subsidies provided to support entrepreneurs and exhibitors.

Kerala's Pokkali Fields earn India's First ASC Group Certification for sustainable shrimp farming

11 Sep 2025 | Thursday https://agrospectrumindia.com/

In a landmark achievement for India's aquaculture sector, the Ecosystem Based Aquaculture Society (EBAS) has secured Aquaculture Stewardship Council (ASC) Group Certification for sustainable shrimp farming in Kerala's traditional Pokkali farm lands. This marks the first time a traditional, extensive culture system for black tiger shrimp (Penaeus monodon) has received ASC certification in the country—positioning Kerala as a potential global model for ecosystem-based aquaculture.

The certification is the culmination of a three-year collaborative effort involving the National Centre for Aquatic Animal Health (NCAAH), Cochin University of Science and Technology (CUSAT), Baby Marine International, and Coop Cooperatives, Switzerland. The partnership, forged under a tri-partite agreement, was designed to transform Kerala's brackish water shrimp culture into a sustainable, biodiversity-protecting production system. At the heart of the initiative is the integration of Ecosystem-Based Approach in Aquaculture (EAA) principles, which combine rigorous environmental monitoring with farmer

participation. The project undertook Biodiversity Environmental Impact Assessments (B-EIA) and Participatory Social Impact Assessments (P-SIA) across Pokkali fields to gauge the ecological and community impacts of shrimp farming. The goal: To produce organic-certified shrimp that enhances farmer profitability while preserving environmental health and supporting local livelihoods. As a mandatory step towards ASC certification, EBAS was formally established as a farmers' society to bring eligible farms under a unified governance framework. In the first phase, eight farms across 200 hectares in Alappuzha and Ernakulam districts have been brought under ASC's group certification. The certified shrimp will now be exported to Coop Cooperative, Switzerland—Europe's largest organic food retailer—through Baby Marine International. "This achievement is not just a certification, it is a commitment to the future of sustainable aquaculture," said Dr. Valsamma Joseph, Director, NCAAH. Baburaj K.V, Vice President–Operations at Baby Marine International, and Philipp Martin Boeni of Coop Switzerland, echoed the vision of extending ASC certification across Kerala's Pokkali and Cole lands, unlocking high-value export markets while creating rural employment and strengthening environmental stewardship.

The certification follows rigorous adherence to ASC Shrimp Standards Ver 1.2.1, ensuring traceability, biosecurity, and community welfare. The partners view this milestone as a stepping stone toward scaling organic, climate-resilient shrimp farming across Kerala, turning its unique Pokkali agro-ecosystem into a global benchmark for responsible aquaculture.

How a 53-YO Kerala Mom Turned Pain Into a Healing Farm With Bees, Bananas & 200+ Crops

https://thebetterindia.com/ 21 Sep 2025

In August 2014, a traumatic event changed KS Sheeja's life forever. Her son, a budding mechanical engineer, suffered a grave motorcycle accident in Coimbatore that nearly cost him his leg

This moment of crisis pushed Kerala-based Sheeja and her family to temporarily relocate to Tamil Nadu for his treatment, requiring them to stay there for 1.5 years. Away from their home in Kerala, the family settled temporarily near the treatment facility. Their days now centred around hospital visits and endless treatments. Burdened by the emotional toll of her son's accident, Sheeja found herself seeking solace and hope amidst despair. It was in these challenging times that she discovered a new passion that would bring peace and purpose to her life: gardening. The 53-year-old began to experiment with planting small vegetables around the villa. She found comfort in the rhythmic tasks of nurturing plants, and witnessing their growth brought her unexpected joy and healing. "The sight of sprouting seeds and blooming flowers became a source of hope, a reminder that life could continue to flourish despite adversity. As tomatoes and other vegetables sprang to life, I realised that my newfound hobby provided me more than just sustenance; it was a lifeline," she shares.

A commitment to learning and growing:

With only a 12th-grade education, Sheeja initially managed a computer education centre for nearly 25 years. But life's unpredictable twists led her down a path she never anticipated — one where grief, resilience, and passion for gardening would intertwine. Upon returning to Kerala after her son's treatment, Sheeja was determined to expand on what she had started. Her family already supported seasonal farming, including banana plantations, and Sheeja embraced this legacy. Motivated by her experience and the therapeutic benefits of gardening, she decided to delve deeper into organic farming. Her aims were clear: to live healthier by eating organic produce, find mental peace, and inspire others to do the same.

Realising the importance of farming knowledge, she pursued formal training in organic farming methods. Sheeja attended formal courses and workshops at a government facility in Kerala. This training equipped her with advanced techniques like precision farming and drip irrigation. With unmatched dedication, Sheeja revitalised her family farm, spread over 25 cents of her own land and an additional acre leased for more extensive cultivation.

She started with simple crops like tomatoes and other vegetables. As the seeds blossomed into fruits, so did Sheeja's spirits. Each harvest brought her a sense of accomplishment and joy, far more gratifying than material wealth. These skills, combined with her innate grit, transformed the modest plots into thriving fields with over 200 plants yielding an abundant array of produce — over 25 varieties of vegetables and 8 types of fruits, including golden cucumber, watermelon, and exotic fruits like rambutan and mangosteen.

Honey, eggs, exotic fruits, and more

Driven by her inner mettle and desire to promote sustainability, Sheeja also ventured into beekeeping, poultry, and processing spices like turmeric. She uses poultry droppings as natural manure and integrates bee boxes to aid pollination, thereby enhancing her garden's productivity while maintaining its organic integrity. She uses hand droppings from her poultry farm as a primary component for her organic fertiliser. Sharing the preparation process, she says, "I fill a 200-litre drum with water and then place 25 kg of poultry droppings into a covering made from fibres, presumably from coconut, which acts like a filter bag. This bag is then hung above the water in the drum but is partially submerged, allowing nutrients to leach out without direct mixing." "The droppings are kept in this setup for about one week, allowing nutrients to leach into the water. After a week, I take one litre of this nutrient-rich water and dilute it with an additional nine litres of water for application. This diluted solution is directly applied to plants as a liquid fertiliser. It is high in nitrogen, which helps plants become greener and more vigorous," she explains. Despite the challenges, including labour shortages and the intricacies of organic farming, her resolve never wavered. Her efforts bore fruit — literally and metaphorically — as she managed a self-sustaining garden that supplied her community with fresh, organic produce. Sheeja's venture didn't go unnoticed. Marketing her product mostly through word of mouth and WhatsApp groups, she garnered a loyal customer base. Her clientele, including local doctors, appreciated the quality and organic nature of her offerings. While she faced challenges in scaling up and reaching distant markets, the demand for her produce continued to grow organically. Dr Rajasree K P has been a regular customer of Sheeja for more than four years. Sharing her experience as a consumer, Rajasree says, "I have been interested in gardening and rooftop vegetable cultivation. It was through common friends that I got to know Sheeja. After that, we have been purchasing organic farm products like cucumber, lady fingers, watermelon, tomatoes, cabbage, cauliflower, eggs, honey, curcumin powder, and more. We are blessed to get farm-fresh and extremely tasty organically grown produce. All my family members appreciate it."

By selling fruits, vegetables, and eggs, she makes around Rs 50,000 as an annual income from her farming activities. With just honey alone, she earns Rs 11,000 by harvesting 20 kgs each year. While her earnings may not revive industrial scales, they embody the priceless yield of self-sufficiency and mental peace. For Sheeja, gardening is her escape, a therapeutic pursuit that brings peace and purpose. Through her YouTube channel, 'She Garden,' and her everyday interactions, Sheeja inspires others to embrace organic farming. In every fruit and flower at her farm, Sheeja sees a reflection of her struggles and triumphs. Commenting on her transformation from homemaker to passionate organic gardener, she says, "More than just sowing seeds — it's about nurturing dreams, healing old wounds with each harvest, and offering others the gift of organic life. My garden was born from a time of adversity and is now a thriving oasis of hope and healing. It is also a reminder that from the darkest moments, we can bloom the most beautiful new beginnings," she adds.

ICAR IN PRINT

Kerala: ICAR-AICRP advocates for increase in cane cultivation to meet demand for organic jaggery

26 September 2025 https://www.chinimandi.com/

A team of scientists from the ICAR-All India Coordinated Research Project (AICRP) on Sugarcane, led by Susheel Solomon, Chairman of the National Level Review Team, visited the Agricultural Research Station (ARS) under Kerala Agricultural University in Thiruvalla on September 23 and 24, reports The Hindu.

The team reviewed five years of research and development activities at the station and assessed recent progress in sugarcane cultivation. Pointing out a shortage of raw material to meet the rising demand for organic jaggery, they stressed the importance of expanding sugarcane cultivation in Kerala and developing climate-resilient varieties. The delegation also recommended making use of the station's flood-prone conditions to test sugarcane varieties for resistance to challenges such as red rot disease and waterlogging, with the help of artificial intelligence tools. During the briefing, ARS head R. Gladis highlighted the station's contribution in developing India's first GI-tagged jaggery, locally known as pathiyan sharkara. The visiting scientists suggested adding value to the product by blending it with medicinal herbs and spices to boost its market appeal.

Food security: Smallholder farmers hold key to tackling global food crisis, says ICAR director

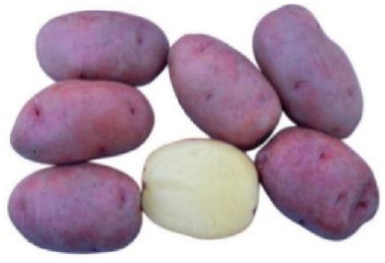
https://timesofindia.indiatimes.com/ Sep 08, 2025

Complex challenges facing global agri-food systems require solutions centred on smallholder farmers, the country's top agricultural research official said as international experts gathered in the capital to deliberate on the future of world food security.Department of Agricultural Research and Education Secretary and ICAR Director General Mangi Lal Jat was addressing DialogueNEXT in India, a two-day conference organised at the ICAR

Convention Centre, Pusa Campus, from September 8-9. The event has brought together agricultural leaders, policymakers, scientists and farmers.“This essentially needs greater investments in cutting-edge science, innovations and partnerships across discovery to delivery. Since India’s agricultural transformation is happening at a faster pace, the country can serve as a smallholder agriculture innovation hub for the Global South,” Jat said in a statement, PTI reported. The event is hosted by the World Food Prize Foundation in partnership with CIMMYT, the Borlaug Institute for South Asia (BISA) and ICAR.This year’s DialogueNEXT theme, Take it to the Farmer, builds on last year’s conference in Mexico, emphasising the urgent need to ensure transformative agricultural solutions reach farmers across the Global South.On World Agriculture Day, the conference celebrates India’s agricultural innovation legacy and honours Indian World Food Prize laureates while showcasing the country’s leadership in global food systems.

Four New ICAR-CPRI Potato Varieties to Boost Productivity and Processing Approved Across India

https://www.potatopro.com/ September 14, 2025



The Ministry of Agriculture and Farmers Welfare, Government of India, has officially notified four new potato varieties developed by the ICAR–Central Potato Research Institute (CPRI), Shimla, for seed production and multiplication across the country. Based on the recommendations of the Central Seed Committee, the newly released varieties—Kufri Ratan, Kufri Chipbharat-1, Kufri Chipbharat-2, and Kufri Tejas—have been approved for nationwide use as quality seed, opening new opportunities for enhancing potato productivity and processing efficiency.

Dr. Brajesh Singh, Director, ICAR-CPRI, congratulated the scientists for their sustained contributions, calling this a milestone for the farming community and potato-based industries. He emphasized that the release of these varieties would not only boost productivity but also strengthen India's potato sector by supporting both table consumption and processing industries. **The varieties bring region-specific advantages:**

Kufri Ratan: A medium-maturing (90 days), high-yielding (37–39 t/ha) red-skinned table variety suited for the plains and plateau regions of North India, including Haryana, Punjab, Uttarakhand (plains), Uttar Pradesh, Madhya Pradesh, and Rajasthan. It produces attractive, dark red, ovoid tubers with yellow flesh and shallow-medium eyes, and is noted for its excellent storability.

Kufri Tejas: A heat-tolerant, medium-maturing (90 days), high-yielding (37–40 t/ha) table potato variety recommended for early-season cultivation in Haryana, Punjab, UP, and Uttarakhand, and for the main season in Madhya Pradesh, Gujarat, and Maharashtra. It produces white-cream, ovoid tubers with white flesh, shallow eyes, and very good storability under ambient conditions.

Kufri Chipbharat-1: A medium-maturing (100 days), high-yielding (35–38 t/ha) chip processing variety suitable for the main season in Haryana, Punjab, UP, Uttarakhand, Madhya Pradesh, Gujarat, Rajasthan, Karnataka, Telangana, and Tamil Nadu. It produces round, white-cream tubers with shallow eyes, white flesh, high dry matter (21%), very good storability, low reducing sugars, and an acceptable chip colour.

Kufri Chipbharat-2: An early-maturing (90 days), high-yielding (35–37 t/ha) chip processing variety recommended for the main season across the same states as Chipbharat-1. It produces ovoid, white-cream tubers with cream flesh, shallow-medium eyes, high dry matter (21%), and very good storability. It also offers wide adaptability and acceptable chip colour, making it suitable for the food processing industry. Brajesh Singh, Director, ICAR-CPRI, congratulated the team of scientists for their dedicated and sustained contributions to the farming community and the potato-based industries. He remarked that the notification of four new varieties marks a significant milestone in strengthening India's potato sector. Dr. Brajesh Singh, Director of the ICAR-Central Potato Research Institute (CPRI): "This is not just a scientific achievement but also a moment of celebration for scientists, farmers, and industries alike." Singh further emphasised that the release of these varieties would open new avenues for enhancing potato productivity, improving processing efficiency, and ensuring better returns to farmers, while simultaneously supporting the growth of the potato-based food industry.

Karnataka to register two new jamun varieties

01 Sep 2025 https://www.newindianexpress.com/

While consumers know the names of most of the varieties of mangoes they consume, there are many other vegetables and fruits that are consumed on a daily basis, but people do not know their names. One of the fruits in the list is jamuns- also known as Black plum or lava plum. The Indian Council for Agricultural Research (ICAR)- Indian Institute of Horticultural Research (IIHR) have successfully developed new varieties of jamuns which will soon be registered and patented. This is apart from the three new jamun varieties that a Bengaluru-based progressive farmer, NC Patel, has grown in his land, which is also going to be registered and then be available in the market. Dr G Karunakaran, principal scientist, ICAR-IIHR, said, of the two new varieties that have been developed, one is Jamun Nerantara, which is found near Pavagada. The variety is found in a land belonging to one farmer, and he is protecting the species under the Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA). This is because there is only one tree that is producing this variety, which is unique because of its sweetness, chewy texture and seed. The other variety is yet to be named. This one has been developed in the institute and is presently called IIHR-JI. Its uniqueness is the size, each measuring 23-24 grams and each tree bears around 100 Kg of fruits. This is so far the largest variety and is less astringent, said Karnunakaran. As per ICAR-IIHR, Karnataka already has multiple varieties of jamuns, including the Dupdal variety from north Karnataka, Siddamani jamun (also known as Chintamani jamun) and two varieties from Bagalkot. Karunakaran added that, unlike other fruits, the variety of the jamuns changes region-wise and it depends upon the soil, environmental influence, climatic conditions, gene pool and method of cultivation. Work on patenting and registering the new varieties is being done, and trials on an Indian basis have already started. He added that a large number of jamun fruits that consumers consume in the market also come from Andhra Pradesh, Tamil Nadu and Kerala. Explaining his new produce, Patel said, he started cultivating three new varieties--Patel Jumbo, Patel Samrudhi and Patel Akal-- from 2005, and now around 150-200 plants of each variety are being grown.

‘IISR Amrit’ mango ginger variety to be cultivated in Gujarat

September 23, 2025 https://www.thehindu.com/

The Indian Council of Agricultural Research–Indian Institute of Spices Research (ICAR-IISR), Kozhikode, on Tuesday entered into a non-exclusive licensing agreement for the cultivation of its improved mango ginger variety, ‘IISR Amrit’, in Gujarat.

The licence has been granted to Limkheda Taluka Mahila Bagayat Sahkari Mandali Ltd., a cooperative society focussed on empowering women farmers through collective strength in agriculture, a press release said. The licensing was supported under the project on improvement of spice value chains at ICAR-IISR funded by the Tata Trusts. The agreement was signed at the IISR headquarters, Kozhikode, on the sidelines of the research advisory committee meeting of the institute. R. Dinesh, Director, ICAR-IISR, handed over the agreement to Parvatiben Bhursinghbhai Kalasva, chairman, Limkheda Taluka Mahila Bagayat Sahkari Mandali Ltd.00:00 Through this partnership, ICAR-IISR will enhance the availability of quality planting material of IISR Amrit in Gujarat, opening new livelihood opportunities for farmers in the region. Mango ginger (Curcuma amada) has a long-standing presence in Gujarat’s kitchens, where it is commonly used in pickles, chutneys, and salads for its raw-mango-like flavour. Beyond its culinary use, it is valued for its antioxidant and digestive properties, making it a popular ingredient in traditional remedies. Although grown in small pockets across India, its commercial cultivation has remained limited. IISR Amrit, a mango ginger variety developed by ICAR-IISR in 2023, has a unique and pleasant flavour profile. The variety has an average yield of 31 tonnes per hectare, significantly surpassing local cultivars, and is renowned for its refined flavour, enhanced aroma, and golden-yellow rhizomes, which have strong consumer appeal. Its higher antioxidant content further boosts its value in both food and nutraceutical sectors.

“Gujarat has a rich culinary tradition of using mango ginger. With rising demand, IISR Amrit will provide farmers with a profitable diversification option alongside crops like ginger and turmeric, which are already familiar to them,” said Dr. Dinesh. Officials at ICAR-IISR said that the introduction of IISR Amrit in Gujarat was expected to not only improve farmer incomes but also strengthen local spice value chains in the region. Tata Trusts, through its grassroots organisations, is facilitating the adoption of the new variety by farmer collectives, ensuring that both economic and nutritional benefits reach rural communities. Alongside this, ICAR-IISR also issued a licence for its black pepper variety, ‘IISR Chandra’, to Amrita Nursery, Nadapuram, Kozhikode.

GENERAL

Surlabbi and Tamhini replace Cherrapunji as the wettest spots in India

06 Sep 2025 https://www.indiawaterportal.org/

Surlabbi and Tamhini replace Cherrapunji as the wettest spots in India. Cherrapunji or the Sohra weather station of the India Meteorological Department (IMD), one of the wettest places on the planet, has received 50 percent less rainfall this year. On the other hand, places in Karnataka and Maharashtra have received more rainfall than Cherrapunji this year. Surlabbi station in Somwarpet taluk of Kodagu district in Karnataka has received the highest rainfall of at 7,300 mm, of which 5,951 mm was during the monsoon season. Tamhini in Maharashtra received the highest rainfall of 5,788 mm across the country for the first two months of the monsoon. At least 32 stations across the country received more rains between June 1 and July 31 than Cherrapunji. Meghalaya experienced the highest deficit rainfall in the country at 43 percent with six of the 11 districts of the state being affected by lower rainfall. The worst affected

has been West Jaintia Hills. Cherrapunji and Mawsynram, known to be the wettest in the world, fall in the East Khasi Hills district, which has received 29 percent less rainfall than the normal during the monsoon season (Down To Earth). Banni grasslands in Kutch found to be effective carbon sinks: Study A recent study has found that the soils of the 2,300 square kilometer Banni grasslands in Kutch, the largest tropical grasslands and one of India's most unique saline grassland-wetland ecosystems, harbour a wealth of organic carbon to the range of 27.69 million tonnes . However, domestic policies focus on trees and forests to increase carbon storage while grasslands are rarely factored in though their soil is responsible for 55 percent of the country's carbon stock. Many of the grasslands continue to be neglected and have been invaded by Prosopis juliflora, an invasive plant that was introduced in the 1960s to combat soil salinisation and improve green cover. This invasive species has now spread to around 50 percent of the Banni grasslands. Communities and individuals have been working on restoring grasslands and it has been found that the restored grasslands sites known as vaadas show the highest soil organic carbon density, at 143 tonnes of carbon per hectare. Following the vaadas are wetlands that store around 138.59 tonnes of carbon per hectare and saline brushlands that store around around 125.75 tonnes per hectare. Areas with Prosopis and mixed vegetation show the lowest storage density at 105.56 tonnes per hectare. (The Scroll). India develops its first indigenous water soluble fertiliser technology. India has successfully developed its first indigenous water-soluble fertiliser technology after seven years of research. This has the potential to transform the country from an import-dependent nation to an export-dominating force in specialty fertilisers. While only 5 percent of NPK formulations are produced domestically in India, 95 percent of the other fertilisers are imported from countries such as China. The technology, has been developed using Indian raw materials and Indian-designed plants, and holds the promise of reducing the country's heavy dependence on fertiliser imports. It has undergone intense government scrutiny and has received Ministry of Mines support for developing a pilot plant that is now ready for scaling-up. The technology is expected to hit the farmers' fields within two years and joint venture discussions are already underway with leading fertiliser companies for commercial implementation (Economic Times). Glacier melt due to global warming has doubled river flows in the Himalayas over the past decade, with 10 percent of the region seeing doubled river volumes, creating both benefits and serious risks, finds a recent study. Rivers in the western Himalayas, which depend heavily on glaciers, show greater increases in flow. In contrast, eastern rivers, which rely more on rainfall, are seeing smaller changes. This uneven impact can raise challenges for sustainable management of water for communities that

depend on hydropower and agriculture in the Himalayas. The short-term increase in water could offer more supply for hydropower, farming, and household needs, but also bring more sediment, such as sand, gravel, and silt, that clogs turbines and damages aquatic systems. However, this surge can be temporary and could lead to less water and more instability in the long term. Smart dam planning and better sediment management are thus urgently needed in the region to adapt to shifting river volumes in the western rivers (SIGMAEARTH). Pine needles could help cut carbon emissions in the Himalayas. An estimated 7.47 million tonnes of pine needles fall across the Indian Himalayan region every year, creating a fire hazard that gets deadlier with climate change. Recent research however shows that these needles can be used as fuel, and replace 4.7 million tonnes of coal needed to generate electricity to power the region. Pine needle biochar can be co-fired with coal in power plants across Himalayan states — to generate 6.4 terawatt-hours of electricity and cut carbon emissions by 5.8 million tonnes annually, while reducing forest fires.

Pine needle biochar produced at 600°C with 10°C per minute heating rate can serve as a good replacement for coal because of its high carbon content, help create new jobs and solve frequent forest fires while drastically reducing the share of coal in power plants, in line with India's net-zero targets by 2070.

A New Green Revolution in Indian Agriculture: How Satellite Remote Sensing is Quietly Transforming the Sector

https://nextbillion.net/ 15 September 2025

In Gujarat, India, a cotton farmer receives an app notification: "Early signs of bollworm stress detected, take preventive measures." In West Bengal, a paddy grower is alerted: "Water stress

identified, initiate timely irrigation." Meanwhile in Nashik, a grape farmer accesses his mobile app to find low nitrogen and phosphorus levels, along with a customised nutrient recommendation. Powered by satellite remote sensing, the app delivers timely insights and actionable solutions, helping farmers make informed decisions exactly when they matter most. This isn't the future; it's already happening, quietly, in the hinterland of India. Satellite remote sensing was once only available to climate scientists or urban planners accessing previously scarce data sources. But now it is increasingly being used by farmers and the businesses and organisations that serve them, enabling practical solutions to one of India's biggest development challenges: the need for effective ways to increase productivity, resilience and inclusivity in agriculture.

Why Indian Agriculture Needs a Digital Uplift

In India, agriculture supports the livelihoods of almost 55% of the rural population, and the agriculture sector contributes about 18% of the gross value added in the Indian economy. The sector has approximately 146 million farmers, most with landholdings of less than 1 hectare. These smallholders face increasing risks from climate variability, rising input costs and soil degradation. The Indian government's Economic Survey indicates that farm income in rainfed areas may decline by 20 – 25% due to climate change. Meanwhile, farmers' traditional methods of monitoring their fields — which are based on manual inspection, intuition and knowledge of historical weather patterns — are ineffective in a world of poorly timed rainfall, surprise heat waves, pest surges and shifting planting seasons.

There's a clear and growing need to shift to a new way of farm management — one informed by accurate data and supported by newly accessible technologies. But the challenge is how to make digital agriculture easily available to the farmers and other stakeholders that can benefit from it the most.

What is Satellite Remote Sensing — and Why Does it Matter for Farmers?

Satellite remote sensing involves capturing data about the Earth's surface using satellites with sensors that are able to detect vegetation health, soil moisture, land temperatures, irrigation patterns and other key information. These satellites — both public (like Sentinel 1 and Sentinel 2 from the European Space Agency, and Landsat, SMAP and MODIS from NASA) and private (like Planet Labs and Maxar) — are continuously scanning agricultural land and producing large datasets that can be transformed into useful insights.

In practice, this provides the following benefits to farmers:

Moisture stress detection enables farmers to irrigate more accurately and avoid over-watering. Vegetation indices enable plant health tracking and crop stress detection before it can be physically observed. Pest and disease detection is possible when satellite

observations can track spatial changes in crop vitality. Planning for sowing and harvest windows becomes better because weather forecasts can be overlaid with soil conditions and crop conditions. Disaster damage assessment after floods and droughts is quicker and more objective. Further enhancing these impacts, these insights are now being delivered to farmers as advisories through mobile apps, web portals, SMS and voice messages — usually in local languages and with audio-visual support when possible. So no matter what level of literacy a farmer has, they can be included.

The Emergence of Satellite Remote Sensing in India

Satellite remote sensing has a long history of use in urban planning and forestry, and it is now quietly transforming the smallholder agriculture sector in India. As climate uncertainty accelerates, it is helping farmers make smarter, data-guided decisions. In Odisha, the World Bank-funded Odisha Integrated Irrigation Project for Climate Resilient Agriculture has used satellite data and crop modelling to deliver irrigation advisories across numerous districts. The initiative aims to benefit about 125,000 smallholder farmer households across 15 districts of Odisha and cover around 128,000 hectares of agricultural land. In Maharashtra, the Indian Institute of Remote Sensing has collaborated with state agencies to map drought-prone areas using satellite imagery. This data has been instrumental in contingency planning and input subsidy guidance in high-risk districts, such as Solapur and Jalna. In Punjab and Haryana, the Mahalanobis National Crop Forecast Centre uses remote sensing to identify early signs of crop stress, thereby allowing pest response to happen faster — something that is especially important in cases such as the Pradhan Mantri Fasal Bima Yojana (India's crop insurance program). The program protects farmers against losses from natural disasters, pests and diseases, and early detection through remote sensing helps it verify damage quickly, speeding up insurance claim processing and ensuring farmers receive timely compensation. Although long-term data is still needed, these initiatives are already showing how satellite-enabled tools can support extension services that have long been stretched too thin, delivering timely, localised advice to farmers' smart devices on their own schedule. For India's primarily rainfed farmland, these are more than just helpful innovations — they can be decisive factors in a farm's survival.

A Lifeline for Climate Resilience

As extreme weather and other climate impacts increase, opportunities for using satellite data for real-time risk mitigation or long-term resilience planning are becoming more frequent. For example, the Indian Space Research Organisation has collaborated with the Mahalanobis National Crop Forecast Centre to launch numerous programs to estimate crop acreage,

monitor droughts and assess flood damage using satellites, and the data these programs provide has become indispensable to:

The Pradhan Mantri Fasal Bima Yojana program, which has implemented remote sensing to verify crop insurance claims and enable timely payments;

State-level drought declarations, which involve the use of satellite-based indicators to help decide if a district is eligible to receive prospective relief packages; and

Soil health monitoring, to support regenerative agriculture and carbon sequestering initiatives.

Through these and other efforts, satellite-based tools have strengthened climate vulnerability assessments across India, sharpening disaster preparedness and enabling more targeted, data-driven adaptation strategies.

Enabling Financial Inclusion to Close the Credit Gap for Farmers

Another compelling application of satellite intelligence is closing the credit gap for farmers in India. A large number of smallholder farmers, especially women and tenants, are unable to receive formal credit because they don't have access to collateral or land titles.

To address this issue, fintechs and agri-lending institutions are using satellite data to conduct yield estimations, assess crop vigor and review irrigation histories, then using this information as industry-specific proxies of creditworthiness. This evidence-based model allows for:

Remote verification of farm activity

Flexible loan underwriting based on farm production, not farmer-reported documentation

Dynamic risk-scoring, which can lower default rates and enable lenders to better target borrowers who are more likely to repay

To support credit-risk assessment for crops and allied operations, the National Bank for Agriculture and Rural Development (NABARD) has been extensively working with agritech and fintech agencies to encourage the adoption of satellite and remote sensing technology. Through programs supporting climate resilient agriculture and Farmer Producer Organisations, NABARD actively promotes the use of geospatial solutions for crop monitoring, loan targeting and insurance.

An Opportunity for Greater Gender Equity

Women are essential actors in Indian agriculture; 73% of rural women work in the sector, but they own only about 13% of the land. This disparity is driving women farmers' lack of access to credit, technology and direct decision-making. But change is underway. Across India, when digital farm advisories and mobile-based guidance are shared through women's collectives, like self-help groups or Farmer Producer Companies, something powerful

happens. Women begin to feel more informed and included, and their voices carry more weight in household and community decisions around farming. Research also shows that women who access such services are more likely to adopt climate-smart agricultural practices than those who don't. Of course, progress is rarely uniform. Women's decision-making power and adoption of new practices are shaped by whether they have land rights, access to credit, supportive local extension services and policies that account for their needs. Still, the opportunity is clear. By giving women — who already make up a substantial percentage of India's agricultural workforce — access to inclusive, satellite-powered tools, we're doing more than boosting yields or preparing farms for climate shocks. We're putting knowledge and agency directly into their hands. That's real empowerment: turning women farmers, long seen as helpers, into leaders and innovators in building climate resilience from the ground up.

Overcoming Barriers to Widespread Adoption

While satellite remote sensing has great potential, widespread adoption has been limited by a number of challenges. Among them is the issue of inconsistent data literacy and digital infrastructure in rural areas. Interpreting complex data often requires assistance from field agents or agri-extension services, and affordability is an obstacle for commercial models without governmental or philanthropic support. However, despite these limitations, the situation is changing quickly, as the penetration of smartphones in rural India surpasses 67%, and digital agri-infrastructure platforms like India Digital Ecosystem of Agriculture (IDEA) are being promoted by the national government.

If we want satellite-enabled farming to become the norm in India, the country's agricultural ecosystem needs to invest in the following:

Open data platforms that enable innovators to build farmer-friendly applications that leverage publicly available government datasets.

Last-mile partnerships established with self-help groups, Farmer Producer Organisations and local institutions to translate satellite data insights into practical advice farmers can use.

Collaboration between the public and private sectors to fund the subsidisation of precision agriculture tools in climate-vulnerable regions.

Training programs to help rural youth act as "digital agriculture assistants" who are available year-round to educate farmers on how to incorporate satellite-based advisories into their practices.

A Quietly Transformative Revolution

The initial Green Revolution radically changed Indian agriculture through the use of seeds, fertilizers and irrigation systems. A new data-driven revolution is on its way.

While it may not be front-page news, a transformation is occurring every time sowing decisions are made using vegetation indexes, loans are issued based on satellite imagery rather than land papers, or irrigation pumps are controlled remotely.

Remote sensing will not resolve all the problems facing Indian agriculture. But alongside other technologies that are already in place, it is fast becoming an essential aid to improving agricultural decisions, yields and ultimately millions of livelihoods across the country.

Equipped with the right delivery model and partners for collaboration, these tools can now empower farmers in India to not only endure amidst widespread volatility, but to truly flourish.

Technology reshaping Indian agriculture: From seed to market

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India has been an agrarian country since ancient times, and the government continues to emphasise that the foundation of a strong and developed nation lies in empowering and uplifting farmers, the Annadatas. Recognising this, policymakers have consistently prioritised farmers' welfare and worked on streamlining the "Beej Se Bazaar Tak" (from seed to market) journey. Technology is now playing a pivotal role in this transformation. The sector is witnessing large-scale integration of Artificial Intelligence (AI), Internet of Things (IoT), Machine Learning (ML), drones, satellite mapping, and the JAM Trinity. These tools are revolutionising farming practices and improving the lives of millions of farmers.

AI and IoT in agriculture

To modernise agriculture and improve farmer welfare, AI and IoT are being widely adopted. They are helping to increase yields, encourage sustainable practices, and address challenges related to weather, pests, and market access. One such initiative is Kisan e-Mitra, an AI-powered voice-based chatbot developed by the Government of India to answer farmers' queries in their own languages. It provides information on schemes such as PM-Kisan

Samman Nidhi, Kisan Credit Card, and Pradhan Mantri Fasal Bima Yojana in 11 Indian languages. Handling more than 20,000 queries daily, it has already responded to over 95 lakh farmer inquiries. The National Pest Surveillance System (NPSS), launched on August 15, 2024, uses AI and ML to detect pest attacks and crop diseases early. Farmers and extension workers can upload crop images to the NPSS app or portal for instant analysis and expert advice. Covering 61 crops and identifying over 400 pests, it has issued 10,154 pest management advisories as of March 2025. AI-powered analytics are also being utilised in satellite-based crop mapping to monitor growth in line with weather patterns, enabling better decision-making. At the same time, the IIT Ropar – Technology and Innovation Foundation is developing IoT-based devices and sensors to enhance saffron cultivation and streamline its supply chain. Applications of AI and IoT extend to precision farming, climate monitoring, smart greenhouses, livestock tracking, and drone-assisted farming.

Space technology in farming

Space technology is being leveraged to make agriculture more resilient and data-driven. The FASAL (Forecasting Agricultural output using Space, Agro-meteorology and Land-based observations) Project is being implemented by the Mahalanobis National Crop Forecast Centre (MNCFC). Using methodologies developed by ISRO's Space Applications Centre, the program generates crop forecasts at district, state, and national levels for major crops, including wheat, rice, mustard, sugarcane, jute, rabi sorghum, cotton, soybean, tur, gram, and lentil. Crop maps and acreage statistics are produced, and a crop health factor is now being generated for wheat and paddy. Geoportals developed with ISRO's Space Applications Centre provide real-time drought monitoring with updates on rainfall, soil moisture, crop condition, and water storage. Under the Pradhan Mantri Fasal Bima Yojana (PMFBY), space technology is being used for smart sampling of crop cutting experiments, yield estimation, and dispute resolution related to area and yield. The Krishi Decision Support System (Krishi-DSS), a cloud-based geospatial platform, integrates satellite images with weather, soil, and water data to guide farmers and policymakers.

Expanding use of drones

Drones are becoming important tools in agriculture for spraying, monitoring, and precision farming. The government is promoting their use through subsidies and schemes. Under the Sub-Mission on Agricultural Mechanisation (SMAM), financial assistance is provided for the purchase of machines and equipment, including drones. Custom Hiring Centres (CHCs) and Farm Machinery Banks (FMBs) are being established to make machinery available on rental basis.

Specific support for drones includes:

100% financial assistance, up to ₹10 lakh per drone, for ICAR institutes, Farm Machinery Training & Testing Institutes, and Krishi Vigyan Kendras. Farmers' Producers Organisations (FPOs) are eligible for grants up to 75% of drone costs for field demonstrations. 40% assistance, up to ₹4 lakh, for CHCs under cooperatives, FPOs, and rural entrepreneurs.

50% assistance, up to ₹5 lakh, for agriculture graduates establishing CHCs. 50% assistance, up to ₹5 lakh, for small and marginal farmers, SC/ST farmers, women farmers, and farmers from North Eastern states. 40% assistance, up to ₹4 lakh, for other farmers. The Namo Drone Didi Scheme, approved with an outlay of ₹1,261 crore for 2023–24 to 2025–26, aims to provide 15,000 drones to Women Self Help Groups (SHGs). The scheme covers 80% of the cost of drone packages, up to ₹8 lakh, enabling SHGs to become drone service providers while improving crop efficiency and reducing costs. Under the SVAMITVA scheme, drones are being used for land mapping to help villagers obtain legal ownership documents. As of July 2025, drone surveys had been completed in 3.23 lakh villages. This helps reduce disputes and improve access to loans.

JAM Trinity for direct support

The Jan Dhan–Aadhaar–Mobile (JAM) Trinity is ensuring transparent, leak-proof subsidy transfers directly into farmers' bank accounts. By eliminating middlemen, it has improved efficiency and empowered farmers economically. On 2 August 2025, Prime Minister Narendra Modi released the 20th instalment of PM-Kisan, transferring ₹20,500 crore directly into the bank accounts of 9.7 crore farmers.

Towards digital agriculture

The government continues to expand digital and technological initiatives through missions such as the Digital Agriculture Mission and e-NAM (National Agricultural Market). The aim is to simplify the farmer's journey from seed to market and build a more self-reliant, efficient agricultural sector. Technology is no longer a distant concept for Indian farmers. It is increasingly becoming an everyday tool in the fields, empowering Annadatas and supporting the nation's progress.

World Ayurveda Day 2025 : പ്രതിരോധശേഷി കൂട്ടാനും ദഹനപ്രശ്നങ്ങൾ അകറ്റാനും സഹായിക്കുന്ന അഞ്ച് സുഗന്ധവ്യഞ്ജനങ്ങൾ

https://www.asianetnews.com/ Sep 22 2025

സെപ്റ്റംബർ 23 ന് ലോക ആയുർവേദ ദിനം ആചരിക്കുന്നു. ആയുർവേദം എന്നാൽ "ജീവിതത്തിന്റെ ശാസ്ത്രം" എന്നാണ് അർത്ഥമാക്കുന്നത്. മനസ്സ്, ശരീരം, ആത്മാവ് എന്നിവയ്ക്കിടയിലുള്ള സന്തുലിതാവസ്ഥയുടെ ആവശ്യകത ആയുർവേദം എടുത്തുകാണിക്കുന്നു. ഈ സന്തുലിതാവസ്ഥ നിലനിർത്താൻ സഹായിക്കുന്ന പ്രകൃതിദത്ത ചേരുവകൾ ഇത് ഉപയോഗിക്കുന്നു. ക്ഷേമം മെച്ചപ്പെടുത്താനും സ്വാഭാവികമായി സുഖപ്പെടുത്താനും സഹായിക്കുന്ന ആറ് ആയുർവേദ സുഗന്ധവ്യഞ്ജനങ്ങളെ കുറിച്ചാണ് ഇനി പറയുന്നത്..

മഞ്ഞൾ

കുർക്കുമിൻ കൊണ്ട് സമ്പുഷ്ടമായ മഞ്ഞൾ ഓക്സിഡേറ്റീവ് സമ്മർദ്ദത്തെ ചെറുക്കാൻ സഹായിക്കുകയും രോഗപ്രതിരോധ ശേഷിയെ ഗണ്യമായി വർദ്ധിപ്പിക്കുകയും ചെയ്യുമെന്ന് ന്യൂട്രിയന്റ്സ് ജേണലിൽ റിപ്പോർട്ട് ചെയ്തിട്ടുണ്ട്. മഞ്ഞൾ ദഹനത്തിനും കരളിന്റെ ആരോഗ്യത്തിനും സഹായിക്കുന്നു. ദിവസവും മഞ്ഞളിട്ട വെള്ളം കുടിക്കുകയോ അല്ലെങ്കിൽ മഞ്ഞൾ പാലിൽ ചേർത്ത് കുടിക്കുകയോ ചെയ്യുന്നതും ഏറെ നല്ലതാണ്.

ഇഞ്ചി

ദഹനസംബന്ധമായ പ്രശ്നങ്ങൾക്ക് മികച്ച സുഗന്ധവ്യഞ്ജനമാണ് ഇഞ്ചി. ഇത് ഓക്കാനം കുറയ്ക്കുകയും, വയറു വീർക്കുന്നത് കുറയ്ക്കുകയും, മൊത്തത്തിലുള്ള കുടലിന്റെ ആരോഗ്യം മെച്ചപ്പെടുത്തുകയും ചെയ്യുന്നു. ദിവസവും ഇഞ്ചിയിട്ട് തിളപ്പിച്ച വെള്ളം കുടിക്കുന്നതും ഏറെ നല്ലതാണ്.

കറുവപ്പട്ട

രക്തത്തിലെ പഞ്ചസാരയുടെ അളവ് നിയന്ത്രിക്കുന്നതിന് കറുവപ്പട്ട മികച്ചതാണ്. ഇത് പ്രമേഹമുള്ളവർക്ക് ഗുണം ചെയ്യും. ഇതിന് ആന്റിമൈക്രോബയൽ ഗുണങ്ങളുണ്ട്. ഇത് അണുബാധകൾക്കെതിരെ പ്രവർത്തിക്കുകയും ചെയ്യുന്നു.

പെരുംജീരകം

പെരുംജീരകം ദഹനത്തെ സഹായിക്കുകയും വയറു വീർക്കൽ, ഗ്യാസ് എന്നിവ കുറയ്ക്കുകയും ചെയ്യും. ആന്റിഓക്സിഡന്റുകളാൽ സമ്പന്നമായ പെരുംജീരകം വീക്കം കുറയ്ക്കാനും ഹൃദയാരോഗ്യത്തെ പിന്തുണയ്ക്കാനും സഹായിക്കും.

ഉലുവ

രക്തത്തിലെ പഞ്ചസാരയുടെ അളവ് കുറയ്ക്കാനും ഇൻസുലിൻ സംവേദനക്ഷമത മെച്ചപ്പെടുത്താനുമുള്ള കഴിവിന് ഉലുവയ്ക്കുണ്ട്. ഇത് പ്രമേഹമുള്ളവർക്ക് ഗുണം ചെയ്യും.

ഇഞ്ചി കർഷകരെ കണ്ണീരിലാഴ്ത്തി ഫംഗസ് ബാധ, രക്ഷയ്ക്ക് കർണാടക മോഡൽ; ശ്രദ്ധിക്കണം ഇക്കാര്യങ്ങൾ

https://www.manoramaonline.com/ SEPTEMBER 23, 2025

ഇഞ്ചി കർഷകർ നേരിടുന്ന ഏറ്റവും വലിയ വെല്ലുവിളികളിൽ ഒന്നാണ് മഞ്ഞളിപ്പുരോഗം. ഏക്കർക്കണക്കിന് ഇഞ്ചി കൃഷി നശിക്കാൻ ഈ ഒരു രോഗം മതി. മഞ്ഞളിപ്പുരോഗം ബാധിച്ച് സംസ്ഥാനത്തിന്റെ വിവിധ ഭാഗങ്ങളിൽ ഇഞ്ചിക്കൃഷി വ്യാപകമായി നശിക്കുന്നത് പതിവാണ്. കൊട്ടിയൂർ, കേളകം, കണിച്ചാർ, പേരാവൂർ പഞ്ചായത്തുകളിൽ മാത്രം നിരവധി ഏക്കർ ഇഞ്ചി കൃഷിയാണ് മഞ്ഞളിപ്പ് രോഗം ബാധിച്ച് നശിച്ചത്. എന്താണ് ഇതിനൊരു പരിഹാരം? പരിശോധിക്കാം...

ഇഞ്ചി ചെടികളിൽ ഫംഗസ് ബാധിക്കുന്നതാണ് രോഗവ്യാപനത്തിന് കാരണം. ഫംഗസ് ബാധ കൂടുതൽ കൃഷിയിടങ്ങളിലേക്ക് പടരാനുള്ള സാധ്യതയുണ്ടെന്ന് കർഷകർ ഭയപ്പെടുന്നു. വിത്ത് നട്ട് ഒന്നര മാസത്തോളം പ്രായമാകുകയും വളപ്രയോഗം നടത്തുകയും ചെയ്തതിനു ശേഷമാണ് തൈകളിൽ മഞ്ഞളിപ്പ് ബാധിക്കുന്നതായി കണ്ടെത്തിയത്. ഫംഗസ് ബാധയുടെ ലക്ഷണങ്ങൾ പ്രകടമായി കണ്ട് ദിവസങ്ങൾക്കുള്ളിൽ തന്നെ ചെടി നശിക്കുന്നു. ഇലകളുടെ അഗ്രഭാഗത്ത് പുള്ളികളും നിറ വ്യത്യാസവുമാണ് രോഗത്തിന്റെ ആദ്യ ലക്ഷണം. ക്രമേണ ഇത് എല്ലാ ഇലകളിലേക്കും തണ്ടുകളിലേക്കും വ്യാപിക്കും. ചെടികൾ മഞ്ഞ നിറത്തിലാകും. അന്തരീക്ഷത്തിലെ ഈർപ്പം വർധിക്കുന്നത് മഞ്ഞളിപ്പു രോഗം വ്യാപിക്കാൻ കാരണമാകുന്നു. മലയാളികളായ കർഷകർ കർണാടകയിൽ വ്യാപകമായി ഇഞ്ചി കൃഷി നടത്തിയിരുന്നു.

എന്നാൽ കഴിഞ്ഞ വർഷം മഞ്ഞളിപ്പ് രോഗം വ്യാപിക്കുകയും നിരവധി കർഷകർക്ക് വൻ നഷ്ടം സംഭവിക്കുകയും ചെയ്തിരുന്നു. പലരും വൻ തുക വായ്പയെടുത്താണ് കൃഷികൾ നടത്തിയത്. ഈ വർഷം വേനൽ മഴ നേരത്തെ ലഭിച്ചത് നിലമൊരുക്കുന്നതിനും സഹായമാകുകയും കർഷകർക്ക് വൻ പ്രതീക്ഷ നൽകുകയും ചെയ്തിരുന്നു. എന്നാൽ കനത്ത മഴ തുടർച്ചയായി പെയ്തത് പ്രതീക്ഷകൾ നശിപ്പിച്ചു.

- **പൈരിക്കുലാരിയ ഫംഗസ് രോഗത്തെ എങ്ങനെ പ്രതിരോധിക്കാം?**

ഇഞ്ചി കൃഷിയെ ബാധിച്ച പൈരിക്കുലാരിയ ഫംഗസ് രോഗത്തിനു പ്രതിരോധം തീർക്കാൻ കർണാടക മോഡൽ പരീക്ഷിക്കാവുന്നതാണ്. കൂർഗ്, മൈസൂരു, ഹാസൻ, ചാമരാജ്നഗർ, ഷിമോഗ ജില്ലകളിൽ രോഗം പടർന്നപ്പോൾ പ്രതിരോധത്തിന് കർഷകർ സ്വന്തം നിലയ്ക്കു നടത്തിയ പരീക്ഷണങ്ങളാണ് പൈരിക്കുലാരിയയെ ഒരുപരിധി വരെ തടുത്തുനിർത്തിയത്. 2024ൽ കർണാടകയിലെ കൂർഗ് ജില്ലയിലാണ് ആദ്യമായി ഈ ഫംഗസ് ബാധ റിപ്പോർട്ട് ചെയ്തത്. രോഗബാധയേറ്റ ഇഞ്ചിച്ചെടിയുടെ ഇലകളും തണ്ടും മഞ്ഞനിറമാകുകയും പിന്നീട് കരിയുകയും ചെയ്തു. രോഗവ്യാപനം കനത്ത ഉൽപാദന നഷ്ടത്തിനും കാരണമായി.

- **ഫംഗസിനെതിരേ ഗ്ലോയിറ്റ്, കവച് പ്രയോഗം**

ഈ സാഹചര്യത്തിലാണ് കർഷകർ സ്വന്തം നിലയ്ക്ക് പ്രതിരോധ മാർഗങ്ങൾ തേടിയത്. ഫംഗസിനെതിരേ ഗ്ലോയിറ്റ്, കവച് എന്നീ മരുന്നുകളിലൊന്ന് 250 മില്ലി ലീറ്റർ ഒരു ബാരൽ വെള്ളത്തിൽ (200 ലീറ്റർ) ലയിപ്പിച്ച് തളിച്ചും ബാക്ടീരിയ പ്രതിരോധത്തിന് സ്ട്രെപ്റ്റോമൈസിൻ (പൊടി), കാസുഗാമൈസിൻ (ലിക്വിഡ്), വലിഡാമൈസിൻ (പൗഡർ)എന്നിവയിലൊന്ന് ഒരു ബാരൽ വെള്ളത്തിൽ 100–150 ഗ്രാം/100 എംഎൽ കലർത്തി പ്രയോഗിച്ചും രോഗനിയന്ത്രണം സാധ്യമാക്കി.

ഫംഗസിനൊപ്പം കീടങ്ങളെയും ഇഞ്ചിയുടെ നീരൂറ്റുന്ന ജീവികളെയും നിയന്ത്രിച്ചാണ് കർണാടകയിലെ ഇഞ്ചിക്കർഷകർ രോഗത്തെ വരുതിക്കു നിർത്തിയത്. കീട നിയന്ത്രണത്തിന് നൊവാകോഡ്, ഗേറ്റ്വേ, തകുമി തുടങ്ങിയ മരുന്നുകളും ഉപയോഗിച്ചു. ഫംഗസ്, കീട ബാധകൾക്കെതിരായ മരുന്നുകൾ വേറിട്ടു തളിക്കുന്നത് കൂടുതൽ ഫലം ചെയ്യുമെന്ന് മറുനാടൻ കർഷകർ പറയുന്നത്. മരുന്നുകൾ പ്രയോഗിച്ച് 7 ദിവസത്തിനു ശേഷം ചെടിയുടെ ആരോഗ്യം വർധിപ്പിക്കുന്നതിന് അമിനോ ആസിഡ്, സീവീഡ്, മൈക്രോ ന്യൂട്രിയൻറ്, മറ്റ് ഫോളിയർ വളങ്ങൾ എന്നിവ പ്രയോഗിക്കുന്നതു നല്ലതാണ്.

- **കോപ്പർ ഫംഗിസൈഡ്, ആൻറിബയോട്ടിക് മിശ്രിതം**

ചെടികളിൽ കീഴടക്കുന്ന നിമാ വിരകളെയും ഫംഗസുകളെയും നിയന്ത്രിക്കാൻ നിർദേശിക്കപ്പെട്ട മരുന്നുകൾ നിശ്ചിത അളവിൽ വെള്ളത്തിൽ ചേർത്ത് ഏക്കറിന് 5 ബാരൽ എന്ന തോതിൽ ഒഴിച്ചുകൊടുത്തതും കർണാടകയിലെ രോഗബാധ കുറച്ചു. കോപ്പർ ഫംഗിസൈഡ്, ആൻറിബയോട്ടിക് മിശ്രിതം ഇടവേളകളിൽ തളിച്ചു. രോഗബാധയുള്ള തോട്ടങ്ങളിൽ ഫംഗസിനെതിരായ മരുന്ന് പ്രയോഗിച്ച ശേഷം ഉയർന്ന അളവിൽ നൈട്രജൻ അടങ്ങിയ വളങ്ങളും രാസ- ഫോളിയർ വളങ്ങളും ഇഞ്ചിക്ക് നൽകുന്നത് പരിമിതപ്പെടുത്തുന്നതാണ് നല്ലതെന്ന് കർഷകർ പറയുന്നു.

- **ശ്രദ്ധിക്കാം ഇക്കാര്യങ്ങൾ**

ആളുകളുടെ വസ്ത്രങ്ങളിലും മറ്റും പറ്റിപ്പിടിച്ച് പൈരുക്കുലാരിയ ഫംഗസ് പടരുമെന്നതിനാൽ രോഗബാധയുള്ള തോട്ടങ്ങളിലെ സന്ദർശനം ഒഴിവാക്കണം. ജോലിക്കാരുടെ ശുചിത്വം ഉറപ്പുവരുത്തണം. കന്നുകാലികൾ ഇഞ്ചിപ്പാടങ്ങളിൽ കയറുന്നത് തടയണം. രോഗബാധയുള്ള ഇടങ്ങൾ ഷെയ്ഡ് നെറ്റ് ഉപയോഗിച്ച് വേർതിരിക്കണം.

കുരുമുളക് കൃഷിക്ക് പി.വി.സി പൈപ്പ് അനുയോജ്യമോ ?

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കുരുമുളക് കൃഷിക്ക് പലരും പി.വി.സി പൈപ്പ് ഉപയോഗിക്കുന്നുണ്ട്. ഇത് ഒട്ടും ഗുണകരമല്ല എന്നാണ് പരമ്പരാഗത കൃഷിക്കാരുടെ പക്ഷം. മരത്തിൽ പറ്റിപ്പിടിച്ചു വളരുന്ന ഒരുതരം വള്ളി ഇനത്തിൽപ്പെട്ട ചെടിയാണ് കുരുമുളക്. ഇതിന്റെ വള്ളി പടർത്തുന്നതിനുവേണ്ടി ശീമ കൊന്ന, കിളിഞ്ഞിൽ, മുരിക്ക് തുടങ്ങിയ പാഴ് മരങ്ങളുടെ കമ്പുകളാണ് പണ്ടുമുതൽ ഉപയോഗിച്ചുവരുന്നത്. കുഴിച്ചുവെച്ചാൽ പെട്ടെന്ന് കിളിർത്തുവരുന്നതാണ് ഇവയൊക്കെ. തന്നെയുമല്ല കടുത്ത വേനലിൽപോലും ഇവ യാതൊരു കുലുക്കവുമില്ലാതെ നിൽക്കുകയും ചെയ്യും. ഒരു മരത്തിൽ നിന്നും നട്ട് കിളിപ്പിക്കുവാൻ പാകത്തിലുള്ള നിരവധി കമ്പുകൾ ലഭിക്കും. കാലക്രമേണ ചെറിയ മരമായി മാറുന്ന ഇവയിൽ കുരുമുളക് വള്ളി വളരെവേഗം പടർന്നു കയറും. ഇവയിൽ ഏണി ചാരിയാണ് കുരുമുളക് പറിച്ചെടുക്കുന്നത്.

എന്നാൽ പുതിയതലമുറ കൃഷിക്കാർ കുരുമുളക് ചെടിയുടെ വള്ളി പടർത്തുന്നതിനുവേണ്ടി പി.വി.സി പൈപ്പുകൾ വ്യാപകമായി ഉപയോഗിച്ചുവരുന്നു. ഇതിന്റെ ദോഷവശങ്ങൾ മനസ്സിലാക്കാതെയും പി.വി.സി പൈപ്പ് നിർമ്മാതാക്കളുടെ വ്യാപകമായ പ്രചാരണങ്ങളിൽ കുടുങ്ങിയുമാണ് പലരും ലോഡ് കണക്കിന് പൈപ്പുകൾ ഇറക്കി കൃഷി ഭൂമിയിൽ കുഴിച്ചു വെക്കുന്നത്. തുശ്ചമായ വിലക്കോ വില ഇല്ലാതെയോ നാട്ടുകിളിർപ്പിക്കുവാൻ പാകത്തിലുള്ള മരക്കമ്പുകൾ സുലഭമായി ലഭിച്ചാലും ഇത് ഉപയോഗിക്കുവാൻ പലരും വിമുഖത കാട്ടുകയാണ്. മരത്തിൽ പറ്റിപ്പിടിച്ചു വളരുന്നതുപോലെ പി.വി.സി പൈപ്പിൽ കുരുമുളക് വള്ളി പറ്റിപ്പിടിച്ചു വളരില്ല.

കനത്ത ചൂടും മഴയുമുള്ള കാലാവസ്ഥയിൽ പി.വി.സി പൈപ്പിന്റെ ആയുസ്സ് വളരെ കുറവായിരിക്കും. പൈപ്പ് പൊടിഞ്ഞുപോകുവാനുള്ള സാധ്യത വളരെയാണ്. പി.വി.സി പൈപ്പുകൾ മണ്ണിനടിയിൽ കിടന്നാൽ കാലങ്ങളോളം നിലനിൽക്കും. എന്നാൽ വെയിലും മഴയുമേറ്റ് പുറത്ത് കിടന്നാൽ ഏതാനും നാളുകൾക്കുള്ളിൽ പൈപ്പ് ഹാർഡ് ആകുകയും പൊടിയുകയും ചെയ്യും. ഫലത്തിൽ ലക്ഷങ്ങൾ മുടക്കിയുള്ള കുരുമുളക് കൃഷിത്തോട്ടം വെറും ചിത്രത്തിൽ മാത്രമായി അവശേഷിക്കും, പി.വി.സി പൈപ്പ് നിർമ്മാണ കമ്പനികൾക്ക് ലഭിക്കേണ്ട പണം കിട്ടുകയും ചെയ്യും.