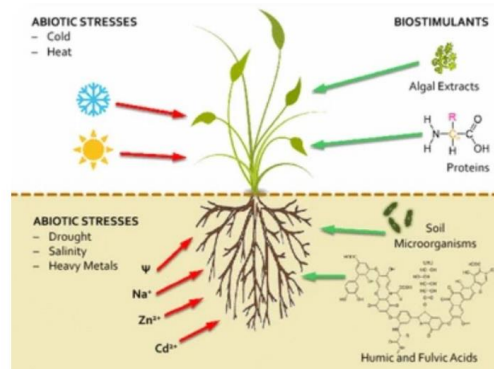


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Biologicals in agriculture are biopesticides, biofertilizers, and biostimulants derived from natural sources like micro-organisms, plants, animals and their derivatives. Their application improves crop resilience as well as soil health. Of all the categories of biologicals, Biopesticides are sought after for their benefits and inclusion in integrated pest management. Biopesticides not only control pests, but they also protect beneficial insects and pollinators. The biopesticides are economical to develop and provide the flexibility of harvest without any issues of residuals and a favourable ecological footprint. Fruit and vegetable growers are the early adaptors of the technology as consumer acceptance of chemical free produce is high. Reduced use of fossil fuels and carbon footprint are also positives for the ever-vigilant consumer.

According to two independent studies the market for biopesticides was estimated to be worth \$3.1 billion in 2018 and grow to \$10 billion by 2025. Biopesticides with wider adoption will pave the way for other biologicals that can complement or replace agricultural chemical fertilizers, alleviate abiotic stress, and increase crop yields. Biologicals are expected to compete in the \$240 billion market for chemical pesticides and fertilizers. Many industry players are looking to supplement their pesticides and fertilizer portfolio with biopesticides, biofertilizers and bio stimulants within the next decade. Biologicals will also be the flag bearers for sustainability and regenerative agriculture. One such example is the use of N-fixing bacteria in the fields to supplement N fertilizer application, this has been tested for corn with positive results.

In this edition of Seed Connect we focus on biologicals as well as climate smart agriculture. We hope you will find the featured articles useful.



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Federation of Seed Industry of India

News from India and Around the World

Climate–smart initiatives

<https://www.financialexpress.com/opinion/climate-smart-initiatives/3057697/>

With erratic weather–related conditions impacting India’s food security, policy makers have to deal with the reality of climate change on a war–footing. Heat stress in the 2021–22 crop year adversely affected the wheat crop and procurement. Untimely rains and hailstorms this year damaged the standing wheat crop due to lodging or bending over from high velocity winds and water logging. Farmers suffer huge losses due to temperature shocks and other climate change–related challenges. The need is to bring science and technology to farmers that make crops heat resistant. Regenerative agricultural practices also are necessary to protect the soil and make it more resilient to weather–related shocks.

What is Precision Agriculture and its Benefits?

<https://www.mapsofindia.com/my-india/india/what-is-precision-agriculture-and-its-benefits>

Precision agriculture is a modern farming technique that uses advanced technologies such as Global Positioning Systems (GPS), Geographic Information Systems (GIS), remote sensing, and machine learning algorithms to optimise crop production and maximise yields. This approach involves collecting, analysing, and interpreting various data sources to make informed decisions about every aspect of the farming process, from seeding to harvesting. Precision agriculture offers a range of benefits for farmers, the environment, and consumers.

Cultivation of exotic vegetables changes Kashmir agriculturist's fate

<https://theprint.in/india/cultivation-of-exotic-vegetables-changes-kashmir-agriculturists-fate/1535862/>

In recent years, Kashmir has been witnessing a growing community of farmers who are revolutionizing the way agriculture is practised in the region. With the help of the department, farmers have made the transition from growing apples to cultivating exotic vegetables, such as broccoli, purple broccoli, asparagus, baby corn, cherry tomato, thyme, red cabbage, coloured capsicum, parsley, celery, Kale, and lettuce.

Punjab: Sangrur surpasses 2022 figure of total wheat production

<https://www.hindustantimes.com/cities/chandigarh-news/sangrur-district-surpasses-2022-wheat-production-figures-set-to-record-11-lakh-mt-production-this-year-101682358791691.html>

Sangrur district has surpassed the number of total wheat production of last rabi season. The total wheat production in Sangrur was 8.74 lakh MT in 2022, while over 9.54 lakh MT wheat has already arrived in grain markets so far. The district is set to record total wheat production near 11 lakh MT this year, officials said.

CGIAR commits to support Vietnam in food system transformation

<https://nongnghiep.vn/khang-dinh-lai-quan-he-doi-tac-de-chuyen-doi-he-thong-nong-nghiep-d349552.html>

The Deputy Minister thanked CGIAR for the support and companionship of CGIAR and its member centers, including CIAT, with Vietnam's agricultural industry for many years. The deputy minister said that the agricultural sector has achieved many impressive achievements after 30 years of restructuring. However, Vietnam is currently ranked 5th in the world in terms of being affected by climate change. At the same time, the number of smallholder farmers in Vietnam is still relatively large.

Govt bets on carbon capture to go green, plans to unveil ...

The government has for the first time declared energy transition as a policy goal in the Budget. To this end, the ministry of petroleum and natural gas (MoPNG) has received a Rs 35,000-crore grant in the 2023-24 Budget, which is expected to be used to deploy alternative technologies like carbon capture, utilisation and storage (CCUS).

Address the growing urgency of fungal disease in crops

<https://www.nature.com/articles/d41586-023-01465-4>

In October 2022, the World Health Organization (WHO) published its first list of fungal pathogens that infect humans, and warned that certain increasingly abundant disease-causing fungal strains have acquired resistance to known antifungals¹. Even though more than 1.5 million people die each year from fungal diseases, the WHO's list is the first global effort to systematically prioritize surveillance, research and development, and public-health interventions for fungal pathogens. Yet fungi pose another major threat to human health — one that has received even less attention than infections in people.

A Digitalisation Roadmap for Climate-Smart Agriculture in India

<https://www.orfonline.org/research/a-digitalisation-roadmap-for-climate-smart-agriculture-in-india/>

Climate-smart agriculture requires a digital integration of climate and agriculture information. India is digitalising rapidly, and so its policies and practices to achieve climate-smart agriculture must also promote digital integration. This policy brief presents a framework and process guide to: (a) digitally integrate India's agriculture and climate information; (b) analyse India's extant agriculture and climate information policies within the framework; (c) highlight their strengths, weaknesses, and oversights; and (d) recommend pathways for the future.

The Sustainable Markets Initiative Agribusiness Task Force

<https://a.storyblok.com/f/109506/x/7b102e6831/agribusiness-task-force-white-paper.pdf>

An interesting report crossed my desk the other day. Entitled 'Scaling Regenerative Agriculture: An Action Plan', it came from the Sustainable Markets Initiative (SMI), a coalition of 12 of the world's largest agri-food companies and organisations, including agribusinesses Bayer and Yara, food companies Mars, Pepsico and McCains, fast-food chain McDonalds and food retailer Waitrose. An impressive line-up of globally leading businesses, and just the kind of farm-to-fork collaboration needed to provide the vision, funding and action plan to kick-start a genuine transition in our food system.

Climate Change Challenge Crusades Must Not Risk Food Security

<https://globalfarmernetwork.org/climate-change-challenge-crusades-must-not-risk-food-security/>

Part of the Green Deal's "Farm to Fork" strategy involves embracing an organic-only farming system

and rejects the safe science-based methods of biotechnology and crop protection. By 2030, the Green Deal aims to have one-quarter of all EU agriculture transition to organic and to slash the use of crop-protection products in half. While I respect the fact that Europeans should decide what makes sense for them, I encourage everyone to look at last year's crisis in Sri Lanka – a result of very similar decisions being made as those proposed in the current EU legislation.

UPL Wants Half of its Revenue to Come from Biopesticides – AgroPages

The title of this article is misleading, and it stems from the fact that “sustainable” gets interchanged with “biopesticides.” About 7% of UPL's business today comes from their Natural Plant Protection (NPP) product line, which generally contains biological-based products. This works out to around USD 400 million in 2022 with USD 6.2 billion in revenue.

Clocking Up a Week's Worth of Work in One Day – GRDC

Our mission by 2030 is to make sure every one of the 10 trillion corn and soybean seeds can be planted, cared for, and harvested autonomously. The ability to execute with “dumb” implements (mowers, tillage) and run sprayers autonomously has been managed well by SwarmFarm with the likes of WeedIt and mowers. Naturally, farmers with a SwarmFarm platform will want to be able to plant and harvest autonomously and reap the benefits of autonomy across all points in the growing season.

New seed treatment improves forage cabbage yields

<https://www.en.krishakjagat.org/seed-industry/new-seed-treatment-improves-forage-cabbage-yields/>

Our most recent seed treatment for agriculture is pelleted swede seed, which is a forage brassica used for winter forage. Pelleted swedes have revolutionized the sowing of this crop in New Zealand, where conventional planting has gradually shifted to precision planting in popularity. The new coating has resulted in improved yield responses with overall better plant volumes and bigger and more uniform bulbs.

Research News

Five new CIMMYT maize hybrids available from South Asia Breeding Program

<https://www.cimmyt.org/news/five-new-cimmyt-maize-hybrids-available-from-south-asia-breeding-program/>

Five new, improved tropical maize hybrids that have been made available by CIMMYT for uptake by public and private sector partners, especially those interested in marketing or disseminating hybrid maize seed across South Asia and similar agro-ecologies in other regions. NARES and seed companies are hereby invited to apply for licenses to pursue national release, scale-up seed production, and deliver these maize hybrids to farming communities.

Performance of Selected Commercially Available Asymbiotic N-fixing Products in the North Central Region – NDSU

Developing a crop-agnostic, nitrogen-fixing product is incredibly challenging though. As **early as 1917**, scientists attempted to cultivate the rhizobia from legumes and inoculate these into other crop species. To date, however, none of these attempts to transfer the complex root nodule to non-legume plants has succeeded. However, the identification of N-fixing organisms that are less efficient at nitrogen fixation than traditional legume rhizobia have been discovered and commercialized. These products were tested by several USA extension groups over the last few years and the results are linked above.

Climate Smart Farming

Climate and agriculture go hand-in-hand, and when there's volatility, the ag industry feels it. As the climate shifts and begins doling out extreme weather on a more regular basis, it's imperative that growers mitigate their innate vulnerability as much as possible by incorporating smart practices. The ripple effects of climate change are varied and significant: increases in invasive pests, long-lasting droughts, intense weather events, and ultimately, reduced crop yields, to name just a few.

Compounding that, regulatory efforts are hampering once-relied-upon solutions, leading growers to seek alternate means of protecting crops and increasing output while keeping the bottom line healthy.

UC Davis Releases Fusarium-resistant Strawberries

The University of California, Davis (UC Davis) announced the release of five new strawberry varieties with resistance to *Fusarium* wilt, high yield, and enhanced fruit quality. The varieties, known as UC Eclipse, UC Golden Gate, UC Keystone, UC Monarch, and UC Surfline, are available for purchase by California nurseries from Foundation Plant Services.

Genomic Surveillance Identifies Emerging Wheat Disease Fungus

Genomic surveillance could help manage emerging crop diseases and identify traits for developing

disease-resistant crops, according to a study conducted by researchers from the University College London (UCL) and an international team from four continents. The results of this study have been published in the open-access journal *PLOS Biology*.

Protein Responsible for Strawberry's Signature Red Color Identified

Scientists from the University of Cordoba in Spain identified transcription factor protein FaMYB123 as a key component in controlling the production of strawberry's red color. It interacts with another factor protein, FabHLH3, which contributes to the increased production of anthocyanins during the fruit's ripening stage.

Regenerative Agriculture: A solution for soil degradation

<https://www.orfonline.org/expert-speak/regenerative-agriculture/>

Indian agricultural farms are increasingly staring at a crisis, with over 29 percent (96.4 million hectares) of India's total geographical area (328.7 million hectares) being degraded, roughly 2.5 times the size of India's largest state, Rajasthan. The numbers highlight the stiff challenge India must face to achieve its target of becoming land-degradation-neutral by 2030.

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