₹80/-

JANUARY 2025

AGRICULTURE TODAY

The National Agriculture Magazine

VOLUME XXVIII | ISSUE 1

www.agriculturetoday.in

2025

THE PATH AHEAD

The World BioProtection Forum
Innovation through collaboration

AGRICULTURE TODAY GROUP

IACG
International Agriculture Consulting FZ-LLC, Dubai

WORLD BIOAG Innovation Forum 2025

10 - 12 APRIL 2025 | DUBAI, UAE

BioAg World Expo 2025, Dubai

BioStimulants | BioFertilizers | BioPesticides | BioLogicals | BioControl

Save your dates , Scan for details

Policy | Regulation | Technology | Innovation | Business | Investment

FOR MORE DETAILS, PLEASE CONTACT :

Mr. Haris Khan | +91 - 9582871463, +971505163745 | ceo@agritodaygroup.com

Dr. Aakanksha Upadhyay | +91-7290031468 | aakanksha.upadhyay@agritodaygroup.com

www.worldbioag.agritodaygroup.com

Publisher & Printer – Dr. MJ Khan on behalf of M/s Concept Agrotech Consultants Limited, Published from 306 Rohit house Tolstoy Road New Delhi-110001 and printed by Everest Press E-49/8, Okhla Industrial Area-II New Delhi-110020
Phone No. 011-23731129 Fax No.011- 23731130
E-mail: editor@agriculturetoday.in
info@agriculturetoday.in

www.agriculturetoday.in
Page in the magazine: 60

2025- YEAR TO THINK SMART

The new year brings hopes and aspirations. We make new promises. We look forward to right our wrongs, and forge new paths. We try to capitalize on our gains from the past year, and aim to strengthen our new position. There is a positive synergy among the stakeholders, and an atmosphere of immense possibilities loom large over the horizon.

The year 2024 was momentous for agriculture. With a respectable food grain output of 328.9 million metric tonnes, India has displayed its stability in production front. On the policy front, several new policies debuted. The Clean Plant Program (CPP) anchored focus on supplying disease-free, climate-resilient, and high-yielding planting material to realise enhanced quality and productivity in horticulture sector. The Digital Agricultural Mission (DAM), Expansion of Agricultural Infrastructure Fund (AIF), National Mission on Edible Oils and National Mission on Natural Farming have all been built up on the already established platform of raising production and productivity of clean, safe and nutritious food.

The gains made on the digital front in agriculture sector is particularly interesting. The year ahead will also capitalise on the gains made on this front. With more than 2800 agri startups powering the Indian farm sector, hopes and aspirations are ripe for a complete digital overhaul. We might be lucky to see an overdose of AI, satellite imaging, geo spatial coordinates, drones and precision farming. The year 2025, will thus become a very important year with agri digitization becoming a more common denominator. With the after effects of climate change a more predictable occurrence, the year will also see interventions and strategies to adapt and mitigate to the changes. We might be able to see more developments on research and policy front. Biofuels and energy efficient machinery are other important interventions that hopefully would become an integral part of the agri infrastructure. While we are keen to reduce the losses associated with agri outputs, we might as well think about climate smart technologies. Farmer producer organizations and other similar collectives will play a big role in universalization of digital and climate smart technologies.

Agriculture has been constantly evolving with the challenges it is exposed to. This puts an immense amount of pressure on the sector and the stakeholders. Innovators and researchers not only have to keep up with this, but also have to make sure that innovations reach the farmers on time. The way we are compressing time through digitization will only be useful, if we are also able to condense the time in bureaucratic processes. The only way to keep up the momentum will be to be act and think smart.

Happy New Year!!

CONTENT

VOLUME XXVIII | ISSUE 01 | JANUARY 2025

AGRICULTURE TODAY
The National Agriculture Magazine

AGRICULTURE TODAY GROUP

ANN
Agri News Network

PRINT AND DIGITAL SUBSCRIPTION

SUBSCRIPTION TARIFF

S.No.	ONE YEAR 12 ISSUES	PRINT	DIGITAL
1.	Individual	800	400
2.	Student	500	250
3.	Organisation	1200	600
4.	Institute / Library	1200	600

To Keep Yourself Abreast with the Latest in Agriculture

Subscribe Now

Please call in +91 72900 88228 or Email : editor@agriculturetoday.in

| www.agriculturetoday.in/subscribe-magazine

AGRICULTURE IN INDIA: WHAT SHOULD WE EXPECT IN THE YEAR 2026?

In the light of the influence of climate change, need for nutrition security of the population, and demand for gainful jobs and associated income, it is necessary to re-mandate agriculture to go beyond the conventional responsibility of food, fodder, and feed, and aim also at generation of jobs for the large workforce dependent on agriculture, and achieve all this in an ecologically sustainable manner.

Financial Year 2025

Before we introspect on the desirable initiatives for a healthier and egalitarian agricultural transformation in the financial year (FY) 2026, let us evaluate the contemporary status. The growth rate of agricultural sector between 2019-20 and 2023-24 was an impressive 4.18 percent. Of this, livestock including aquaculture has stood out to be a growth engine, registering a growth rate of 7.38 percent. Despite truancy of weather in the year FY 2024, particularly in South India, Maharashtra, and Rajasthan which experienced prolonged drought periods, the foodgrains output was 328.9 million metric tons (mmts), only a tad lower than in the preceding FY 2023, which was 329.7 mmts. The output of various crops in FY 2024 were maize (37.6 mmts), nutria-cereals (17.5), oilseeds (39.60 mmts), pulses (24.25 mmts), sugarcane (453.16 mmts), and cotton 32.52 million bales (1 bale = 170 kgs.). A quick analysis of these figures shows that, we need to focus on enhancing output of nutria-cereals, pulses, and oilseeds in the new year, all of which are climate-resilient crops, and are highly suited to the vast rainfed regions of the country.

About the **AUTHOR**

Dr Ashok Dalwai
CEO, National Rainfed Area Authority; Chairman, Inter-ministerial Committee on Doubling of Farmers' Income, Ministry of Agriculture, Govt. of India

The FY 2025 unlike its preceding year has been blessed with a good monsoon. Timely onset and fair distribution of rainfall enabled timely sowing & planting of kharif crops, which ensured good rooting. The Kharif performance as per first Advanced Estimates is outstanding with an output of 164.70 mmts of foodgrains, which is not only higher than the previous year's, but is also the highest for any of the previous kharif seasons.

Some Positive Changes in the Last Decade

Some of the positive developments that are proving to be supportive of the agricultural growth are bringing additional area under irrigation & micro-irrigation (9 million hectares) – both under Pradhan Mantri Krishi Sinchayi Yojana (PMKSY), market reforms (eNAM), FPOS, increase in MSP (minimum of 50% of the cost of production as margin of profit), corpus funds for upgrading agri-infrastructure (AIF under ANB), formalisation of micro-food enterprises (PMFMFE), etc.

Major Initiatives in FY 2025

The following 5 (five) are the major initiatives made in FY 2025, and will prove ben-

eficial in the coming year. These include:

Clean Plant Program (CPP) – targets to supply disease-free, climate-resilient, and high-yielding planting material to realise enhanced quality and productivity in horticulture sector.

Digital Agricultural Mission (DAM) – an umbrella scheme that supports digital public infrastructure (DPI), digital general crop estimation survey (DGCES), and various information technology initiatives by centre, states, research, and academic institutes.

Progressive Expansion of AIF – this now enables the eligible individuals to access funds under Agricultural Infrastructure Fund (AIF), which were earlier restricted to communities.

National Mission on Edible Oils – with an allocation of Rs. 10,103 crore (FY 2025 to FY 2031), this aims at promoting seasonal oilseeds to promote self-reliance in edible oil sector.

National Mission on Natural Farming – it is a response to degraded land and to tap the growing demand for agrochemical-residue free food.

Recommended Path for FY 2026

In the light of the influence of climate change, need for nutrition security of the population, and demand for gainful jobs and associated income, it is necessary to re-mandate agriculture to go beyond the conventional responsibility of food, fodder, and feed, and aim also at generation of jobs for the large workforce dependent on agriculture, and achieve all this in an ecologically sustainable manner. The FY 2026 should therefore lay the foundation for a new and comprehensive trajectory of agricultural growth. The following broad orientation is suggested:

New crop production matrix – Support accelerated productivity and area led production in respect of deficit crops – pulses, oilseeds, and nutria-cereals

Emphasis on high value agriculture – A stimulating policy framework to achieve elevated output of horticulture, dairy & livestock, fisheries & aquaculture. Both technology and price triggers are needed. Animal & fish breeds, and clean planting material are a pre-requisite. Upgradation of local breeds, particularly cattle & buffaloes is essential.

Now that the Ministry of Agriculture is building its DPI – AgriStack, with details of farmers and their land coordinates, it would be feasible to superimpose several other layers like soil data etc. and promote precision agriculture.

Risk management – This is a crying need given the increasing number of weather variation events. A set of technical, safety-net, and digital-support system would be useful in minimising the loss of production and income. Some suggestions in this regard are as follows:

Hyper-local farming and community-centric agriculture – Transit from the tradition commodity-led production system to agro-ecologically-synchronous hyper-local production system. This will support locally suitable climate-resilient crop production, besides encouraging appropriate supply chains. The consumers will also get to eat their preferred food items. Production risks logically get minimised.

Livestock-led integrated production system – Livestock, including small & large ruminants are highly climate-resilient. They can divide and minimise the production and income risks. It would be advisable to target coverage of at least half the agricultural households under dairy and livestock by enhancing non-crop investments – both production and long-term financing. There is scope for monetisation in both in domestic and export markets.

Artificial Intelligence-led risk management – AI can help in forecasting various risks linked to pests and diseases, weather anomalies, soil deficiencies, price fluctuations, and the like. Advanced information when shared with the farmers will enable them to make necessary interventions and minimise likely losses.

Robust coverage under crop insurance – Technology-supported PMFBY should be implemented with greater vigour to cover maximum number of farmers and area in both kharif and rabi seasons. Needed amendments to the process of loss assessment and claim settlement would be necessary to attract the farmers.

Social safety net – Coverage of eligible farmers under pension scheme, namely, Pradhan Mantri Kisan Mandhan Yojana (PMKMY) that assures a monthly pension of Rs. 3,000 after the age of 60 years on payment of a nominal premium of Rs. 55 to 200 by the applicants in the age group of 18 to 40 years would be a god safety net. There should be a campaign-led coverage of the agricultural households under various other social security schemes of the government.

Post-harvest management (PHM) – This is the most critical need of the hour to complete the agricultural value chain. Monetisation of the agricultural produce depends upon the existence of integrated agri-logistics (storage & transportation), agro-processing (food & non-food). And marketing. An ecosystem-oriented intervention would be help in capturing optimal value in favour of the farmers.

Geo-spatial farming and land use optimisation – This technology encompassing both satellite imaging and proximate imaging using drones is useful in precise mapping of water resources, soil health, crop health status, among other things. This technology is also capable of identifying unused and under-utilised land, and lead to efficient use of land and comprehensive land management.

Digital technology-led value chain approach – Now that the Ministry of Agriculture is building its DPI – AgriStack, with details of farmers and their land coordinates, it would be feasible to superimpose several other layers like soil data etc. and promote precision agriculture.

EMERGING TRENDS THAT WILL SHAPE THE FUTURE OF FOOD PRODUCTION IN INDIA

With global food demand projected to rise by 68% by 2050, Indian agriculture faces the dual challenge of increasing productivity and embracing sustainable and regenerative agricultural practices. Beyond food, the sector is also adapting and gearing up to meet the growing demand for crops used in feed, fuel, and industrial applications. Transformative shifts driven by new technologies, climate-resilient practices, and evolving consumer preferences for sustainable and health-focused products are reshaping the landscape. As we move into 2025, these trends will not only redefine food and resource production but will also position India as a global leader in sustainable and diversified agriculture.

By improving production quality and aligning with global standards, India is strengthening its position in the global agricultural market, offering farmers better income opportunities.

Regenerative Agriculture: Restoring Ecosystems

Regenerative agriculture is reshaping farming by focusing on soil health, biodiversity, and ecosystem restoration. Techniques such as no-till farming, cover cropping, and agroforestry help sequester carbon and reduce erosion, addressing climate change. In a country where 29% of land is degraded, these practices align with India's net-zero emissions goal for 2070.

Despite its benefits, adoption faces challenges like yield reductions and cultural resistance. Addressing these requires targeted financial incentives, robust educational initiatives, and strong policy support. Programs such as the Rice Carbon initiative, which ties farming practices to emission reduction incentives, exemplify the shift toward eco-friendly farming.

Water Conservation: Securing a Scarce Resource

India's agriculture consumes over 85% of its freshwater resources, making water conservation essential (*Source: PIB*). Practices like Direct-Seeded Rice (DSR) and Alternate Wetting and Drying (AWD) are reducing water usage by up to 30% while improving yields. These methods are particularly effective in water-stressed regions like Punjab and Haryana, and in other key rice-growing states.

Complementing these innovations are government-backed micro-irrigation systems, which optimize water use and ensure sustainability. As groundwater depletion intensifies, such measures are critical for long-term agricultural viability.

Leveraging Technology and Public-Private Partnerships

Technological advancements are driving efficiency and precision in Indian agriculture. Drones, IoT devices, and GPS-guided equipment are transforming farming operations by reducing labor dependence and optimizing resource management. For instance, drones provide real-time data on crop health and pest infestations, enabling targeted interventions.

Public-private partnerships (PPPs)

About the **AUTHOR**

Simon Wiebusch, President, Bayer South Asia and Country Divisional Head Crop Science Division, Bayer for India, Bangladesh & Sri Lanka

are playing a vital role in driving these technological adoptions. Collaborative initiatives between the government, private AgTech companies, and non-governmental organizations (NGOs) are fostering innovation and ensuring that smallholders have access to affordable, cutting-edge solutions. Digital platforms like FarmRise, developed through such partnerships, equip farmers with crop advisories, market intelligence, and financial services, bridging the information gap.

PPPs are also instrumental in developing infrastructure, streamlining supply chains, and scaling sustainable practices like Direct Seeded Rice and regenerative farming. These collaborations highlight the need for collective action to achieve large-scale transformation.

High-Value Crops and Diversification

The shift from cereal crops to high-value produce such as fruits, vegetables, and spices is a growing trend. This diversification is driven by rising incomes, export demand, and the need to improve farmer incomes. Government incentives and partnerships with private players are bolstering this transition, with value-added horticulture gaining prominence.

By improving production quality and aligning with global standards, India is strengthening its position in the global agricultural market, offering farmers better income opportunities.

Shifting Consumer Demands

Evolving consumer preferences are reshaping farming practices and supply chains. Beyond food, agriculture is witnessing increased demand for crops used in feed, fuel, and industrial applications, such as corn for biofuels and bamboo for sustainable materials. Simultaneously, the rise in demand for sustainably sourced and health-focused produce, fueled by urbanization and climate awareness, is opening new avenues for farmers.

Farmers who align with these trends are accessing emerging markets and securing premium prices for their products. This transformation is not only

The future of Indian agriculture lies in its ability to integrate traditional practices with modern solutions.

driving the adoption of sustainable and regenerative farming techniques but also redefining marketing strategies to align agriculture with broader sustainability goals, catering to both traditional and non-food sectors.

Financial Inclusion and Value Chain Integration

Financial inclusion is playing a pivotal role in transforming Indian agriculture. Digital payment systems, crop insurance schemes, and accessible credit facilities are empowering smallholders to invest in modern technologies. At the same time, Farmer Producer Organizations (FPOs) are facilitating value-chain integration, ensuring better price realization for farmers and reducing intermediaries.

Addressing Nutrition and Accessibility Challenges

Advancing agriculture is not only critical for economic growth but also for addressing the country's nutritional needs. Despite being a significant food producer, India faces challenges in ensuring equitable access to nutritious food for its population. Expanding agricultural innovation, improving distribution systems, and integrating value chains are essential to overcoming these access barriers and ensuring that advancements in agriculture translate into healthier and better-nourished communities.

Challenges: The Need for Scale and Speed

While these trends are promising, the sector faces a critical need to scale up innovations rapidly. Practices like regenerative agriculture, water-saving techniques, and advanced technologies must move beyond pilot projects and isolated regions to achieve nationwide impact.

The urgency lies not only in scaling but in accelerating the adoption of these advancements to meet rising demands and mitigate the effects of climate change. Challenges such as resource constraints, fragmented landholdings, and limited technical knowledge can slow progress, but concerted public-private efforts and inclusive policies can overcome these hurdles.

Rapid scalability, backed by innovative financing models and farmer-centric education initiatives, will be key to unlocking the full potential of these emerging trends. The focus must be on ensuring equitable access to innovations, empowering smallholders, and driving large-scale transformation across the country.

The Road Ahead

The future of Indian agriculture lies in its ability to integrate traditional practices with modern solutions. Trends like regenerative agriculture, water conservation techniques, high-value crop diversification, and cutting-edge technologies are paving the way for a resilient and efficient sector. Public-private partnerships and collective action will be key to addressing current challenges and unlocking the full potential of these advancements to improve rural livelihoods and farmer incomes.

By addressing current challenges and embracing these advancements, India can lead the global movement toward sustainable food systems, ensuring prosperity for its farmers and security for the planet through a predictable and science-based regulatory and policy environment to advance the deployment of modern tools, innovations, and technologies.

AGRICULTURE IN TRANSITION: THE PATH TO 2025!

The Indian agriculture sector has shown remarkable success in recent years. The record-breaking food grain production, estimated at 332 million metric tons is the proof of the resilience, and potential of our farmers.

A host of well-designed government initiatives such as the National Mission on Sustainable Agriculture, Agri Infrastructure Fund, the National Agriculture Market, Cluster Development Programme, and advancements in agricultural mechanization and drone technologies, are acting as the backbone of a robust foundation for sustainable growth of the agriculture sector. As we look ahead to the future , it is important to consolidate the advancements and build on these with a sharper focus on innovation, forward-looking policies, and cutting-edge practices to maintain the momentum.

Technology will continue to be vital to the future of agriculture. AI-powered precision farming is already sowing hope, offering immense possibilities to a tech-enabled agricultural landscape. Mechanization too will continue to aid efficiency of farmers in agriculture processes and management. As we step into a new year, we must scale up our focus on innovation in agricultural progress, along with technology. The rapid digitization and technologies like drone for real-time monitoring and efficient farm management are poised to go from the fringes to the mainstream. Digital platforms for knowledge and scale neutral technologies empowering farmers with the tools and information they need to thrive would continue to gain momentum.

On the policy front, 2025 should bring enhanced financial options for smallholder farmers, tailored incentives for greener chemistries and effective mechanisms to mitigate the effects of climate change.

As we step into a new year, we must scale up our focus on innovation in agricultural progress, along with technology.

The role of research institutions and agricultural universities cannot be overstated. Bridging the gap between ground-breaking discoveries in the lab and their real-world application in the fields will be a key to fostering inclusive growth in agriculture. Encouraging Public Private Partnerships in cutting edge research would give the necessary push to take agriculture to a higher growth trajectory.

The momentum achieved need to be carried forward while bracing for the challenges and opportunities that lie ahead. With a collective push from all stakeholders, the road ahead holds immense promise for transformative growth, ensuring that Indian agriculture remains resilient, productive, and sustainable for generations to come.

Through innovations, stepped up R&D, better integration of technology into farming and best farm practices, we can collectively make agriculture more profitable and attractive. And farmers should continue to derive the best out of this, productivity-wise and financially. India's future, will continue to be shaped by how our farms and farmers are nurtured. At Syngenta, we shall continue to make 2025 more meaningful, productive and effective for millions of Indian farmers. We hope to continue to play a vital role in India's stride towards Viksit Bharat by 2047.

About the **AUTHOR**

Susheel Kumar,
Country Head and Managing Director ,
Syngenta India Pvt. Ltd.

PENDING REFORMS CAN MAKE INDIA A GLOBAL HUB FOR AGROCHEMICALS

India has become the fourth largest manufacturer and second largest exporter of agrochemicals in the world. The Ministry of Agriculture and Central Insecticide Board & Registration Committee (CIB&RC) has been taking proactive steps toward reforming the policy and regulatory framework for the agrochemical sector which has contributed immensely to India's impressive agriculture production and growth.

Last year saw number of key interactions between the industry and government to further strengthen the policy and regulatory framework that will enable introduction of new technologies for our farmers. The reform agenda primarily has looked at key issues that would reduce registration timelines and would pave the way for introduction of the latest crop protection products critical in the context of the numerous new pests and diseases that threaten the crops of our farmers.

Another significant move has been the government's attempt to clean substandard products in the agrochemical sector that have damaging effects on agriculture growth, harm farmers and tarnish the reputation of legitimate businesses. Enforcing the path-breaking Know Your Company (KYC) requirements by the CIB&RC, has resulted in the de-registration of over 7,000 non-compliant firms. This action, which aims to weed out fake manufacturers according to government sources, will leave around 2,500 legitimate companies in the industry.

Another reform is the digital registry of genuine companies as part of Integrated Pesticide Management System (IPMS) under development by the Ministry which will help streamline registration and offer transparency on manufacturing

Enforcing the path-breaking Know Your Company (KYC) requirements by the CIB&RC, has resulted in the de-registration of over 7,000 non-compliant firms.

About the **AUTHOR**

Dr. K C Ravi,
Chief Sustainability Officer,
Syngenta India Pvt. Limited

infrastructure, production, and exports. This is indeed a most welcome step for taking the reforms agenda to its logical conclusion. The need of the hour is to follow through with the cancellation of the licenses of deregistered companies.

Going forward following the pharma sector, an independent body like QCI could help in auditing manufacturing units to ensure compliance with quality standards. QCI can also be tasked with overseeing market sampling and product analyses being undertaken by state labs. This process would ensure equitable access to high-quality products across markets.

Another critical reform is to encourage innovation and the introduction of newer crop protection molecules. Currently, India has registered only about 350 molecules, compared to 1,250 globally. The lack of Regulatory Data Protection (RDP) in the country discourages innovators from introducing new molecules, as the registration process is costly and risky. Implementing a 3-5 year RDP would incentivize innovation, benefiting farmers by providing access to a broader range of effective and safe products.

Given the impact of climate change, changing cropping patterns, emergence of newer pests, diseases, and weeds, the farmers need a wider and newer range of products to protect their crops.

These pending reforms, implemented in a mission-mode, will not only elevate the quality of products for Indian farmers, but also help position India as a global hub for agrochemicals, with the potential to increase exports from $4 billion to $11 billion by 2030. It will also ensure a stronger and more vibrant agrochemical industry, benefiting Indian agriculture and the farmers require high-quality crop protection solutions.

INDIA POISED FOR TRANSFORMATIONAL GROWTH IN SEED SECTOR

India's seed sector is poised for significant growth and transformation in the coming year, driven by technological advancements, policy reforms, and a focus on quality and traceability. This growth is underpinned by factors such as increased Seed Replacement Rate (SRR), adoption of innovative technologies for breeding in priority crops. While India currently holds a modest 1% share in the global seed export market, there's a big ambition to increase this to 10% (approximately INR 10,000 crore) by 2028.

Technological Advancements

Leading seed breeders are integrating advanced digital technologies to empower farmers in combating challenges posed by pests, climatic variations, and other environmental factors. This digital adoption is expected to enhance agricultural productivity and resilience. There's also a growing emphasis on R&D, with proposals for a Research Linked Incentive (RLI) scheme to address challenges such as high costs, infrastructure limitations, and IPR concerns.

Policy Developments

A comprehensive National Seed Production & Trade Policy is anticipated to encourage exports and outline strategies for infrastructure creation. The industry is advocating for GST exemptions on inputs and services for seed production and distribution to alleviate the cost burden on seeds. There's also a push for a 'Single Window System' for obtaining national-level registrations, aiming to foster a consistent approach across states and streamline regulatory approval processes.

Trade - Import-Export Facilitation

The government has already simplified the import process for certain seeds by eliminating the requirement for prior approval from the EXIM Committee. Further, to boost India's position as a "Seed Export Hub," several initiatives are being proposed:

- Establishment of a 'National Seed Export Promotion Council' to ensure compliance with global standard.
- Development of seed export zones and accredited seed health testing facilities.
- Collaboration with international organizations like ISTA to leverage global knowledge and technology
- Predictable and simplified guidelines to obtain NBA approval for access, export of germplasm.

While India currently holds a modest 1% share in the global seed export market, there's a big ambition to increase this to 10% (approximately INR 10,000 crore) by 2028.

Focus on Quality Seed Availability

Ensuring the availability of high-quality seeds remains a priority. Key developments include:

- Promotion of new and superior seed varieties through digital platforms.
- Emphasis on developing climate-resilient and pest-resistant seed varieties.
- Integration of DNA fingerprinting and advanced seed laboratory processes to ensure seed quality.

Traceability

The implementation of robust traceability systems is gaining momentum:

- SATHI (Seed Authentication, Traceability, and Holistic Inventory) Portal: This digital platform aims to revolutionize seed certification and inventory management.
- Blockchain Technology: Solutions are being implemented to combat spurious seeds and ensure authenticity throughout the supply chain.
- Real-time Tracking: Advanced traceability solutions will enable stakeholders to monitor seed movement at every step, enhancing transparency and accountability.

In conclusion, India's seed sector is on the cusp of significant advancements, driven by a combination of technological innovation, policy reforms, and a focus on quality and traceability. These developments are expected to not only boost domestic agricultural productivity but also position India as a major player in the global seed market.

About the **AUTHOR**

Rajvir Rathi
Vice Chairman
Federation of Seed Industry of India

Unlocking Value, Unleashing Potential

The agriculture and allied sectors today provide livelihood for nearly half the Indian population. However, agriculture faces a complex interplay of factors like climate change, demographic shifts, changing consumer preference, and global economic uncertainties. While the push for agricultural reforms and investments in infrastructure is expected to stimulate growth, challenges like input cost inflation and climate change may dampen the overall performance.

Given the scenario, the sector's growth in the coming year is likely to be moderate.

Exports offer substantial prospects for Agri produce, especially the high-value, niche products like organic and specialty crops. However, the domestic market will be the primary growth engine because the rising middle class, urbanization, and changing dietary preferences are fuelling demand for a diverse range of agricultural products. Reforms in agricultural marketing, land leasing, and credit access are expected to create a conducive environment. Policy-wise, the government might continue supporting farmers through various schemes and/or subsidies.

Challenges and Trends in the coming year

- **Vagaries of Nature and Sustainable Agriculture:** Climate change poses a significant threat to Indian agriculture, with increasing temperatures, erratic rainfall patterns, and extreme weather events impacting crop yields, and farmer livelihoods. The adoption of climate-resilient agricultural practices, such as agroforestry, conservation agriculture, and water-saving technologies, will be crucial.
- **Rising Input Cost:** Rising input costs, including fertilizers, pesticides, and fuel, can erode farmers' profitability, and the government may need to ensure their timely availability and stabilize input prices.
- **Market Access and Price Volatility:** Ensuring fair and remunerative prices for farmers remains a key challenge. Besides Government interventions, market-based interventions such as price support mechanisms and future markets can help stabilize prices and protect farmers' incomes.
- **Value Addition:** Besides reducing wastage and post harvest losses, processing and value addition is expected to create new opportunities for farmers and entrepreneurs. Investments in food processing industries can help increase farmers' incomes, and enhance export competitiveness.
- **Women in Agriculture:** Empowering women is essential for sustainable development. Initiatives to promote women's participation in decision-making, and training can help increase agricultural productivity and improve rural livelihoods.
- **Digital Agriculture:** Digital technologies *viz.*, IoT, AI and use of Agri drones are transforming global agri practices. Digital solutions can help Indian farmers make data-driven decisions, optimize costs, and improve market access.

Initiatives to promote women's participation in decision-making, and training can help increase agricultural productivity and improve rural livelihoods.

The Road Ahead

- **Strengthening Extension Services:** Investment in agricultural extension services can help farmers adopt best practices and access timely information.
- **Promoting PPP (Public-Private Partnerships):** To accelerate adoption of new technologies and improve market access.
- **Research and Development:** Investment in high-yielding, climate-resilient crop varieties and innovative farming techniques.
- **Rural Infrastructure:** Improved irrigation, warehousing, rural roads and eNWR to reduce post-harvest losses and enhance market & credit access.
- **Skill Development:** Enable farmers to acquire new skills like agri options and adapt to changing market conditions, and manage risks.

India is on the cusp of unleashing the full potential of her agriculture sector. By embracing technology, sustainable practices, and effective policy interventions, India can realise the full potential and achieve food security, rural prosperity, and economic growth.

**. Views are personal*

About the **AUTHOR**

Arun Raste
MD & CEO , NCDEX

AGRICULTURE POLICY INITIATIVES IN INDIA (2024)

Agriculture forms the backbone of the rural economy, providing employment to a large segment of the population. In 2024, the government of India had introduced various policy initiatives aimed at enhancing agricultural production, boosting market growth, improving research and innovation, and regulating agricultural inputs to ensure sustainable growth.

Agricultural Production

In 2024, India continues to focus on increasing agricultural productivity, ensuring food security, and improving the income of farmers. Key initiatives were:

1. **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY):** This scheme focuses on providing irrigation facilities to increase the area under irrigation. By enhancing water use efficiency, it supports farmers in boosting crop production. The scheme also emphasizes watershed development and rainwater harvesting, addressing water scarcity in arid regions.
2. **National Mission on Sustainable Agriculture (NMSA):** To promote climate-resilient agriculture, this mission supports sustainable farming practices, including organic farming, efficient water use, and integrated pest management. It provides incentives for adopting technology that reduces input costs and enhances soil fertility.
3. **Paramparagat Krishi Vikas Yojana (PKVY):** This program promotes organic farming by encouraging the use of traditional agricultural practices. In 2024, the government is expanding the organic farming network, providing farmers with technical assistance, certification, and financial support.
4. **Fertilizer Subsidy:** India continues to provide a fertilizer subsidy to farmers, ensuring the availability of essential nutrients at affordable prices. The government is working on enhancing the efficiency of fertilizer use to reduce dependency on chemical fertilizers.

While the government's programs to promote organic farming are laudable, the approval and introduction of new technologies which promote balanced nutrition are still an area to be addressed.

Rainwater harvesting can be game-changing, and there is dire need to do this across the country to have access to water for irrigation. It also addresses challenges of groundwater contamination which has been growing over the last several decades and impacts safety, quality and quantum of production.

While the government's programs to promote organic farming are laudable, the approval and introduction of

About the **AUTHOR**

Komal Shah
Director SML Limited (formerly known as Sulphur Mills) and Sumil Chemicals Pvt Limited

new technologies which promote balanced nutrition are still an area to be addressed. The country has witnessed a disproportionate use of nitrogen and phosphorous based fertilizers over several decades which has created various imbalances across soils around the country. Addressing this imbalance will be a key area for the policy makers in the coming year, to enhance production, quality and farmer income and livelihoods.

Market Growth

The agri-inputs market saw a strong demand for fertilizers which have witnessed a significant growth during 2024. While generic crop protection companies had various challenges during 2024, the entry of new molecules witnessed a greater growth and acceptance. Biologicals also had a significant growth during 2024.

Research and Innovation

Research is crucial to the development of agriculture in India. The government has increased investment in agricultural research, with a focus on enhancing productivity, resilience to climate change, and technological adoption:

1. **Indian Council of Agricultural Research (ICAR):** ICAR continues to play a vital role in fostering agricultural innovation. In 2024, the government is allocating more funds for advanced research in areas like genetically modified crops, drought-resistant seeds, and innovative pest control methods.
2. **Drones in Agriculture**: The government is giving incentives to farmers for use of drones in agriculture.
3. **Climate-Smart Agriculture:** Given the growing impact of climate change, the government is focusing on research related to climate-smart agriculture practices. This includes the development of crop varieties resistant to heat, drought, and pests.

While generic crop protection companies had various challenges during 2024, the entry of new molecules witnessed a greater growth and acceptance.

The adoption of drones will drive efficient and precise application and also address labour challenges going forward. While the government is actively promoting research and development on climate resilient crops, the advent of newer technologies which can promote climate smart agriculture, faced a challenge in terms of longer regulatory approvals.

Regulation in Agricultural Inputs

Regulation of agricultural inputs, such as seeds, fertilizers, pesticides, and machinery, is crucial for ensuring the safety and sustainability of farming practices:

1. **Seed Regulation:** The government has strengthened seed regulation to ensure the availability of high-quality, certified seeds. In 2024, there is a renewed focus on improving the seed supply chain to avoid the problem of fake or substandard seeds that affect crop yields.
2. **Pesticide Management:** The government has been active in regulating pesticide use, ensuring that farmers use only approved and safe chemicals. Additionally, there are efforts to increase awareness of integrated pest management (IPM) techniques to reduce dependence on chemical pesticides.
3. **Fertilizer Regulation:** The Fertilizer Control Order (FCO) continues to regulate the production, distribution, and sale of fertilizers. In 2024, the government encouraging organic alternatives to chemical fertilizers.

Regulations to address climate change and sustainability in agriculture remain areas of future endeavour. Globally there is a challenge to reduce Nitrous oxide, a greenhouse gas which has 300 times the global warming potential of carbon dioxide and cannot be sequestered through forestation or other sustainable practices. India is thus poised to reduce these emissions. Moreover, while India is a leading horticulture exporter for various fruit crops, some of these exports continue to witness losses or rejections due to poor shelf life and quality. Addressing the quality of production will be of greater importance while maintaining or enhancing productivity.

With continued support for farmers and a focus on innovation, the Indian agricultural sector is poised for long-term growth and development.

DEVELOPMENT IN AGRICULTURE: EXPECTATION IN 2025 AND BEYOND

The landscape of agriculture has been undergoing transformative changes, driven by advancements in technology, the introduction of innovative seed varieties, and proactive government policies. As we look ahead to 2025, these developments are expected to significantly shape agricultural practices, enhance productivity, and contribute to sustainable food systems.

Technological Advancements

Technology is revolutionizing agriculture through precision farming, artificial intelligence (AI), and biotechnology. Precision farming utilizes GPS and IoT (Internet of Things) devices to monitor crop health, soil conditions, and weather patterns. This data-driven approach enables farmers to make informed decisions, optimize resource use, and increase yields while minimizing environmental impact. By 2025, we can expect widespread adoption of these technologies, with more farmers using drones for crop monitoring and automated systems for irrigation and pest control.

Biotechnology, particularly in genetic engineering, is also playing a crucial role. The development of genetically modified (GM) crops that are resistant to pests, diseases, and extreme weather conditions can lead to increased resilience and productivity. In 2025, we anticipate a broader acceptance of GM crops, driven by a growing need to ensure food security in the face of climate change and population growth. Additionally, innovations in CRISPR technology may lead to the development of new seed varieties that are more nutritious and have shorter growth cycles.

Seed Varieties

The importance of improved seed varieties cannot be overstated. High-yielding, disease-resistant, and climate-resilient seeds are essential for enhancing agricultural productivity. By 2025, we expect to see a surge in the availability of hybrid and more climate resilient/tolerant modified seed varieties tailored to specific regions and climatic conditions. This is particularly vital in areas prone to droughts or floods, where traditional crops may fail.

The rise of open-source seed initiatives may also democratize access to quality seeds, empowering smallholder farmers and enhancing food sovereignty.

Moreover, research institutions and agricultural companies are increasingly focusing on developing seeds that require fewer inputs, such as water and fertilizers. This aligns with sustainable agricultural practices, aiming to reduce the environmental footprint of farming.

About the **AUTHOR**

Mr Debabrata Sarkar,
Vice President-Asia Pacific,
AlgaEnergy

The rise of open-source seed initiatives may also democratize access to quality seeds, empowering smallholder farmers and enhancing food sovereignty.

Government Policies

Government policies play a pivotal role in shaping the future of agriculture. By 2025, we expect governments to implement more comprehensive agricultural policies aimed at promoting sustainability and resilience. This includes initiatives for funding research and development in agricultural technologies, subsidies for adopting precision farming practices, use of biofertilizer and incentives for using sustainable seed varieties.

Additionally, policies that support smallholder farmers through access to credit, training, and market opportunities will be crucial. Governments may also focus on integrating agroecological practices, which promote biodiversity and ecosystem health, into mainstream agricultural policies.

Another expectation is the establishment of stricter regulations on agrochemicals and fertilizers to mitigate their environmental impact. This could lead to a shift towards organic farming and regenerative practices, encouraging farmers to adopt more sustainable methods.

As we approach 2025, the convergence of technology, innovative seed varieties, and supportive government policies is poised to transform the agricultural sector. These developments promise to enhance food security, improve livelihoods, and promote sustainable practices. By embracing these changes, we can create a resilient agricultural system capable of meeting the challenges of the future while safeguarding our natural resources. The collective effort of farmers, researchers, and policymakers will be essential in realizing this vision.

The Future of Indian Agriculture: A SHIFT TOWARDS SUSTAINABILITY AND INNOVATION

Indian agriculture, which contributes over 18% to the country's GDP and supports nearly 50% of its workforce, is at a pivotal juncture. With climate change intensifying challenges such as erratic rainfall, heat stress, and resource depletion, the sector is undergoing a transformation. This shift is driven by biological innovations, regenerative practices, and digital technologies, all aligned with India's sustainability and climate resilience goals.

Growth in Biologicals and Regenerative Practices

The global biologicals market, valued at $12 billion in 2022, is projected to grow at a CAGR of 13% to reach $20 billion by 2027. India is emerging as a significant player in this space, driven by the increasing adoption of biostimulants, biofertilizers, and biofungicides. The domestic biostimulants market alone is expected to surpass $600 million by 2025, fuelled by government policies promoting sustainable inputs under the National Mission on Sustainable Agriculture (NMSA).

Regenerative agriculture is gaining traction in India, especially among progressive farmers and corporate-backed sustainability initiatives. Currently practiced on less than 3% of India's arable land (estimated at 4.5 million hectares), regenerative practices such as cover cropping, no-till farming, and organic amendments are helping restore soil

About the **AUTHOR**

Renuka Karandikar,
CEO,
BioPrime

Indian agriculture's transformation into a sustainable and technology-driven sector is critical not only for food security but also for its contribution to global environmental goals. By focusing on biological solutions, regenerative practices, and export opportunities, India can position itself as a leader in sustainable agriculture while improving farmer incomes and ecological health.

health and boost productivity. These practices have shown the potential to increase soil organic carbon by 20-30% over a decade, enhancing water retention and reducing fertilizer dependency.

Export Market and Economic Potential

India is the world's largest producer of spices, pulses, and milk and the second-largest producer of rice, wheat, fruits, and vegetables. The country's agri-exports reached $50.21 billion in FY23, a 19.3% growth over FY22. Products such as rice (21.3 million metric tons exported) and marine products dominate this basket. However, there is significant untapped potential in premium segments like organic produce and sustainable inputs, including biologicals. Globally, organic food demand is growing at a CAGR of 10.2%, presenting an opportunity for India to leverage its biological solutions to enhance productivity while preserving soil health.

Technological Integration in Agriculture

Technology-driven solutions are becoming mainstream in Indian agriculture. For example, precision farming powered by IoT, AI, and satellite imagery is helping optimize water use, fertilizers, and crop protection. Digital marketplaces like DeHaat and Agrostar, which connect millions of farmers to input suppliers and buyers, are revolutionizing access to quality products and markets.

India's agri-biotech sector is making strides with startups like Bioprime leading innovation leveraging microbial consortia, secondary metabolites, and data analytics for biological product innovation. These advancements are crucial as climate-induced abiotic stresses currently reduce productivity by 30-40%. Solutions that enhance nutrient use efficiency (NUE) and boost stress tolerance have already demonstrated yield increases of 15-25% in crops like rice, wheat, and maize.

Policy and Sustainability Goals

India's commitment to achieving net-zero emissions by 2070 and reducing the carbon intensity of its GDP by 33-35% by 2030 has placed sustainable agriculture at the forefront. Policies promoting natural farming, such as the Sub-Mission on Agroforestry and Paramparagat Krishi Vikas Yojana (PKVY), encourage reduced chemical use and support biological alternatives.

Carbon farming, though nascent in India, offers promise. Studies estimate that regenerative practices can sequester up to 3 metric tons of CO2 per hectare annually. Scaling these practices across India's 140 million hectares of cultivated land could make agriculture a key player in meeting emission reduction targets.

The Way Forward

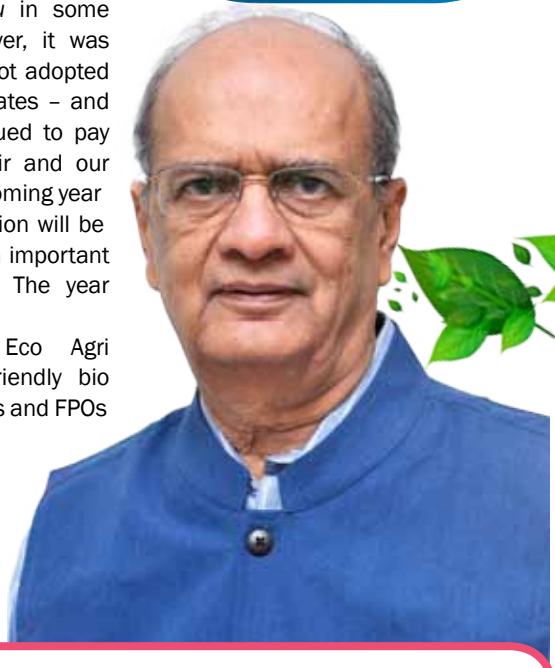
The future of Indian agriculture hinges on balancing productivity with sustainability. Regenerative farming practices, combined with biological innovations and digital tools, will define this transition. For instance, integrating biostimulants into conventional farming systems can reduce chemical fertilizer use by 25-30% without compromising yields.

At BioPrime, we are contributing to this vision through cutting-edge biological products that enhance soil health, improve NUE, and boost crop resilience. By 2025, we aim to support 5 million farmers across 10 million acres, reducing input costs, while improving productivity by up to 20%.

Reflections and Expectations

About the **AUTHOR**

Padmashri Dr. M. H. Mehta, Chairman Working Group Eco Agri/Organic Farming. Chairman-The Science Ashram/Gujarat Life Sciences, Ex. Vice Chancellor – Gujarat Agricultural University



I look at the year gone by as a year of moving towards a positive trend and optimism for Indian agriculture. Increased acceptance and adaptation for Eco Agriculture and the understanding that the various terms like organic/Regenerative Agroecology, Natural, Jaivik etc. are not contradictory but complimentary, and therefore we encompass all these under a general term Eco Agriculture in preparing the Road Map for Evergreen Revolution. The need for an evolutionary and balanced approach is to be adopted for moving from Green to Evergreen Revolution.

Popularization of alternative eco-friendly bio-inputs, the increased trend for FPOS even in small and remote villages, agri. startups, Drone Didi's, and acceptance of Eco Agri./organic practices by small and large cooperatives are some great and hopeful trends that mark the year gone by and moving towards bigger growth in 2025!

We still have to re-emphasize our actions for climate change, adaptation, nutrition of people and farm animals in the years ahead. Agrowaste utilization will need a much greater action in the coming years. Our efforts in demonstration of an ecofriendly solution-Multi microbial spray to decompose the crop residue -Parali- *in situ* in some states raised hopes. However, it was disappointing that it is still not adopted in a large scale by all the states – and crop residue burning continued to pay havoc with our soils, our air and our resources. Hope that in the coming year agro-waste treatment/utilization will be adopted on a big scale as an important part of EcoAgri Revolution. The year ahead therefore will have

- Moving towards Eco Agri Revolution based on eco-friendly bio inputs by all states cooperates and FPOs
- Climate smart adaptation
- Creation and strengthening of more Agri-startups, FPOs, value addition and exports.

Manoj Varshney, MD & CEO, IFFCO-MC

Indian Agriculture: A Vision for 2025

Indian agriculture is undergoing a significant transformation, driven by climate change, consumer demands, and technological advancements. By 2025, the focus must shift towards sustainable growth, leveraging innovation and collaboration.

Key Priorities for 2025

- Climate Resilience: Adoption of climate stress-tolerant technologies and bio-based solutions
- Sustainable Inputs: Nano-fertilizers, biological crop protection, and for eco-friendly productivity.
- Market Evolution: Meeting demand for safe, traceable, and export-quality produce through diversification.

At IFFCO MC Crop Science, we are committed to enabling farmers with innovative, sustainable, and accessible solutions. By empowering them with knowledge and tools, Indian agriculture can achieve resilience, competitiveness, and long-term prosperity. The future is bright, and together, we can realize its full potential.

India Spurring Digital Revolution

Agriculture continues to drive India's economy and society, even as it develops and modernizes. Government programs, technical advancements, and the growing global demand for environmentally friendly food production are driving a revolution in the agricultural farming sector, often regarded as the backbone of India. As we move into 2025, the Indian agriculture sector is about to undergo a major transformation, powered by new technologies, changing policies, and a stronger focus on sustainability. The trajectory we are witnessing today is one of innovation and adaptation, where traditional methods of farming are increasingly being complemented by cutting-edge technologies that offer more efficient, cost-effective, and sustainable solutions.

Technology Intervention

One of the most significant trends in the agriculture sector is the rapid adoption of technology, especially in precision agriculture. Drones, AI-powered analytics, IoT-based monitoring systems, and data-driven decision-making are reshaping how farmers manage their land, crops, and resources. IoT holds immense potential for generating new ideas that could drive innovations in modern agriculture and address several challenges faced by farmers today. Applications such as smart irrigation, precision farming, crop and soil tracking, smart greenhouses, supply chain management, livestock monitoring, agricultural drones, pest and disease prevention, and farm machinery are among the areas considered for IoT implementation in the agriculture sector.

These innovative solutions have the potential to revolutionize farming practices, improve efficiency, reduce resource wastage, and ultimately enhance agricultural productivity and sustainability. As the world's population continues to grow, the need for efficient and resilient food production systems has become more pressing than ever before. India, with its rich agricultural heritage and vast potential, is uniquely positioned to lead this digital revolution and shape the future of farming.

About the **AUTHOR**

Chirag Sharma,
MD & CEO,
Drone Destination

The government of India has also launched several key initiatives such as the Clean Plant Programme, Digital Agriculture Mission, Agriculture Infrastructure Fund (AIF) Expansion, and National Mission on Natural Farming (NMNF) with the focus on creating a resilient and prosperous agricultural ecosystem, while empowering farmers with modern tools and resources.

Policy Push

Through several programs and policy changes, the Indian government has already recognized the importance of drone technology in the agriculture sector and has been making deliberate efforts to strengthen the agricultural sector. Programs include the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) and the Pradhan Mantri Fasal Bima Yojana (PMFBY), which seek to give farmers insurance and financial support, thereby guaranteeing their economic security. The government of India has also launched several key initiatives such as the Clean Plant Programme, Digital Agriculture Mission, Agriculture Infrastructure Fund (AIF) Expansion, and National Mission on Natural Farming (NMNF) with the focus on creating a resilient and prosperous agricultural ecosystem, while empowering farmers with modern tools and resources. These programs, approved recently by the Union Cabinet, signify a robust commitment to strengthening the country's agricultural landscape.

Women Empowerment

The Union government has also approved the Central Sector Scheme 'Namo Drone Didi' for providing drones to the women self-help groups (SHGs) under DAY-NRLM, with an outlay of Rs. 1,261 crore. The scheme aims to provide drones to 14,500 selected women SHGs during the period from 2024-25 to 2025-2026 for providing rental services to farmers for agriculture purpose - application of liquid fertilizers and pesticides. 'Prime Minister Modi's focus on women-led development is propelling a significant transformation in India's drone sector. The government's initiative to train thousands of women as drone pilots (Drone Didis) and entrepreneurs is not only giving a boost to digital agriculture practices but also providing highly skilled livelihood opportunities to lead this innovative revolution.

The market opportunity for agritech is anticipated to reach $25 Bn by 2025, signifying a transition from its nascent stages to mainstream prominence in the near future.

At Drone Destination, we are proud to have trained more than 600 Namo Drone Didis in the recent past and intend to train 5000+ women drone entrepreneurs in the next 02 years. Some of these women have had the opportunities to make over Rs. 50,000 monthly in the recent Kharif season using drone spray services in their villages. Besides training, we are excited to participate proactively in the supply of agriculture drones to the Drone Didis with the help of our Group company, Hubblefly Technolgies, a DGCA-approved drone manufacturing company. Drone Destination has also laid out an extensive network of 200+ Drone Hub on Wheels, in 12 states offering drone spray services in collaboration with IFFCO, Coromandel, Syngenta etc. Pilots on-board these drone hub on wheels (service vans) also offer drone demonstrations, training, drone sales and maintenance to proliferate agricultural drone adoption in the country.

All these policies supporting the use of drones and other digital tools, along with enhanced infrastructure for connectivity and logistics, will create a more conducive environment for agri-tech companies to thrive. These policies will also encourage the growth of rural entrepreneurship, where local farmers and small-scale agri-businesses can leverage advanced technology to increase efficiency and market access.

Year Ahead

Looking ahead to 2025, the growth of India's agri-tech market will be driven by rising food demand due to the country's growing population and changing diets. The processed food market is expected to reach Rs. 3.45 lakh crore (US$ 470 billion) by 2025, up from Rs. 1.93 lakh crore (US$ 263 billion) in FY20, fueled by government initiatives and infrastructure investments. The market opportunity for agritech is anticipated to reach $25 Bn by 2025, signifying a transition from its nascent stages to mainstream prominence in the near future. The need for efficient farming, supported by technologies like drones, AI, and machine learning, will further boost productivity and minimize costs. These advancements will enhance operational efficiency, reduce manual labor, and improve crop management, contributing to the sector's growth.

In conclusion, the future of Indian agriculture in 2025 looks promising, with the sector on the brink of a technological renaissance. As we embrace innovation, technology, and supportive policies, the agriculture industry will witness unprecedented growth, productivity, and sustainability. Drone Destination is committed to playing a pivotal role in this journey, providing farmers with the tools they need to optimize their operations, enhance productivity, and contribute to India's digital agriculture growth story.

TRANSFORMING AGRICULTURE IN 2025: THE PATH TO SUSTAINABLE GROWTH

India's push for digital infrastructure in agriculture, through initiatives like AgriStack, will likely improve access to government services, weather data, and market information for farmers, thus fostering better decision-making

About the **AUTHOR**

Deepak Pareek, Founding Convener, Global Grains and Pulses Council

The agriculture sector is undergoing significant transformations globally, driven by evolving market dynamics, technological innovations, and changing policy landscapes. As we look towards the coming year, several key trends and developments are expected to shape the sector's growth and performance.

Broad Scenario and Growth Outlook

The global agricultural sector is poised for steady growth in the coming year. Despite challenges like climate change, inflationary pressures, and geopolitical tensions, agriculture remains a vital economic pillar. Global demand for food continues to rise, driven by population growth, urbanization, and increasing disposable incomes, particularly in emerging markets. The global food systems will see shifts in consumer preferences, such as an increased demand for plant-based products, organic foods, and more sustainable agricultural practices.

In India, a significant agricultural player, the government's ongoing efforts to support rural development, including infrastructure and digital adoption, will contribute to enhancing the sector's performance. With initiatives like the Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) there's an increased focus on welfare and financial inclusion for farmers.

Major Markets and Trade Dynamics:

In the coming year, agricultural markets will see fluctuating trends due to supply-demand imbalances and trade policies. Major markets like India, China, Brazil, and the U.S. will continue to play central roles in driving production, consumption, and exports of commodities like wheat, rice, pulses, and edible oils. India's recent policy shifts, such as the opening of duty-free imports for certain crops, will likely have ripple effects on global trade dynamics.

Emerging economies in Africa and Asia will also see growing agricultural trade due to the rise of middle-class consumers and government policies aimed at enhancing food security and infrastructure. The African continent's agricultural potential is vast, with investments being channelled into improving yields and export capabilities.

Blockchain technology will revolutionize supply chains by improving transparency and traceability.

Technology Developments:

Technology will be one of the primary enablers of growth in agriculture in the coming year. Precision farming, driven by IoT, AI, machine learning, and remote sensing, is expected to gain traction, enabling farmers to optimize resource usage, increase yields, and improve sustainability. Drones and satellites will play a key role in monitoring crop health, predicting weather patterns, and detecting pest outbreaks.

Blockchain technology will revolutionize supply chains by improving transparency and traceability. This is particularly relevant for industries like food safety, where consumers and regulators are demanding more accountability.

Furthermore, vertical farming and hydroponics will continue to gain popularity, especially in urban areas, where traditional agriculture faces land and water constraints. These technologies offer the potential for sustainable food production and are expected to thrive in the coming year, especially in water-scarce regions.

Policy Developments

Policy changes in agriculture will be instrumental in shaping the sector's future. Governments worldwide are increasingly focusing on sustainability, climate-resilient farming, and digital adoption. The European Union's Green Deal and India's National Mission on Sustainable Agriculture are examples of large-scale initiatives aiming to reduce carbon footprints, promote organic farming, and enhance soil health.

India's push for digital infrastructure in agriculture, through initiatives like AgriStack, will likely improve access to government services, weather data, and market information for farmers, thus fostering better decision-making.

In summary, the agricultural sector in the coming year will witness robust growth, propelled by technological advancements, supportive policies, and evolving market demands. However, challenges like climate change, fluctuating commodity prices, and supply chain disruptions will require continuous adaptation and innovation. Governments, agribusinesses, and technology providers must collaborate to ensure a sustainable, resilient, and efficient agricultural system globally.

INDIA'S MOMENTOUS ACHIEVEMENTS IN AGRI MECHANIZATION

Dr. S. N. Jha
Dy. Director General (Agricultural Engineering),
Indian Council of Agricultural Research (ICAR)

India altogether is doing extremely well in agriculture with significant achievements in Agricultural mechanization, post-harvest processing & value addition, micro-irrigation system, soil & water conservation, energy and crop residue management. Applying Digital Solutions such as drone, robotics, sensor led automation, food safety, secondary agriculture-based entrepreneurship development may be in the centre stage of Agriculture research and development & deployment in 2025 to provide safety, speed and scale to Production and Post-production agriculture aiming to save resources and mitigating the adverse effect of climate change.

Roller Coaster Year -2024

The year 2024 can safely be described as a year of two halves. The first half was a period when our Prime Ministers pet project 'Atmanirbharta" faced serious head winds, and in some sectors nearly got sacrificed at the altar of food inflation. With parliamentary elections in the country, it was understandable that the ruling party would not take any chances which can fuel inflationary pressures in food. The second half of the year was devoted to course correction, and many of the Pre-Election knee jerk decisions were largely reversed. It may not be out of place to call 2024 a "Roller Coaster Year".

I have been closely associated with oils/oilseed and sugar /ethanol sector, and would confine my comments to these two important sectors which contribute more than Five Lakh crore in terms of revenue. Needless to say that the employment generation capacity of these two sectors is immense and the health of these sectors is vital for the overall health of the Nation.

Sugar Sector

During 2023 India suffered a patchy monsoon, and armchair analysts and commentators predicted a massive drop in cane production in the country. The fear was sugar prices would go through the roof and naturally the decision makers were alarmed and took immediate game changing decisions to keep a lid on likely bull run in Sugar prices. It's a different matter that all the doomsday soothsayers were subsequently proved wrong, and sugar production remained reasonably strong at around 34 million tons (in terms of sucrose). Some decisions which had far reaching consequences are listed below.

- Ethanol production from cane juice and B heavy molasses was banned in December 2023 during peak crushing season to conserve Sugar for domestic consumers.
- Export of Sugar was banned.

The first half of the year saw edible oil and oilseed prices under serious pressure.

- Maize and grain ethanol was heavily incentivized by giving a rate of 71.86 per litre which was much higher than juice and B heavy ethanol.
- Sugar industry demand for increasing MSP (minimum selling price) of sugar as well as ethanol was put on back burner.
- FRP of cane for the next crushing season starting in October 2024

About the **AUTHOR**

Atul Chaturvedi, Executive Chairman Shree Renuka Sugars Ltd.

was announced much earlier than normal.

All these actions definitely kept a lid on sugar prices, but had the potential of driving the sugar and ethanol sector to sickness and reverting to past scenario of huge pending dues of the farmers. With massive investment done in building distilleries the interest outgo has become almost unbearable for sugar sector. Partial course correction has been done in the second half of the year, and juice ethanol and B heavy ethanol are again permitted to be produced.

Decision on MSP and increasing the price of Juice and B heavy ethanol has still not been announced at the time of writing.

Edible Oil/Oilseeds

The first half of the year saw edible oil and oilseed prices under serious pressure. Import Duty on edible oils was negligible, and India had a good crop of Mustard and Soya. Elections ensured import duties were not tinkered with, and no wonder both mustard and soya were available much below MSP. NAFED did enter buying mustard at MSP but the damage had been done and oilseed farmers suffered by selling much of their produce below MSP.

During second half of the year, government realized that their inaction on raising import duties on edible oil was having detrimental effect on oilseed farmers and was affecting Prime Minister's Atmanirbharta project for gaining Self Sufficiency in Edible oils. Needless to mention our edible oil import bill has ballooned to around Rs 1.4 lakh crore and our edible oil security is heavily compromised.

Course correction happened and Government raised import duties on edible oils by 20% and also gave the required thrust to National Mission on Edible oils.

Expectations for 2025

We expect government decision makers to desist from taking knee jerk actions which have the potential of destabilizing sectors.

We expect GM in oilseed should become a reality for raising productivity of oilseeds.

For Sugar Sector we expect revision of Minimum Selling Price for sugar in line with increase in FRP (Fair Remunerative Price) of cane. It may be worthwhile to mention that last increase was done in 2018, and after that cane prices have moved up by more than 34% with no increase in MSP.

We expect sugar based ethanol products should be priced at same level as maize and grain ethanol.

For edible oil, Sector we feel the budgetary allocation under NMEO should be raised significantly if any game changing result are to be expected. At around Rs 1400 crore per annum the amount would be totally insufficient.

We expect GM in oilseed should become a reality for raising productivity of oilseeds. Too much debate and dithering has been witnessed in last few decades. Time is ripe for biting the bullet and allowing GM and other technological interventions to raise productivity which falls far short of world averages.

Being an incorrigible optimist, I am sure 2025 will bring smiles back not only on the faces of Oilseed and Cane farmers, but sugar and edible oil industry as well. If industry is healthy our farmers would be healthy as well.

Wishing the very best for 2025.

AGRICULTURE 2025: REIMAGINING INDIA'S AGRI-ECOSYSTEM FOR A SUSTAINABLE FUTURE

India's agricultural sector, employing 42% of the workforce and contributing 17.66% to the Gross Value Added (GVA), is undergoing significant transformation.

Technology will play a key role

The Digital Agriculture Mission (DAM), was launched in 2024 with a financial outlay of Rs 2,817 crore. Central to this mission is AgriStack, a farmer-centric Digital Public Infrastructure aimed at providing digital identities to over 11 crore farmers by 2027. Piloted in states such as Uttar Pradesh and Maharashtra, AgriStack consolidates critical data, including land records and crop details, enabling streamlined access to subsidies, crop insurance, and real-time advisories. The crop data is consolidated using a combination of satellite data, remote sensing tools and manual checks and balances.

Complementing this is Soil Profile Mapping, which creates detailed maps for 142 million hectares of agricultural land, offering farmers actionable insights to adopt precision farming. This initiative significantly enhances soil health management and boosts productivity. In states like Punjab and Haryana, drone-based spraying has reduced input costs by 30%, while soil health cards, distributed to 23 crore farmers, have optimized fertilizer use.

Piloted in states such as Uttar Pradesh and Maharashtra, AgriStack consolidates critical data, including land records and crop details, enabling streamlined access to subsidies, crop insurance, and real-time advisories.

Additionally, the Digital General Crop Estimation Survey (DGCES) employs technology-driven crop-cutting experiments to provide accurate yield estimates, crucial for efficient planning and resource allocation.

ONDC is helping build true scale when it comes to Agriculture platforms. Thanks to platforms such as DeHaat coming on ONDC network, the farmers have better access to service providers – drones or tractors on rent, for instance – as well as input sellers.

About the **AUTHOR**

Ramakrishnan M, Managing Director and Arindam Pal, AVP, Primus Partners

Fisheries and Aquaculture will take off

Pradhan Mantri Matsya Sampada Yojana (PMMSY) Scheme 1.0 comes to an end by March 2025. Version 2.0 to be launched next year is expected to be even more impactful. We expect significant investments in infrastructure and capacity building. In addition to existing schemes, several high-impact cluster development activities are planned by the Government, which will certainly improve fish farmers' livelihood and incomes.

Non-traditional sources of income will increase

Maize was largely bought by poultry industry at one point. Currently, Ethanol production is driving demand as well as prices for maize, and farmers are bound to make more money through this channel in the coming years.

Both Agriculture and Forest Departments have started engaging with farmers on carbon credits. Oceans have always been known as the best carbon sink. Mangroves in coastal regions are expected to play a big role in the evolving carbon credits market.

With inreasing consumer consciousness around chemical-free and healthy food options, demand for urban farming models like hydroponics and vertical farming are growing rapidly. Also, the market for native Indian crops – such as Khapli, Bansi varieties of wheat - is growing rapidly. We expect both the government and the farmer communities to invest heavily in this area.

As we look toward 2025, Indian agriculture stands at the crossroads of tradition and innovation. By embracing technology, sustainability, and farmer-centric policies, India is poised to lead the global narrative in agriculture.

2025 - A YEAR OF PROMISE AND PROGRESS

As we reflect on 2024, India's agricultural sector has shown remarkable progress driven by innovation, technology, and collaborative efforts. Contributing approximately 18.3% to the GDP and employing 42% of the workforce, agriculture continues to be a vital pillar of India's economy.

Government Interventions

This year saw significant interventions from the Government of India and organizations like CII, NDDB, FACE, ICFA, RBIH and NITI Aayog. Through roundtable discussions, panel conferences, and exhibitions, these entities have fostered positive dialogue and actionable outcomes. Initiatives like PM Kisan Yojana, which has disbursed INR 2.6 lakh crore to farmers, have empowered smallholders and strengthened the sector. These collective efforts are building an ecosystem where startups and established players collaborate and innovate.

Evolving Agritech

Globally, the agri-tech landscape is undergoing transformation, with over 2,700 agritech startups in India driving innovation. Funding in the sector has grown by 300% between 2016 and 2023, reflecting its potential to solve problems at scale. Startups are leveraging advanced technologies like IoT, AI, drone technology, satellite imagery and data analytics to boost productivity, enhance profitability and address climate goals. Investors are increasingly aligning with these priorities, recognizing the dual benefits of sustainable practices and economic growth.

In 2025, we anticipate growth fuelled by public-private partnerships and government-backed technological interventions. Programs like DigiKrishi, which is digitizing over 4 crore farm records, are expected to improve operational efficiency. Meanwhile, solar-powered irrigation systems, already benefiting 3.6 lakh farmers, are poised for wider adoption, reducing costs and environmental impact.

Government schemes like the Paramparagat Krishi Vikas Yojana, promoting organic farming across 8.1 lakh hectares, and the formation of 5,000 Farmer Producer Organizations (FPOs) are enabling farmers to access broader markets and fairer prices. These initiatives, coupled with the rise of agri-tech startups, are fostering an ecosystem where innovation meets scalability. The Government of UP is focused on digitizing the agri and dairy sector towards its 1 trillion-dollar economy goal. Many of India's leading milk co-operative federations such as Sudha Milk (COMFED Bihar), Parag Milk (PCDF UP), Saras (RCDF RJ) are focusing on reaching the farmer digitally and implementing Direct Benefit Transfer infrastructure.

Addressing Climate Change

As India addresses global challenges like food security and climate change, the sector is well-positioned to lead with climate-resilient, farmer-centric, and technology-driven solutions. Programs encouraging natural farming, renewable energy adoption, and supply chain transparency will be pivotal in achieving sustainable agricultural growth. Both the milk cooperative federations and large private milk processing companies are increasing their efforts on reducing carbon emissions. Companies like HUL, Danone, Nestle as well as cooperative federations like AMUL are taking significant steps towards carbon emission reduction.

The agriculture and dairy sector is are also increasing its focus on traceability towards increasing export potential for India's products. India's agriculture sector continues to inspire confidence, creating meaningful change for farmers while meeting global demands for sustainability. By integrating technology, fostering collaborations, and prioritizing inclusive policies, we can look forward to 2025 as a year of promise and progress.

In 2025, we anticipate growth fuelled by public-private partnerships and government-backed technological interventions.

About the **AUTHOR**

Ravishankar Shiroor,
Co-founder,
Stellapps Technologies

Reflections on Indian Agriculture for 2024

Despite its central role, Agriculture in 2024 faced a range of challenges and opportunities as it navigated the complexities of modern development, climate change, and evolving global markets. Climate change in India has led to a significant shift in agricultural patterns, affecting crop acreages and productivity in both positive and negative ways. Changes in temperature, erratic rainfall, delayed or heavy monsoons, and extreme weather events (like floods and droughts) have compounded the challenges for Indian farmers, particularly in key crop sectors like Rice, Wheat, Cotton, Soyabean and Vegetables. However, Millets, Pulses and Groundnut have proved resilient with increased acreages in rainfed growing systems. Despite efforts to modernize, many farmers, especially smallholders, still lack access to the latest agricultural technologies, machinery, and knowledge. This limits productivity and makes them vulnerable to market fluctuations. The challenges associated with the digital divide and a lack of proper training in modern farming practices persist. A significant portion of India's agricultural land is fragmented into small plots, which reduces economies of scale, complicates mechanization, and lowers farm productivity. The issue of land consolidation and the difficulties in land acquisition and ownership laws have slowed progress in addressing this challenge. Economic pressures, including fluctuating market prices, rising input costs, and inadequate returns on investment, continue to drive distress among farmers.

The key to managing these challenges lies in the following, while good first steps have been taken in most of them by Government, Private sector, NGOs, Civil

The first good step of digital transformation of agricultural marketing via e-NAM is a great policy initiative connecting over 1,000 mandis across the country, providing farmers with access to better price discovery and wider markets and this needs to be further strengthened.

society, our Farmers and Farmer bodies. Time has come to accelerate these initiatives and demonstrate at scale to continue to be food self-sufficient and be a leading exporter to the world.

Mitigating the Climate Change Impact

Increasing awareness and education about climate change mitigation which can help stabilize productivity and safeguard farmers' incomes. This is not only for farmers but also for companies and all other stakeholders to make efforts to rapidly scale and adopt ESG practices into their respective organizations and way of doing business.

Improved pest management strategies

Diversification of Crops beyond staple crops (like rice and wheat) into high-value crops, climate smart crops, horticulture, floriculture, and animal husbandry

Intensifying initiatives for watershed management and water conservation with a focus on rejuvenating rivers and lakes, improving rainwater harvesting, and promoting micro-irrigation technologies like drip and sprinkler systems.

Promotion of renewable energy and enhanced soil health management techniques like composting and using bio-fertilizers for improving soil fertility and long-term productivity

Market Reforms is Still a Work in Progress

With agricultural reforms still being debated, the government should push for better regulation of markets, fair pricing mechanisms, and stronger contracts between farmers and private players to avoid exploitation. The first good step of digital transformation of agricultural marketing via e-NAM is a great policy initiative connecting over 1,000 mandis across the country, providing farmers with access to better price discovery and wider markets and this needs to be further strengthened.

Technology Integration (Digitization)

Agriculture must embrace technology to become more efficient, profitable, and sustainable. Accelerating investments in agri-tech by government, private sector and through the start-up incubation programs will help in integration of smart

farming technologies, drones, IoT, blockchain for supply chain transparency, and AI-powered crop monitoring systems in improving yields and efficiency. This shift towards tech-driven agriculture is expected to grow as more farmers gain access to digital infrastructure.

Collaboration

There is a need for stronger collaboration among government agencies, private sector companies, and farmers. Public-private partnerships can help in disseminating technology, improving market linkages, and building infrastructure for agro-processing. Agri-tech companies can provide the necessary innovation, while the government can ensure inclusivity and scale. Farmers need to collaborate through Cooperatives and Farmer organizations to reduce costs, improve bargaining power, and gain better access to markets. These collaborations help farmers share knowledge, resources, and best practices, ultimately improving productivity and income. On a global scale, India needs to collaborate more effectively with other agricultural powerhouses, such as Brazil, Israel, and the USA, to exchange best practices, agricultural technologies, and research. Partnerships in climate-resilient agriculture, GM technology, and global supply chains will position India as a leader in the global agricultural landscape. Agriculture is an interconnected system that requires collective action across multiple sectors and stakeholders. Problems like climate change, water scarcity, and low productivity cannot be solved by individual efforts alone. Successful solutions will require collaboration among farmers, industry, government, and academia. Cooperation across borders to tackle global issues like trade barriers, climate change, and technological development needs to be fostered. Pooling of resources and sharing of knowledge is critical to ensure that innovations in agriculture are scalable and accessible to all farmers.

Better Seeds and Biotechnology

The use of high-quality seeds that are resistant to pests, droughts, and diseases can significantly increase productivity. Policy decisions around biotechnology, gene editing and other evolving technologies need to be made, if India has to stay relevant in the evolving Agriculture scenario. Despite the best efforts by Government, Industry and Academia, we are not able to break the stalemate on allowing newer technologies in seeds for Indian farmers and needless to say it is costing us dearly in terms of farm incomes and farm productivity which is making us vulnerable.

Coordination between state and central governments in the formulation and implementation of policies is crucial to avoid duplication and ensure that farmers benefit from nationwide schemes.

State-Federal Coordination

Agriculture is largely a state subject, but central government schemes need to be effectively implemented at the state level. Coordination between state and central governments in the formulation and implementation of policies is crucial to avoid duplication and ensure that farmers benefit from nationwide schemes. Ease of doing business for private sector and predictability in policy is critical and Industry is experiencing challenges in this front.

In conclusion, Indian agriculture in 2024 has witnessed several positives that can help transform the sector for the future. The government's proactive policies, coupled with innovations in technology, greater emphasis on sustainability, value-added production to expanding export markets and increased farmer support through government schemes offer a roadmap for transforming the sector and there are promising signs of growth and resilience. By continuing to invest in innovation, sustainability, and farmer welfare, Indian agriculture can rise to meet the challenges of climate change and global market demands, while also enhancing the livelihood of millions of farmers.

About the **AUTHOR**

Dr. Venkatram Vasantavada
Managing Director & CEO,
SeedWorks International Ltd.

AGRICULTURAL TECHNOLOGY: INDIA'S DIGITAL REVOLUTION IN 2024 AND OUTLOOK FOR 2025

As we approach the end of 2024, India's agricultural sector is poised for significant growth, driven by groundbreaking policies and technological innovations that promise to reshape farming practices across the country. India's agricultural sector stands ready to embrace the transition into an extraordinary digital revolution facilitated by path-breaking policies and technological innovations that are going to change the face of Indian agriculture, both nationally and globally. The year 2024 will be remembered as a watershed moment for digital agriculture, marked by two transformative government initiatives that demonstrate a bold commitment to technological empowerment and women's economic inclusion.

The emerging technological landscape is characterized by innovations in precision agriculture, artificial intelligence, drone technology, and data analytics.

Namo Drone Didi

The Namo Drone Didi scheme emerges as a particularly innovative policy intervention. By targeting 15,000 women-led Self-Help Groups (SHGs) between 2024-25 and 2025-26, the initiative goes beyond mere technological distribution. The comprehensive support package, including an 80% subsidy, low-interest loan facilities, drone pilot training, and potential additional income of Rs. 1 lakh per year, represents a holistic approach to women's economic empowerment through agricultural technology. Adding to this momentum is the Digital Agriculture Mission, recently approved by the Union Cabinet with a significant allocation of Rs. 2,817 crore. The mission seeks to build a robust digital agricultural ecosystem by focusing on Digital Public Infrastructure, conducting the Digital General Crop Estimation Survey (DGCES), and advancing IT initiatives across government and research bodies. This initiative underscores the government's commitment to harnessing data and technology to address challenges, enhance productivity, and foster sustainable farming practices. These policies mark a significant shift towards technology-driven agricultural development. They acknowledge that modern agricultural challenges require data-driven solutions that can enhance productivity, reduce risks, and create new economic opportunities for farmers and rural entrepreneurs.

About the **AUTHOR**

Pradeep Palelli,
Co-founder & CEO,
Thanos Technologies

Tech Driven Agriculture

The emerging technological landscape is characterized by innovations in precision agriculture, artificial intelligence, drone technology, and data analytics. These technologies promise to address critical challenges such as resource optimization, climate resilience, and sustainable farming practices.

In this context of broader technological transformation, Thanos Technologies offers an ecosystem of agricultural drones. The company experienced a breakthrough year in 2024, crossing the Rs. 20 crore revenue milestone and expanding its operational footprint to seven states. With plans to reach 10–12 states by the fiscal year-end and ambitious targets of Rs. 100 crore revenue by 2025-26, Thanos exemplifies the potential of homegrown agricultural technology solutions.

Looking ahead to 2025, the agricultural sector stands on the threshold of an unparalleled digital transformation, set to redefine traditional farming practices and unlock new opportunities for growth and innovation. Government policies, technological innovations, and entrepreneurial spirit are converging to create an ecosystem that promises not just incremental improvements but a fundamental reimagining of agricultural practices.

The journey has just begun, and the future looks incredibly promising!

For Viksit Bharat

The agricultural sector remains a cornerstone of economic stability in India, with a consistent growth rate of 4.18% annually over the past five years.

Historically, the Government of India has prioritized self-sufficiency in food grains to address the need of food security. As a result, India has achieved self-sufficiency in major crops to a large extent. However, constant fertilizer and food subsidies have created distress on natural resources. Though these subsidies have resulted in an increase in productivity, it has led to environmental issues such as soil fertility loss, excessive water use, increased carbon emissions, etc. Additionally, it has not been able to cater to nutritional needs, which has resulted in adverse impacts on health by increased consumption of carbohydrates and sugar in the diet.

To address these challenges, the government has shifted its focus, evident in the 2024-25 budget with a 13% cut in fertilizer spending, and a 3% reduction in food subsidies. Increased funding for research and development, micro-irrigation, and climate-smart technologies marks a positive step towards transforming agriculture.

In a significant move in 2024, the Ministry of Agriculture and Farmers Welfare introduced Digital Public Infrastructure in agriculture to boost productivity and resilience. Projects like Agri-Stack and Decision Support System aim to streamline services for farmers and foster data-driven decisions, enhancing the entire agricultural ecosystem.

Moving forward, the government should continue its efforts towards making agriculture, more sustainable, increasing farmer's income, and re-aligning policies towards export-oriented agriculture, value chain development, crop diversification, climate-change adaption, research and digital governance. Embracing an approach, which is inclusive, innovative and climate sensitive is essential, providing farmers with a diversified portfolio, comprising agriculture, horticulture, animal husbandry and fisheries. Further strengthening the collective bargaining through FPOs/ FPCs, SHGs and cooperatives.

Every rupee spent on agricultural R&D yields a return of 11.2, far exceeding the returns from subsidies on fertilizers (0.88), power (0.79), education (0.97), or roads (1.10). This supports the argument for reallocating subsidy funds to agri-R&D to shift towards sustainable agricultural solutions and drive greater agricultural growth. Focusing on R&D and digitalization could significantly enhance productivity, sustainability, and profitability in the agricultural sector.

Moreover, promoting allied sectors such as fishing and livestock farming can enhance farmers' incomes, contribute to agricultural GVA, and reduce environmental stress through sustainable practices. These efforts are essential for a Viksit Bharat by 2047.

About the **AUTHOR**

Amit Vatsyayan
Partner, Ernst & Young LLP and leads the Social Sector Practice
EY

Biologics -For Boosting Agricultural Growth

Agriculture which touches the lives of all consumers and producers/farmers has the potential to speed up the growth of our economy. Last year's budget – 2024 delivered by Hon FM Nirmala Sitharaman touched many areas. Support to transform agricultural research in times of the looming climate crisis was highlighted. It was seen in launch of more than 109 high yielding climate resilient varieties of 32 field and horticultural crops. Outlay given to natural farming was more than 2500 cr. However, biologics sector [biofertilizers, organic fertilizers and biopesticides] has not quite caught the attention of the policy makers which if supported for entire Indian agriculture can reward the country favourably. Biologic sector is growing fast at a CAGR of 10 to 15% which means it will double in size within 5 to 7 years. Biologics help the farmer tackle productivity issues by improving soil health and conserving water. Food security and food safety are two sides of the same coin which can be addressed by increasing usage of biologicals in the tool box of the farmer.

Support for regenerative agriculture has to be done by way "Bharat Soil Carbon Incentivization Model" for improving the soil carbon levels.

Policy Support

PM – PRANAM scheme was launched in 2023-24 to promote use of chemical and alternative fertilizers and generating awareness of regenerative agriculture. Government had allocated Rs 1.05 lakh crore to fertilizer subsidy but it is expected to cross Rs 2.25 lakh crore this year. Therefore, shift to alternative fertilizers primarily biofertilizers and organic fertilizers is the key.

Biologics have the potential to grow from 5% to around 30% of the fertilizer and agro-chemical market which translates to farmers improving their cost of production by targeting high yields, improving soil fertility and reducing pesticide residues in food. However, extension up to the farm gate is the key. Currently, being a new sector there are many MSMEs producing biologics which have to spend a lot of time, energy and resources educating farmer and distribution channel which is predominantly selling conventional chemical inputs/seeds. Therefore, large scale demonstrations at District [KVKs] and taluka/village level targeting high yields in different crops has to be done on war footing with sufficient fund outlay.

About the **AUTHOR**

Sandeepa Kanitkar
Managing Director,
Kan Biosys

Extend Support to Biologicals

Productivity challenges in different crops have been seen on ground due to insufficient extension efforts in spite of some currently available excellent biologics technologies. The aim should be to develop and adopt a universally/nationally tested package of practices based on soil test based fertilizer recommendations along with organic and biofertilizers. 3 tier level combination of chemical, organic and biofertilizers can be a useful tool to rationalize the subsidy on chemical fertilizers. Currently, around 50 to 70% of subsidy is being lost to compromised fertilizer use efficiency which is not benefiting anyone, but causing a huge impact on soil fertility and contaminating our precious water bodies. Support for regenerative agriculture has to be done by way "Bharat Soil Carbon Incentivization Model" for improving the soil carbon levels. This is especially important for nutrient and water hungry crops like rice and sugarcane. Chemical fertilizer companies are being subsidized for selling fertilizers to make them affordable to farmers. This has helped our farmers achieve food security. But the imbalance use is compromising future cultivation. Therefore, new models for supporting bi-

ofertilizer and organic fertilizer companies need to be developed for promoting sale and innovation.

Functional Seed dressing with microbial biofertilizers at seed factory and farm level is a big policy push which needs to be given by the government for the seed industry. This is for building climate resilience for better nutrient absorption in crops.

Conducive Regulatory Ecosystem

Our agrochemical industry brings valuable foreign exchange with massive exports. They should be supported to maximise exports by initiating free trade agreements [FTA] with various developing as well as developed countries. Agrochemical industry should also be encouraged to take up biopesticides for rationalizing the use of some old chemistry actives which are on the verge of being phased out. Biopesticides are increasingly being adopted by horticultural farmers engaged in high value agriculture. Government and private extension efforts can speed up the usage of biopesticides for combating pesticide resistance and food safety among all farmers. India provides ample opportunity for innovation in biologics by virtue of trained manpower, rich biodiversity and fermentation capabilities. Conducive and rapid regulatory ecosystem will truly benefit the sector and the farmer to compete in global markets.

Biologic sector if properly supported by policy for the innovators, manufacturers, channel and farmer - can develop India into an innovation and manufacturing hub in times of climate challenges.

Biologic sector if properly supported by policy for the innovators, manufacturers, channel and farmer - can develop India into an innovation and manufacturing hub in times of climate challenges. Support to biologic sector can benefit the farmers with respect to productivity challenges and population at large with respect to food security and safety. Hopefully, the year 2025 will prove to be one of change and growth in agriculture through technology innovation, supportive policies, and a dedication to sustainable practices. Now that we step into the new year, all of our farmers, researchers, policymakers, and industry leaders must work together in building this resilient and prosperous agricultural landscape.

Reflections and Expectations

As we approach the end of 2024, it's an opportune moment to reflect on what has been an extraordinary year for the agricultural sector. This year has brought a remarkable mix of advancements, challenges, and hope, all of which underscore the resilience and ingenuity of the global farming community, especially small scale producers which make majority of farming community.

One of the defining aspects of 2024 has been the rapid pace of technological innovation transforming how we grow, harvest, and distribute food. Precision agriculture has reached new heights, with AI-driven tools enabling farmers to monitor soil health, water usage, and crop conditions in real-time. These tools not only contribute towards improved yields but also help farmers reduce waste and work more sustainably.

Despite these achievements, 2024 wasn't without its challenges. Climate change continues to cast a long shadow over agriculture, bringing extreme weather events that disrupt planting and harvesting. Over 60% of farmers experienced atleast one major climate event this year including flood, prolonged droughts causing damages to crop and livestock production. Yet, through these trials, the resilience of the farming community stood out.

With global efforts to address food security intensifying, 2025 promises greater collaboration between governments, organizations, and private players to tackle hunger and malnutrition. Farmers, as always, should be at the heart of these efforts, driving solutions for a better future.

2024 was a year that reminded us of the resilience and potential of agriculture. It was a year of both challenges and triumphs, of adversity and innovation. As we approach 2025, we carry forward the lessons learned and the advancements made, ready to navigate the road ahead with hope and determination.

About the **AUTHOR**

Dr. Purvi Mehta
Prominent agriculture professional and global voice. Currently serving as Senior Advisor for Global Growth and Opportunities at the Gates Foundation. She is also Associate Professor at Cornell University and Global board member of World Food Prize.

Growing Trend and Outlook of Indian Animal Healthcare

India continues to hold leadership positions in global milk, egg, and meat production, ranking 1st, 2nd, and 5th, respectively, making a substantial contribution to the country's economy. The animal healthcare industry plays a crucial role in supporting the nation's animal husbandry sector. The animal healthcare in India has evolved from focusing solely on curative treatments to adoption of preventive approach aimed at enhancing productivity, and the overall well-being of animals. The Indian animal health market is estimated to be valued at INR 11662.30 crore in FY 2024 with a CAGR of ~ 10% for last 5 years. Various government schemes and regulatory frameworks designed to address the specialised needs of animal welfare have been driving the development of the sector.

The Indian animal healthcare sector is witnessing a range of emerging trends, reflecting advancements in technology, changing consumer behaviour, and evolving industry needs. These trends are transforming the animal healthcare landscape, leading to more efficient, sustainable, and productive practices.

Increased Focus on Animal Health and Welfare

There is an increasing focus on the importance of animal health, both for the well-being of animals and for the safety and quality of animal produce (milk, meat, and eggs). Animal welfare initiatives like improved breeding practices, disease management, and preventive healthcare, are gaining wider acceptance.

Rise in Animal Protein Consumption

Due to rising demand for animal-derived proteins, the need for healthy and productive livestock, fuelling the demand for veterinary products like vaccines, antibiotics, and nutritional supplements are increasing. Government is also supporting the growth of the dairy and meat industries, which are significant contributors to the national economy.

The Indian government has recognized the importance of the animal healthcare sector and is introducing several initiatives to support the industry.

About the **AUTHOR**

Dr Arun Atrey, Managing Director & CEO- Zenex Animal Health
Chairman, Therapeutic sub-committee & Past President, INFAH

Technological Advancements

Advancements in veterinary medicines, vaccines, and diagnostics are developing the animal healthcare industry. With increased adoption of technology, more efficient and cost-effective ways to diagnose and treat diseases in animals are emerging. Technologies such as genomics, digital monitoring tools for livestock health, and artificial intelligence-based diagnostic platforms are gaining traction.

Government Initiatives and Regulations

The Indian government has recognized the importance of the animal healthcare sector and is introducing several initiatives to support the industry. Programs focused on improving livestock productivity, controlling diseases, and ensuring food safety are contributing to the growth of the sector. The National Livestock Mission and other support programs for dairy and poultry farmers are creating an enabling environment for better veterinary care. Also, regulatory frameworks for veterinary products are being strengthened, ensuring that animal healthcare products meet quality standards and are safe for both animals and consumers.

Export Opportunities

India is a key player in the global livestock and animal products market, including the export of dairy, meat, and poultry. Additionally, the country has a significant opportunity to expand its presence in the global animal healthcare market, driven by its robust manufacturing capabilities, cost

advantages, and the rising global demand for veterinary products.

Veterinary Diagnostics and Lab Services

With increasing awareness on early diagnosis and prevention, there is a growing demand for veterinary diagnostic services such as point-of-care diagnostics and other diagnostic tools. Laboratory services are expanding to provide faster and more accurate results, allowing for timely treatment of diseases.

Sustainable Practices with Herbal alternatives

Sustainability is becoming a major focus in the Indian animal healthcare sector. Many companies are developing eco-friendly veterinary products and focusing on sustainable practices in the production of feed, supplements and medicines. There is a rising interest in herbal animal feed supplements and drugs, which are not only seen as more environmentally friendly but also healthier for the animals.

Improved Veterinary Education and Training

The rise in demand for skilled veterinary professionals is driving improvements in veterinary education and training programs. Veterinary institutes and private companies are focusing on training veterinarians and livestock farmers on the latest techniques in animal healthcare, diagnostics, and management practices.

There is a rising interest in herbal animal feed supplements and drugs, which are not only seen as more environmentally friendly but also healthier for the animals.

Challenges Facing the Sector

While the outlook is generally positive, several challenges could impact the growth of the sector:

Small & Marginal Farmers: Lack of awareness about health, nutrition and farm management persists as the sector is dominated by small & marginal farmers.

Inadequate Infrastructure: Despite advancements in urban areas, rural India still lacks sufficient veterinary services and infrastructure to support the growing needs of the livestock sector.

Dependency on Import: Due to cost & technology advantages as well as non-availability of key starting materials, the country is dependent on imported raw materials/APIs.

Fluctuating price of animal produce

The growing trends in Indian animal healthcare reflect the evolving needs of the sector. From a shift toward preventive care and the adoption of technology to a focus on sustainable practices, the industry is moving toward more efficient, compassionate, and productive solutions. Overall, the Indian animal healthcare industry is poised for strong growth, driven by a rising livestock population, advancements in veterinary technology, increasing consumer demand for animal products, and government initiatives. However, challenges such as unorganized farming, infrastructure limitations, appropriate remuneration of animal produce, technology disadvantage etc. need to be addressed to ensure the sustainable development of the sector.

Technology for Fostering Sustainable Agricultural Future

"As we near the close of 2024, the agritech industry stands at the confluence of innovation and necessity. Driven by challenges like climate unpredictability and resource scarcity, agritech companies, including Satyukt Analytics, have spearheaded transformative solutions leveraging satellite remote sensing and AI. This year, Satyukt has expanded its reach, offering small and marginal farmers access to real-time data for optimizing crop yields, managing water use, and reducing input costs. With over 140 million farmers in India and an even larger global audience, our satellite-driven tools have become vital for sustainable agriculture.

Dr. Sat Kumar Tomer, Founder & CEO, Satyukt Analytics

The industry's growth reflects a 10-15% rise in global investments, with a focus on precision farming and sustainable solutions. The integration of smartphone-based platforms and satellite insights has empowered stakeholders across the agricultural value chain. At the Global Fintech Fest 2024, we emphasized how such innovations not only improve productivity but also support resilient farming systems in the face of global challenges like food security and water scarcity.

Our vision for 2025 is clear- scale these solutions to empower millions more, fostering a sustainable agricultural future worldwide."

2025: A NEW ERA FOR INDIAN AGRICULTURE

As 2024 draws to a close, the Indian agricultural sector reflects on a year marked by significant growth and pivotal transformations, setting a strong foundation for further advancements in 2025. With the government's proactive stance on agrarian policy reforms and a surge in agritech innovations, the sector is gearing up for a revolutionary phase of development.

This past year, India's agriculture has seen substantial growth, fuelled by strategic government initiatives and breakthroughs in technology. The integration of advanced agritech solutions has particularly revolutionized traditional farming practices, enhancing efficiency and productivity across the board. This technological push was supported by a significant rebound in agritech funding, which not only recovered from previous lows but also gained momentum, reflecting the broader positive trends in the start-up funding ecosystem.

As we look forward to 2025, the agricultural landscape is expected to benefit immensely from several key policy reforms. Notably, the government plans to refine agricultural loan structures, increasing the credit limits under the Kisan Credit Card from Rs. 3 lakh to between Rs. 4 and Rs. 5 lakh. This adjustment aims to give farmers better access to necessary financial resources, empowering them to invest in quality inputs and modern farming equipment. Additionally, repayment norms are set to be relaxed, allowing farmers to manage their finances with more flexibility against the backdrop of fluctuating market conditions and environmental challenges.

The continued growth in agritech funding is set to bring more innovative solutions to the forefront in 2025. Emerging technologies in precision agriculture, sustainable farming practices, and data-driven farm management are poised to further transform the agricultural sector.

The continued growth in agritech funding is set to bring more innovative solutions to the forefront in 2025.

These technologies will enable farmers to achieve higher crop yields, optimize input use, and reduce environmental footprints, thus promoting a more sustainable agricultural model.

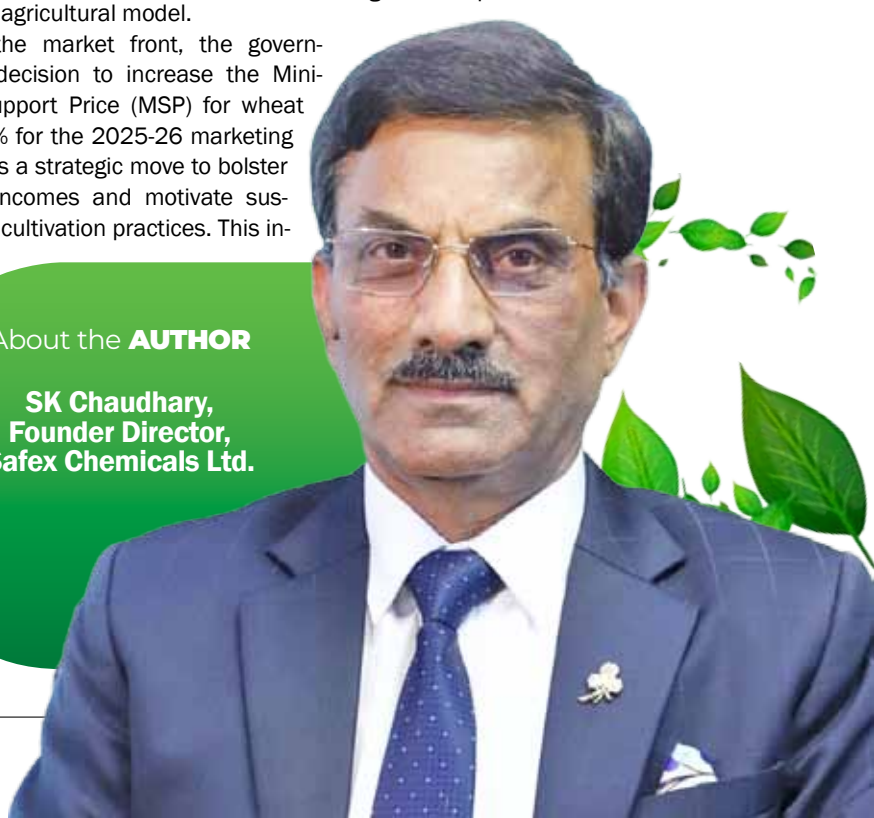
On the market front, the government's decision to increase the Minimum Support Price (MSP) for wheat by 6.59% for the 2025-26 marketing season is a strategic move to bolster farmer incomes and motivate sustainable cultivation practices. This increase is part of a broader effort to provide economic security to farmers while encouraging the adoption of innovative agricultural techniques.

The upcoming year holds promising prospects for India's agricultural sector. With the anticipated enhancements in policy, technology, and market conditions, 2025 is expected to be a year of unprecedented growth and innovation. These changes are not only crucial for the sustainability and profitability of agriculture but also for the broader economic stability and food security of the country.

The converging dynamics of policy support, technological innovation, and favourable market conditions are set to catalyse a new era of growth and productivity in Indian agriculture. As stakeholders in this vital sector, we must continue to embrace these changes and work collaboratively to realize the full potential of the agriculture industry's future. The efforts made today will pave the way for a more prosperous and sustainable agricultural landscape in 2025 and beyond, reinforcing India's position as a global agricultural powerhouse.

About the **AUTHOR**

SK Chaudhary,
Founder Director,
Safex Chemicals Ltd.



2024: A TRANSFORMATIVE YEAR FOR AGRICULTURE

The year 2024 has been pivotal for global agriculture, driven by innovation, policy interventions, and increasing focus on sustainability. Despite challenges like climate change, resource constraints, and market volatility, the sector has demonstrated remarkable resilience. As we step into 2025, agriculture is set to harness technology and forward-thinking policies for sustainable growth, productivity, and farmer welfare.

About the **AUTHOR**

Rajat Vardhan
Founder & CEO
ScaNxt Scientific Technologies

Broad Scenario, Growth, and Performance

Globally, agriculture is undergoing a paradigm shift. Emerging economies in Asia and Africa are spearheading growth, becoming key contributors to global food supply. Developed nations are leading the charge in smart agriculture with investments in AI, IoT, and robotics. The global agriculture market is projected to grow at 3.5% CAGR, with sustainable farming and regenerative agriculture contributing significantly.

India, with its vast agricultural base, has outperformed in 2024, recording an all-time high in food grain production and exports. The integration of technology, particularly AI and ML, in areas like pest detection, soil health monitoring, and yield forecasting has enhanced productivity. However, smallholder farmers, who contribute 80% of total agricultural output, remain vulnerable to climatic and financial uncertainties, highlighting the need for targeted interventions.

Major Markets, Technology, and Policy Developments

Key agricultural markets like cereals, horticulture, and dairy have witnessed steady growth, supported by advancements in processing and supply chains. AI and ML-based precision farming technologies, sensor-based soil health monitoring, and satellite imagery have revolutionized resource use, reduced waste and enhancing yields.

The government has introduced transformative policies like the Digital Public Infrastructure for Agriculture, which integrates farmers into digital ecosystems for better decision-making, and the Agriculture Accelerator Fund, which fosters agri-tech startups and rural employment. The Atmanirbhar Clean Plant Programme has boosted horticultural productivity, while increased agricultural credit has empowered farmers to adopt modern technologies.

To ensure that these technologies reach their full potential, AI and ML-based initiatives must receive focused funding and widespread promotion. Model training on diverse datasets is essential for high throughput and effective usage, especially in addressing region-specific challenges like pest outbreaks and climate resilience.

Expectations from the Government for 2025

As the sector gears up for 2025, certain focus areas can unlock agriculture's full potential:

Climate Resilience: Expand the development and dissemination of climate-resilient crops and scale weather-based insurance schemes to protect farmers from extreme events.

Infrastructure Modernization: Invest in controlled atmosphere storage facilities, irrigation networks, and market-linked supply chains to reduce post-harvest losses and ensure fair pricing.

Technology Hubs: Establish block-level Centers of Excellence to showcase innovations from industry and startups, driving faster technology adoption by farmers.

AI & ML Advancements: Promote national-level AI and ML projects to train robust models capable of addressing diverse agricultural challenges, from pest outbreaks, soil management, AI-enabled precision breeding to yield optimization.

Smallholder Empowerment: Design targeted financial inclusion and capacity-building programs for small and marginal farmers, enabling access to modern tools, renewable energy solutions, and digital platforms.

Global Collaborations: Strengthen partnerships with international research institutions to bring advanced solutions in precision farming and post-harvest management to Indian farmers.

Sustainable Practices: Incentivize organic and regenerative farming practices while promoting renewable energy and water conservation techniques.

The integration of technology, particularly AI and ML, in areas like pest detection, soil health monitoring, and yield forecasting has enhanced productivity.

Outlook for 2025

The coming year presents immense opportunities for agriculture to redefine its role in food security, climate action, and economic growth. With technology at the forefront and policies aligning economic goals with sustainability, India is poised to lead the global agricultural transformation. By prioritizing AI and ML advancements alongside farmer empowerment and infrastructure upgrades, 2025 can be a defining year for achieving productivity, resilience, and sustainability in agriculture.

BUILDING ROBUST, INCLUSIVE AND PARTICIPATIVE WAREHOUSING ECOSYSTEM

The agricultural landscape in India is witnessing a significant transformation, with technology-driven innovations paving the way for more efficient and sustainable practices. Among these innovations, the Electronic Negotiable Warehouse Receipt (eNWR) is emerging as a game-changer for the agri-warehousing industry, offering farmers, traders, and institutions a seamless and secure way to manage commodity transactions.

eNWR system enables farmers to store their produce in a safe and scientific way in warehouses near their farms and to seek pledge loan from banks against the NWRs issued against deposit of their stock. Hence, the eNWRs help the farmers to avoid distress sale of agricultural produce during the peak marketing season and to avoid the post-harvest storage losses. eNWR ecosystem infuses efficiency, and transparency in the pledge financing by restricting the possibilities of tampering, mutilation, fraudulent overstatement of stock value in the warehouse receipt, loss or damage associated with physical paper-based warehouse receipts and so on. Financing against eNWRs is undertaken for meeting the short term fund needs against the pledge of eNWRs (Exchange Deliverable) of commodities issued by WDRA registered Repositories. The eNWR benefits a variety of other players, including banks, financial institutions, insurance companies, trade, commodity exchanges, and consumers.

Following are our key suggestions for building robust, inclusive and participative warehousing ecosystem:

Mandating banks to lend against Electronic Negotiable Warehouse Receipt (eNWR)

eNWR system enables farmers to store their produce in a safe and scientific way in warehouses near their farms and to seek pledge loan from banks against the NWRs issued against deposit of their stock.

Despite the potential of eNWR ecosystem to serve as a robust commodity risk management tool for banks/FIs, adaptation rate of eNWRs by FIs for pledge finance is still very low.

It is suggested that, the Reserve Bank of India (RBI) may consider requiring banks to lend against eNWRs or provide preferential treatment to eNWRs through the following measures:

Priority Sector Lending (PSL): Assign higher weightage to eNWRs compared to physical receipts under PSL classification.

Differential Interest Rates: Offer lower interest rates for eNWR-based pledge financing to beneficiaries, as banks save on overhead costs such as collateral management fees and physical inspections.

PRI Scheme Extension: Extend the applicability of the PRI scheme for eNWR financing to all farmers, up to ☐15 lakh per season. This will address gaps that the SMF scheme alone cannot cover in enhancing the post-harvest ecosystem as PRI is limited to SMF category and that to Rs 3 lacs in pre-harvest.

Credit Guarantee Scheme: We would like to extend our thanks for the launch of the credit guarantee scheme by the Ministry recently. To promote the upcoming credit guarantee scheme for eNWR financing, the Ministry may instruct State Level Bankers' Committees (SLBCs) to include it in their periodic reviews and promotional activities. Subsidized Warehouse Rentals: Introduce budgetary provisions through NABARD as the nodal agency to subsidize warehouse rentals, encouraging farmers to participate in the WDRA ecosystems.

Separate Asset Class Reporting: Require banks to report warehouse receipt financing as a distinct asset class in their MIS submissions to the RBI, instead of clubbing it under farmer/MSME categories.

About the **AUTHOR**

Mr. Abhishek Rai,
Chief - Marketing & HR,
NeRL

Changes in the existing PSL guidelines of RBI

Currently, the PSL guidelines issued by RBI under Chapter –III, clause 8.2(b), loans to non-individuals against pledge finance up to Rs 75 lakhs under NWR/eNWR get classified under PSL assets which is equivalent to the loan amount under clause 8.1 to the individual farmers.

We request that clause 8.2(b) be enhanced up to Rs 2 crore equivalent to 8.2(a) for NWR/eNWR-based financing. It will greatly boost banks to push for NWR/eNWR pledge finance.

Loans for the following activities will be subject to an aggregate limit of ₹2 crore per borrowing entity:

Crop loans to farmers which will include traditional/non-traditional plantations and horticulture and loans for allied activities.

Medium and long-term loans for agriculture and allied activities (e.g. purchase of agricultural implements and machinery and developmental loans for allied activities).

Loans for pre and post-harvest activities viz. spraying, harvesting, grading and transporting of their own farm produce.

Loans up to ₹75 lakhs against pledge/ hypothecation of agricultural produce (including warehouse receipts) for a period not exceeding 12 months against NWRs/eNWRs and up to ₹50 lakhs against warehouse receipts other than NWRs/ eNWRs.

Permitting Banks to participate in Commodity Derivatives Market for hedging exposure to Crop Loans

Banks are mandated to lend to the agri sector under PSL and have a substantial loan book. It is necessary to ensure that these loans are adequately protected from risk arising out of volatility in agricultural commodity prices. Banks can use commodity derivatives market to hedge commodity price risk. They have the required knowledge and competence to adopt such risk mitigation tools. This can protect them from adverse price moves in the underlying commodity and consequent delays/ defaults in loan repayment.

Despite the potential of eNWR ecosystem to serve as a robust commodity risk management tool for banks/ FIs, adaptation rate of eNWRs by FIs for pledge finance is still very low.

At present the Banks are not allowed to participate in Commodity Derivatives Market. RBI may consider evolving a policy to enable Banks to participate in the commodity derivatives markets to hedge their risk arising out of lending to agricultural commodity sector.

Mandating Companies with Large Borrowings to Hedge Commodity Price Risks

RBI vide a circular "DBR.No.BP.BC.96 /21.04.157/2014-15" dated May 28, 2015, issued the guidelines asking banks to encourage hedging by the large Agri-borrowers by creating awareness. Further, RBI vide circular "DBOD.No.BP. BC.116/21.06.200/2013-14" dated June 3, 2015, has also issued a notification regarding capital and provisioning requirements for exposures to entities with unhedged foreign currency exposure. It has been mandated that entities should calculate the extent of loss as a percentage of EBID and make prudential measures with incremental capital and provisioning requirements. Also, the SEBI vide circular" SEBI/HO/CFD/CMD1/ CIR/P/2018/0000000141" dated November 15, 2018, has mandated every listed company to disclose commodity price risk and hedging activities in their annual report.

For unhedged foreign currency of companies, RBI has mandated incremental capital and provisioning requirements for over and above present requirements, there is no such guidelines for unhedged commodity exposures. There is a need for similar guidelines for unhedged commodity exposures to help in reducing the systemic risk.

We are confident that suggested measure will add to the Prime Minister's vision on Viksit Bharat 2047.

Crop Nutrition Pivotal

2024 has been a year of significant progress and resilience in Indian agriculture. Several key transformations are shaping the sector, such as advancements in digital infrastructure, public-private partnerships, and a focus on high-yielding, climate-resilient crop solutions. However, there is a need for some interventions to make 2025 a year for Indian agriculture.

Looking ahead, we foresee a year of opportunities and growth, driven by innovative practices and progressive policies. Enhancing crop nutrition will be pivotal in this journey. By focusing on balanced and efficient nutrient management, we can improve soil health, boost crop yields, and ensure the production of high-quality produce. This approach will not only support farmers in achieving better outcomes but also contribute to the overall sustainability of the agriculture sector.»

About the **AUTHOR**
Sanjiv Kanwar, MD, Yara South Asia

THE DECADE BELONGS TO INDIA'S AGRI SECTOR

Rural economies in India have witnessed tremendous developments in 2024 due to the growth of agri-tech areas of the Indian economy which fostered the creation of innovative solutions to fundamental issues in agriculture as well as agri-tech companies who have revolutionized the sector be it through digitalizing supply chains or farmer to buyer connections, exploring AI, IoT, and fintech for better yields and credit accessibility. For a country whose more than half the population depends on the agricultural sector, we need to keep on upgrading our systems and infuse them with best of resources.

Agriculture sector has always been priority from the Government stand point, but in 2024 we have seen a great shift with private sector coming in with heavy investments and propositions. New technologies are bringing in greater advancement in the sector, and with private players pooling in money, it has the potential to exhibit a dynamic rise not only from the domestic institutional investors but also from foreign investors. As rightly said by Jeff Bezos, this decade belongs to India and the growth and investments which we have seen in the last four years has been rising steadily, and as the data is showing it has been substantially increasing in the agriculture side.

The emergence of both B2B and D2C start-ups in the last 24 months has helped this sector grow tremendously.

The emergence of both B2B and D2C start-ups in the last 24 months has helped this sector grow tremendously.

About the **AUTHOR**

Shashank Singh,
Co-founder,
Poshn

D2C startups are helping mostly in the fruit and vegetable part of the agriculture sector setup where in they are promoting procurement directly from the farmer to your plate, increasing the quality of farm produce one gets and also increasing the traceability of the fruits and vegetables which is helping people to determine what exactly they are eating, and from where the particular crop is coming. It has also helped in increment of farmer's income as now a lot of intermediaries are not required which is helping farmer to increase his earnings manifolds. B2B start-ups are changing the landscape of quality and credit extension to processors, whereas in the sector which demands hard cash on the delivery of goods B2B startups have extended credit to processors of the agri input. They are changing the landscape for the processors as now the processors are not tied up in the working capital, instead they are more focused towards processing more agri input which is beneficial to farmer as well as for the processors. With the stabilizing of the world after covid, India is ready to see new capital infusion in the agri sector and various other sectors. Of course, this decade belongs to us and primarily it belongs to the Agri Sector of India.

Having traversed an arduous journey from a stage of perennial shortages and dependence upon external aid, we have attained not only food security but gained surpluses so as to feed others. In the coming year, let us aim to be the global food and agriculture superpower. Our single and dedicated focus should be addressing the productivity concerns; we already sit atop or near the top in production. Our goal should be to reach the pinnacle of productivity and value of our agricultural produce.

About the **AUTHOR**

Tarun Shridhar, Director General, Indian Chamber of Food and Agriculture (ICFA) and Former Secretary, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India

Agriculture Today through 2024

EATING THE RIGHT FOOD AND PRODUCING IT SUSTAINABLY

Dr. Yvonne Pinto, Director General - International Rice Research Institute (IRRI) is a recognized global expert in Agriculture and Food Systems Innovation and Agricultural Technology Ecosystems and related evaluation and monitoring. With more than 25 years' experience in providing trusted advice and consultancy across the sector, she is a global leader in rice science with presence and extensive R&D partnerships across major rice producing nations. She is the first female DG in IRRI's 64 year history. In an interaction with Agriculture Today, Dr Pinto delves deeper into the global rice production scenario and the challenges associated with it. Excerpts from the interview.

What are the challenges facing rice production globally?

Rice cultivation feeds almost 4 billion people, that is about more than half the world's population. Rice cultivation therefore assumes an important stature globally, and people have a cultural affiliation to it. This presents a tremendous opportunity to improve rice production.

But we live in an era where it is not simply about higher yields or greater resilience. It's about less environmental damage and about social factors and how to improve the nutritional quality of rice. And so, all of those elements are necessary in order to sustain the production, in order to sustain the demand. And I think, in some countries the level of that demand is decreasing, but there are new regions in the world, like Africa, where the level of demand is rising.

And so, opportunities, for example, that may have been more about supplying your domestic needs, are becoming opportunities to supply to a global demand.

How biotechnology can improve production and productivity of rice? Is it a viable solution,

especially in developing nations?

I think the advancements in biotechnology globally have been rapid. In the last five years, remarkable things have become possible.

The question of whether they are applicable in developing countries relates to the institutions based in those countries and their capabilities. Nothing is taken for granted in the sense that technology can only be relevant if it is done in co-creation with the communities that are going to use it. So, there are opportunities in biotechnology that relate to improving the speed at which material is produced, improving the precision by which we select genes that enable plants to be more resilient or to reduce their carbon emissions or to reduce methane, for example.

There are opportunities with technologies such as gene editing or CRISPR, which speed up the opportunity to produce those products. And in Varanasi, for example, ISOC has a speed breeding facility which narrows the length of time to get material that you desire into a farmer's field and therefore into production systems. So, there are tremendous opportunities.But, like most things, you have to be careful about the context in which it is being used.

What are the traits that the future research in rice varietal improvement will be invested in, globally and in India?

If we look at rice-consuming nations in South Asia and Southeast Asia, there are opportunities for climate resilience because this region is hit regularly by extreme weather events, and the intensity and the frequency of those is increasing. So, to safeguard our food security in the region, we need to ensure that we have resilient materials.

At the same time, we have situations where water is becoming scarce, where people are less inclined to want to have chemicals applied to their food systems and therefore there are alternatives that we need to seek in order to find appropriate alternatives that are relevant and effective. And I think, finally, there are, in the South Asian and Southeast Asian populations, issues related to non-communicable diseases. Things like pre-diabetes, diabetes and lack of iron-induced anaemia.

There are opportunities with echnologies such as gene editing or CRISPR, which speed up the opportunity to produce those products.

We can use better and more nutritious varieties to address those diseases and therefore control the incidence of them and prevent them from happening in younger people.

How can digital technology revolutionize rice production systems around the world?

Digital or precision agriculture is a way to integrate technology into production systems. How do we use things like mobile phones and smartphones to connect farmers to information, whether that be advisory information on how to produce your crop or whether it may be where you can buy certain inputs or access certain materials or actually have access to finance that enables you to be able to invest in your farming system? How do we also give information that tells you how to improve your nutritious intake through things like mobile telephones? Also, we can triangulate weather advisory using satellites.

We can enable farmers to access markets by having digital marketplaces. We can enable them to sell their products through digital commodity exchanges. We can enable purchases and processes to access farmers and produce through those mechanisms.

So, those are all being tested in various combinations globally now, and there are some very successful examples. What is a little more distant and is beginning now and moving at a rapid pace is the use of artificial intelligence and machine learning, and something called network science to revolutionize computational biosciences. How do we understand what traits we have in gene banks? How do we identify the efficacy of those traits when they're being tested? How do we ensure that we can use these new technologies to derive more precision quicker, faster and

more effectively? And then into the future we have the notion of digital twins.

So, we work very much at the International Rice Research Institute on rice. How do we create a rice digital twin where we can model how rice can perform in temperatures of 50 degrees centigrade, for example? What does it need? How can we address those things? How do we essentially understand using digital technologies how we may predict the reactions of rice plants to high temperatures and therefore prepare to deal with those? So, some of those are a little more proximal or a little more distant rather.

In view of climate change, what apparent changes need to be brought about in the current system of rice cultivation?

There are different ecologies of rice cultivation. Rice grown globally is short, medium and long duration. It's long grain, it's short grain, it's sticky, it's fluffy. It grows in puddled or paddy or rain-fed environments.

So, they're very, very diverse. When it relates to climate change, the impact on these different ecologies is different. But if I give you an example, IRRI is working in the Mekong Delta in Vietnam. We're working with what we call direct seeded varieties. These varieties are planted on over a million hectares and the seeding rate is reduced by 50%. The water conservation is 35%.

What is a little more distant and is beginning now and moving at a rapid pace is the use of artificial intelligence and machine learning, and something called network science to revolutionize computational biosciences.

The application of fertilizers is reduced by 20% because they're deep placed, while the seed is being seeded or drilled. And the methane emissions are reduced from about 40% to 60%. So, that just represents an example of how a range of technologies and agronomic practices contribute to a much more sustainable proposition in the face of climate change.

And those are possible in all of those agro-ecologies. We just need to work out how best to deploy those combinations of technologies and agronomic practices.

What is the future research mandate of IRRI?

IRRI is a member of the CGIAR. This is a network of 15 centres around the world. Each of them has a slightly different commodity focus. There are two really important priorities ahead for IRRI.

One is that IRRI needs to combine the sum of its parts. It needs to be able to combine, in the current world, climate resilience with farmer livelihoods, with social factors like nutrition. Those packages have to be able to create impact at a significant scale.

But increasingly, eating rice alone is not the answer. And so, we need to work with other research organizations and national systems and policy makers to ensure that what is on the plate is more nutritious for our populations, so that their health is improved and we can prevent some of these non-communicable diseases as we go forward. And we can work with government to ensure that people are fed, they are deriving the best nutrition, they are meeting their cognitive potential and they are contributing economically to the country's interests.

And that begins with eating the right food and being able to produce it in more sustainable ways.

DIRECT SEEDED RICE: A SUSTAINABLE SOLUTION FOR RICE CULTIVATION

Rice cultivation plays a crucial role in India's economy, providing livelihoods for millions of farmers. In the FY 2022, India produced over 129 million metric tons of rice, with an average yield of 2.8 metric tons per hectare (Source: Ministry of Agriculture & Farmers Welfare).

The shift towards more sustainable and resource-efficient agricultural practices is becoming increasingly important in the face of global challenges such as water scarcity, labour shortages, and climate change. In this context,one such solution is Direct Seeded Rice (DSR), a modern farming technique that offers an efficient and eco-friendly alternative to traditional transplanting. Traditional rice planting methods, such as transplanting, involve labour-intensive processes, including seedling preparation, uprooting, and transplanting, which require significant time and effort. These methods also lead to higher water usage due to practices like puddling, which increases the carbon footprint and contributes to soil degradation over time. In contrast, DSR reduces the need for such intensive labour, saves water, and helps improve soil health by minimizing soil disturbance. DSR not only enhances the sustainability of rice cultivation but also addresses the challenges faced by farmers while optimizing productivity.

Direct Seeded Rice

Direct Seeded Rice (DSR) is a rice farming method in which seeds are sown directly into the soil, eliminating the need for transplanting seedlings from a nursery. This can be achieved through wet direct seeding, where pre-germinated seeds are sown into flooded soil, or dry direct seeding, where seeds are placed in a well-prepared, non-flooded seedbed. One of the main challenges of DSR, especially with dry seeding, is weed control. However, seed priming with water and potassium chloride (KCl) has shown potential in improving crop establishment and enhancing overall performance.

State Bank of India (SBI) offers products like the Kisan Credit Card (KCC) and Kisan SamridhiRinn Scheme, which provides farmers with easy access to working capital for adopting modern farming methods like DSR.

About the **AUTHOR**

Shri Mahadev TrimbakKakade
Chief Manager (Research)
SBIRD, Hyerabad

Dry Direct Seeded Rice (Dry-DSR)

Dry-DSR is a method in which rice seeds are directly sown into a well-prepared, non-puddled seedbed without prior germination. The seeds can either be broadcasted or drilled in rows using a seed drill. This approach is particularly suited for zero-till or reduced-till systems, offering significant water savings and environmental benefits. It is commonly used in rainfed uplands, medium and lowlands, and deepwater areas during the wet season.

One of the key advantages of D-DSR is its high-water efficiency, saving up to 30% more water compared to traditional transplanted rice. Additionally, it reduces methane emissions by 18-20%. This method also reduces labour requirements, enhances seedling emergence, and reduces the risk of lodging. However, weed control remains a major challenge, particularly in D-DSR. Effective management of weeds can be achieved through post-emergent herbicides. Precise irrigation management is essential for ensuring even seedling emergence and optimal growth.

Wet Direct Seeded Rice (Wet-DSR)

Wet-DSR is a method where pre-germinated seeds are sown into a moist field, typically when delayed monsoon rains prevent timely sowing. By using irrigation water and sprouted seeds, farmers can ensure timely crop establishment with significantly lower water usage compared to traditional transplanting methods. Although Wet-DSR requires more water than dry direct seeding, it still consumes considerably less water than conventional puddled transplanted rice (PTR).

This method is particularly suitable for regions with reliable rainfall or access to supplemental irrigation. It can be carried out using traditional broadcasting techniques or modern methods such as drum seeding. When managed properly, Wet-DSR yields are comparable to those of transplanted rice, with the added benefit of improving water productivity by 0.3 to 0.4 kg of rice per cubic meter of water.

DSR not only enhances the sustainability of rice cultivation but also addresses the challenges faced by farmers while optimizing productivity.

Advantages of Direct Seeded Rice:

■ **No significant reduction in yield under optimal conditions:** When direct seeding is done correctly and under favourable conditions, it has been shown that crop yields remain comparable to those of traditional transplanting methods. This ensures that farmers can achieve similar outputs with improved efficiency.

■ **Savings on irrigation water (12-35%) with efficient water management practices:** Direct seeding reduces water requirements by minimizing the water-intensive processes involved in transplanting, such as puddling. With proper water management techniques, this can lead to significant water savings, ranging from 12% to 35%, making farming more sustainable.

■ **Reduction in labour and drudgery by eliminating transplanting:** Direct seeding eliminates the need for labour-intensive tasks like uprooting seedlings and transplanting them into fields. This not only saves time but also reduces the physical strain on farm workers, improving overall productivity and efficiency.

■ **Reduction in cultivation time, energy, and cost:** Direct seeding requires less time and effort in comparison to traditional planting methods. The process of preparing seedlings and transplanting can be time-consuming and costly, while direct seeding speeds up the planting phase, resulting in lower energy use and reduced costs for farmers.

■ **No plant stress from transplanting:** Transplanting can sometimes cause stress to plants as they are moved from one location to another, leading to slower growth or reduced yields. Direct seeding ensures that the plant remains in its initial growing location, reducing the risk of transplant shock and supporting healthier, more resilient crops.

■ **Faster maturation of crops:** Direct seeding encourages quicker crop establishment and growth, resulting in faster maturation times compared to traditional transplanting. This means crops can be harvested earlier, increasing the efficiency of the farming cycle and providing quicker returns on investment.

■ **Lower greenhouse gas (GHG) emissions:** Since direct seeding reduces the need for practices like land

preparation and puddling, it results in lower emissions of greenhouse gases. This contributes to a reduction in the carbon footprint of agricultural operations, promoting environmentally friendly farming practices.

- **Mechanized Direct Seeding Rice (DSR) creates employment opportunities:** Mechanized DSR systems allow for the mechanization of the seeding process, creating new employment opportunities, especially for young people. These jobs are related to service provision models where machinery is used for seeding, providing a sustainable income source in rural areas.
- **Increase in total income by reducing cultivation costs:** By cutting down on labour, water, energy, and time requirements, direct seeding can lower overall cultivation costs. These savings can help increase the total income of farmers, as the reduction in costs improves their profitability without sacrificing crop yields.
- **Compatibility with Crop Rotation:** Direct Seeded Rice matures earlier than transplanted rice, allowing farmers to plant subsequent crops sooner. This flexibility encourages crop rotation and crop intensification, which can enhance land productivity and soil fertility over time.

The Role of Banks and FIs in Supporting DSR:

Banks and financial institutions can play a crucial role in promoting the adoption of Direct Seeded Rice (DSR) by offering customized financial products and services. This could include providing concessional interest rates /processing charges for DSR-specific machinery, such as seed drills, seeders, and advanced irrigation systems, to farmers who adopt DSR practices. Additionally, Banks/ Financial Institutions can offer advisory services to help farmers implement DSR techniques, ensuring higher yields with lower resource consumption.

Collaboration between agricultural institutions, banks, and government agencies is crucial to mainstream DSR as a viable alternative to Puddled Trans- planted Rice.

State Bank of India (SBI) offers products like the Kisan Credit Card (KCC) and Kisan SamridhiRinn Scheme, which provides farmers with easy access to working capital for adopting modern farming methods like DSR. The KSR product has been designed for corporate farmers, large farmers, and agri-companies using scientific farming methods, offers timely cash credit at competitive prices, supporting the purchase of inputs needed for DSR also. These products enable farmers to transition to more sustainable and efficient farming practices while boosting productivity.

The Future of DSR in Indian Agriculture:

Direct Seeded Rice represents a significant opportunity to transform rice farming in India by making it more sustainable, economical, and climate-friendly. However, realizing DSR's full potential will require continued research and development, especially in creating high-yielding, DSR-compatible rice varieties. Additionally, as technology improves, more advanced seeding and irrigation machinery will enhance the efficiency and ease of DSR adoption.

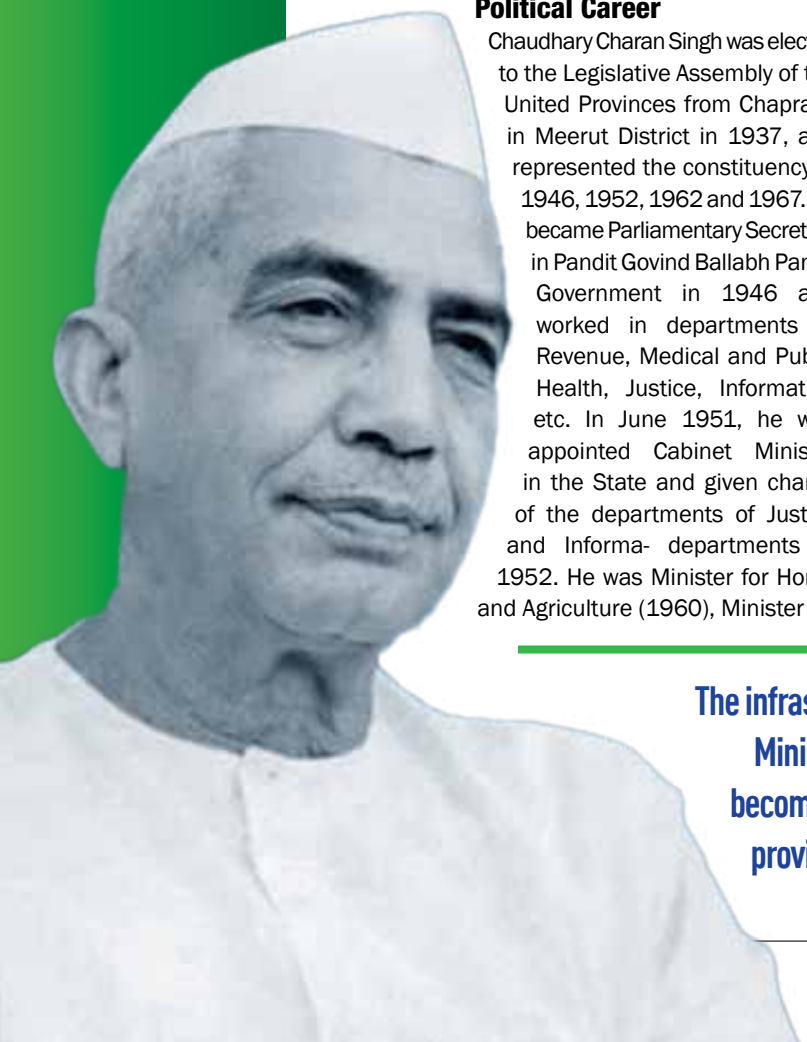
Collaboration between agricultural institutions, banks, and government agencies is crucial to mainstream DSR as a viable alternative to Puddled Transplanted Rice. By building awareness and providing the necessary resources, India can make substantial progress in achieving food security while conserving resources and minimizing environmental impact.

Direct Seeded Rice (DSR) represents a transformative approach to sustainable rice cultivation, offering a range of benefits that address the critical challenges faced by farmers today. With continued research, technological advancements in seeding and irrigation machinery, and collaborative efforts between agricultural institutions, financial Institutions, and government agencies, DSR can play a pivotal role in reshaping Indian agriculture. As India moves toward ensuring food security while conserving vital resources, DSR is poised to become a cornerstone of the nation's agricultural future.

CHOUDHARY CHARAN SINGH
INDIAN FARMER'S MESSIAH

As the nation gears up for the joyous occasion of Farmers Day on December 23rd, it's time to shine a spotlight on the unsung heroes of our land—Indian farmers. Beyond the festivities and merriment, this day offers a moment to reflect on the invaluable contributions, challenges faced, and the indomitable spirit that defines these guardians of our fields. Farmers are the backbone of India's economy and a vital contributor to rural prosperity. Every year on December 23rd, National Farmers' Day is observed to commemorate and appreciate all responsible farmers for their contributions to society. A day woven into the fabric of our nation's agrarian identity. This auspicious occasion is more than a mere date on the calendar; it is a heartfelt homage on the birth anniversary of Choudhary Charan Singh

Born to Smt. Netra Kaur and Chaudhary Meer Singh on 23 December 1902 in Nurpur village in United Provinces of Agra and Oudh, Choudhary Charan Singh had his primary education in his native village school at Jani Khurd, and passed his matriculation from the Government High School, Meerut. He graduated in Science from Agra College in 1923, did his M.A. in History from Agra University, passed the L.L.B. examination in 1927, and got himself enrolled as an advocate. Chaudhary Charan Singh's strong social conscience was quite evident in his youth itself. The ideas and teachings of Swami Dayanand Saraswati, the founder of Arya Samaj had a deep influence on him. Inspired by Mahatma Gandhi and Sardar Patel, Chaudhary Charan Singh joined the freedom movement.



Political Career

Chaudhary Charan Singh was elected to the Legislative Assembly of the United Provinces from Chaprauli in Meerut District in 1937, and represented the constituency in 1946, 1952, 1962 and 1967. He became Parliamentary Secretary in Pandit Govind Ballabh Pant's Government in 1946 and worked in departments of Revenue, Medical and Public Health, Justice, Information etc. In June 1951, he was appointed Cabinet Minister in the State and given charge of the departments of Justice and Informa- departments in 1952. He was Minister for Home and Agriculture (1960), Minister for Agriculture and Forests (1962-63). He gave up the Department of Agriculture in 1965, and took charge of the Local Self-government department in 1966.

The Agricultural Produce Marketing Bill

The bill, which he introduced in the assembly in 1938, was passed in 1964, and helped improve the market linkages for the farmers. The consecutive years of drought in 1966-1967 led the Central government to consider procuring food grains directly from farmers at prices, which would have been highly unfavorable to them. Chaudhary Charan Singh modified the central government's plan to the advantage of agriculturalists by offering them a much higher procurement price than the prevailing market rates. The infrastructure he put in place for this led in time to the Minimum Support Price mechanism, which has today become an integral part of government interventions to provide pricing stability to the agricultural producers.

The infrastructure he put in place for this led in time to the Minimum Support Price mechanism, which has today become an integral part of government interventions to provide pricing stability to the agricultural producers.

Chaudhary Charan Singh was elected to the Lok Sabha for the first time in 1977, and was Home Minister in the Janata party Government. In January 1979, he was appointed Finance Minister, and subsequently elevated to the post of Deputy Prime Minister.

He was sworn in as the Prime Minister on 28 July 1979. Chaudhary Charan Singh's interventions to reduce input costs for the farmers, rural electrification, his role in the creation of institutions like the NABARD, the Rural Development Ministry highlights his deep commitment to Indian farming community.

Publications

Chaudhary Charan Singh was a scholar of Indian economics. His books "India's Economic Policy - The Gandhian Blue-print" and "Economic Nightmare of India – Its Cause and Cure" are masterpieces on the subject. Some of his important publications include: Abolition of Zamindari, Co-operative Farming X-rayed, India's Poverty and its Solutions, Agrarian Revolution in Uttar Pradesh, and Land reforms in UP and the Kulaks. He wrote a unique book on Indian etiquette which was published with the title "Shishtachar".

Bhart Ratna:

In February 1970, Chaudhary Charan Singh became the Chief Minister of the State for a second time. His tenures as Chief Minister have been described by many as golden chapters in the history of the state of U.P.

National Farmers' Day, also known as 'Kisan Diwas', is observed every year on December 23 to celebrate the hard work and determination of the farmers. This particular day was chosen to commemorate the occasion as it marks the birth anniversary of former prime minister Chaudhary Charan Singh.

Significance of Farmers' Day

This day holds significance as it coincides with the birth anniversary of Choudhary Charan Singh, the country's fifth Prime Minister and a staunch advocate for farmers' rights. Farmers Day serves as a platform to recognize the hardships faced by farmers and their pivotal role in ensuring food security. It is a time to appreciate their resilience, dedication, and tireless efforts in cultivating the land. Beyond recognition, the day also fosters awareness about the challenges faced by farmers, promotes agricultural innovations, and emphasizes the need for sustainable practices. Farmers Day acts as a collective tribute to the backbone of the nation, underscoring the importance of agriculture in shaping the socioeconomic fabric of India. The day is dedicated to educating farmers with the most recent agricultural knowledge in order to boost their produce.

Choudhary Charan Singh Contribution in Agriculture

Sectors	Contributions
Land Reforms	He was given the nickname 'Champion of India's Peasants'. Debt Redemption Bill of 1939: This provided debt relief to rural borrowers and Holding Act of 1960: Aimed at cutting the ceiling on land ownership to make nit uniform across the state.
Advocacy for Peasants	Chaudhary Charan Singh was a passionate supporter of peasant rights and welfare. His agriculture policy aimed to empower farmers while also ensuring social fairness. He worked to create a fair and equitable structure that addressed the farming community's concerns.
Economic Policies	Chaudhary Charan Singh, as Minister of Agriculture and Forests, introduced programmes to increase agricultural productivity and encourage rural development. His emphasis on economic measures that aid farmers includes endeavours to expand irrigation facilities, improve agricultural methods, and provide financial assistance to farmers.
Initiatives for Rural Development	Chaudhary Charan Singh was an advocate for holistic rural development. He initiated initiatives to improve rural infrastructure, such as better roads and market access. These initiatives were designed to foster agricultural growth and overall prosperity in rural communities.
Reduction of Ministerial Advocacy	In an effort to promote austerity and social fairness, Chaudhary Charan Singh took the initiative to lower ministers' wages and benefits in Uttar Pradesh. This Privileges highlighted his dedication to responsible governance and fiscal prudence.

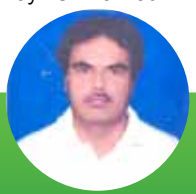
Celebrations across the nation

Across the length and breadth of India, Farmers Day is marked with a range of celebrations. From agricultural fairs showcasing the latest farming technologies to cultural events that honour the agrarian way of life, the day is a testament to the unity that binds the farming community. The occasion symbolises the display of a diverse range of programmes, debates, seminars, competitions, talks, workshops, exhibitions, and so on the farmers exceptional contributions to the country's economic growth and advancement in various ICAR institutes.

Challenges faced by Indian farmers

Indian farmers face many problems. Changes in weather, like dry spells and floods, can destroy crops. Using advanced farming tools and good irrigation is hard for many farmers, hurting their output. Market prices go up and down, and getting loans is difficult. These things can make farmers lose money. Some other problems include smaller areas of farmable land, poor soil quality, and divided lands.

This makes farming sustainably harder. Farmers also struggle with other things like not having enough schools or hospitals. To help farmers and improve their lives, we need a range of policies and fresh ideas.



About the **AUTHOR**

Dr. Rishi Pal,
Associate Professor,
(Agriculture), Meerut of Institute Technology-Meerut (MIT)

SIGNIFICANCE OF CORPORATE SOCIAL RESPONSIBILITY (CSR) FOR STARTUPS IN INDIA

Corporate Social Responsibility (CSR) has become a pivotal concept in the business world, embodying a company's commitment to contribute positively to society beyond mere profit generation. It encompasses ethical practices that benefit employees, the environment, and the community while ensuring business sustainability. For startups, CSR can be particularly significant as it helps build trust, enhances brand reputation, and lays the foundation for long-term growth.

CSR and Its Importance for Startups

For startups, which are often characterized by limited resources and a strong focus on growth, the integration of CSR can offer a range of benefits. While established corporations have long embraced CSR as a core part of their operations, startups can also leverage CSR to enhance their brand, attract investment, and build a sustainable business model. Several key reasons underscore the significance of CSR for startups:

Building Trust and Reputation*:* Trust is a valuable currency for startups, which are often new to the market and lack a long track record. CSR can help startups build trust among consumers, investors, and other stakeholders. According to a 2020 survey by Edelman, 64% of consumers worldwide said they would buy or boycott a brand solely based on its position on social issues. By adopting responsible business practices, startups can differentiate themselves and foster loyalty among stakeholders.

Attracting and Retaining Talent: Today's workforce increasingly values purpose-driven organizations. Studies have shown that millennials and Gen Z workers, who are poised to make up the majority of the workforce in the coming decades, prefer to work for companies that align with their social and environmental values. A Cone Communications study found that

India is one of the few countries in the world where CSR is legally mandated.

64% of millennials consider a company's social and environmental commitments when deciding where to work, and 88% say they will remain loyal to a company that supports social issues they care about. Startups with a strong CSR focus can, therefore, attract and retain top talent.

Access to Investment*:* In recent years, there has been a rise in impact investing, where investors seek financial returns alongside social or environmental impact. According to the Global Impact Investing Network (GIIN), the impact investment market reached $715 billion in 2020, reflecting growing investor interest in businesses that address social and environmental challenges. Startups that incorporate CSR into their business models may be more likely to attract investment from impact investors who are looking for a dual return on investment—both financial and societal.

Mitigating Risks and Ensuring Long-term Sustainability*:* CSR can help startups mitigate risks associated with environmental regulations, social activism, and reputational damage. For instance, startups that adopt sustainable practices early on can avoid future regulatory fines and adapt to increasingly stringent environmental laws. Moreover, by aligning their operations with societal values, startups are better positioned to build lasting relationships with customers and communities, thereby ensuring long-term business sustainability.

Community Engagement and Support: Startups often rely on local communities for their growth, and CSR can be an effective tool for building positive relationships with these communities. By contributing to local development initiatives—such as education, healthcare, or environmental conservation—startups can foster goodwill and support from the communities they serve. This local engagement not only enhances the startup's reputation but also creates a sense of shared value, where both the business and the community benefit.

CSR Laws in India

India is one of the few countries in the world where CSR is legally mandated. The introduction of CSR into Indian law came with the enactment of the Companies Act of 2013, specifically under Section 135. This landmark legislation made it compulsory for companies with a net worth of Rs.500 crore or more, a turnover of Rs.1,000 crore or more, or a net profit of Rs.5 crore or more to spend at least 2% of their average net profits from the previous three years on CSR activities.

The law was introduced to channel corporate resources towards national development goals. Under this regulation, companies are required to form a CSR committee, develop a CSR policy, and ensure that their CSR activities focus on areas such as education, healthcare, poverty alleviation, environmental sustainability, and rural development. The law has been instrumental in institutionalizing CSR in India, ensuring that companies contribute to

About the **AUTHORS**

Jaiprakash Bisen, ICAR-Indian Agricultural Statistics Research Institute, New Delhi
and
Sunil Kumar Das, ICAR-National Institute of Abiotic Stress Management, Maharashtra

societal development in a transparent and accountable manner.

Since the implementation of CSR in India, corporate spending on social initiatives has increased significantly. According to data from KPMG India, Indian companies spent Rs.24,865 crore on CSR activities in FY 2021-22, reflecting a steady rise in corporate contributions to social causes since the law's introduction. Furthermore, a growing number of Indian companies are using their CSR budgets to fund projects that align with the Sustainable Development Goals (SDGs), thereby contributing to global development efforts.

Status of CSR Activities in India and Flow of CSR Funds

India's CSR landscape has evolved significantly since the introduction of mandatory CSR laws. Corporations across sectors are investing in various social initiatives, contributing to the country's development. Education, healthcare, rural development, and environmental sustainability have emerged as key areas of focus for CSR activities.

According to a report by *NGOBOX*, education has consistently been the largest recipient of CSR funds in India, accounting for nearly 40% of total CSR spending. Many companies are involved in initiatives aimed at improving access to quality education, providing scholarships, building infrastructure, and promoting digital literacy. The COVID-19 pandemic further highlighted the importance of digital education, with several corporations investing in e-learning platforms and technology for students in rural areas.

Healthcare is another significant focus area, receiving around 20% of CSR funding. Companies have been involved in building healthcare infrastructure, funding mobile health clinics, promoting sanitation, and providing access to clean drinking water. The pandemic also spurred a surge in CSR spending on healthcare, with companies donating to COVID-19 relief efforts, supplying medical equipment, and supporting vaccination drives.

Rural development, including projects related to agriculture, water conservation, and infrastructure development, accounts for around 15-18% of CSR spending. Environmental sustainability initiatives—such as reforestation, renewable energy, and waste management—receive approximately 10-12% of CSR funds.

The flow of CSR funds has also been directed toward empowering marginalized communities and promoting gender equality. Companies are supporting skill development programs for women, enhancing livelihoods for rural populations, and fostering entrepreneurship among disadvantaged groups. Moreover, CSR funds have been allocated to promote gender diversity in the workforce, with many companies providing leadership training and opportunities for women.

Global Success of CSR

Globally, CSR has become an essential component of corporate strategy. Companies worldwide are increasingly recognizing that being socially responsible is not only good for society but also for business. Many of the world's largest companies have adopted robust CSR programs that address a wide range of social, environmental, and economic challenges.

One of the most successful examples of CSR in action is Unilever's Sustainable Living Plan, which aims to decouple business growth from environmental impact while improving the well-being of millions of people. Launched in 2010, the plan has delivered significant results: by 2020, Unilever had helped 1.3 billion people improve their health and hygiene, achieved zero waste to landfill in its global factories, and reduced the environmental footprint of its products by 29%.

Another notable example is Patagonia, an outdoor apparel company renowned for its environmental activism. Patagonia has built its brand around sustainability, advocating for responsible consumption and encouraging customers to repair and reuse their products rather than buy new ones. In 2016, Patagonia donated 100% of its Black Friday sales—amounting to $10 million—to grassroots environmental organizations, further cementing its reputation as a socially responsible company.

CSR's global growth is also reflected in the rise of sustainability reporting. According to the Global Reporting Initiative (GRI), more than 90% of the world's largest companies now issue sustainability reports, up from just 20% in the early 2000s. This surge in reporting reflects the growing demand from consumers, investors, and governments for transparency and accountability in corporate practices.

CSR in India: Success and Challenges

India's CSR framework has been widely regarded as a success, but it has not been without its challenges. The mandatory CSR requirement has led to increased corporate contributions to social causes, with many companies going beyond the minimum 2% spending requirement. Companies like Tata Group, Infosys, and Mahindra & Mahindra have been leaders in this space, focusing on initiatives such as education, clean energy, healthcare, and rural development. The Tata Group, for instance, has long been associated with its philanthropic endeavors through the Tata Trusts, which fund initiatives in areas such as health, education, and rural livelihoods.

However, there are concerns that some companies view CSR as a box-ticking exercise, with little strategic alignment between their CSR initiatives and business objectives. There is also a growing need for more effective monitoring and evaluation of CSR projects to ensure that corporate spending leads to meaningful social impact. Additionally, smaller companies often struggle to meet their CSR obligations due to limited resources and a lack of understanding of CSR's strategic value.

Despite these challenges, India's CSR law has had a transformative effect on the corporate sector, encouraging companies to engage more meaningfully with social and environmental issues. As the CSR landscape in India continues to evolve, there is a growing emphasis on aligning CSR efforts with national priorities such as poverty eradication, gender equality, and sustainable development.

Corporate Social Responsibility has evolved into a critical aspect of modern business, with significant implications for startups, established corporations, and society at large. For startups, CSR offers an opportunity to build trust, enhance brand reputation, attract talent and investment, and ensure long-term sustainability.

BIOLOGICAL CONTROL OF TICKS IN RUMINANTS

"Control of an organism by using another living organism" is the definition of biological control. The preservation of native typical adversaries, the identification, evaluation, and introduction of a natural enemy from outside, and the growth of biocontrol agents are all included in classical biological control. A particular pest population is biotically suppressed for a longer period of time by biocontrol agents, which often have slower rates of action. Ticks have a significant role in spreading diseases that affect people, animals, and cattle. Tick abundance reduction is a crucial yet challenging objective.

Although chemical pesticides can be successful when used on tick habitats, they seem to have serious adverse effects on creatures that are not the intended target. The best way to stop tick-borne illnesses is probably going to continue to be reducing tick abundance. It has been demonstrated that a range of tick biocontrol strategies, such as parasitoids and some avian predators, can occasionally lower tick populations. The targeted use of fungal diseases is perhaps the most promising bio-control strategy. It has been demonstrated to decrease tick populations both directly (via death) and indirectly (through fitness declines).

These preliminary successes demonstrate the importance and potential of rigorous research into novel and existing methods of biological control of ticks. The most promising alternatives to chemical pesticides are biological control (bio-control) agents, which are species that consume target pest organisms via predation, herbivores, or parasitism. Bio-

Although chemical pesticides can be successful when used on tick habitats, they seem to have serious adverse effects on creatures that are not the intended target.

control agents typically are nontoxic to humans and to non target wildlife (for a few exceptions, see below). Moreover, bio-control agents are expected to coevolve with their target organisms, reducing the likelihood that resistance will evolve. Biological control of ticks or mites means controlling them with natural organisms that are their natural enemies.

There are three major types or organisms that are natural enemies of those ticks and mites that affect livestock:

- Predators: They just eat the ticks; either those still attached to the host, or engorged females that have dropped to the ground: mainly birds, ants and a few mite species.
- Parasitoids: These are wasps that deposit their eggs on ticks. The larvae of the wasps feed on the tissues of the ticks that are ultimately killed. They can be considered as parasites" of the ticks.
- Pathogens: Mainly bacteria, fungi and nematodes (roundworms) that infect and kill the ticks or mites or their larvae. They can be considered as "diseases" of the parasites.

Why biological control is preferred?

Pest biocontrol is becoming one of the most hopeful replacements to chemical pesticides. This technique is used:

- To minimize the chemical residues on our planet
- To minimize the growing problem of arthropod resistance to pesticides
- To balance rising prices of new chemical pesticides\
- To create friendly environment (chemical free)
- Due to longer effect of this techniques compared to other methods
- To overcome the drawback of broad spectrum insecticide

About the **AUTHORS**

Pramod Prabhakar, and Rajesh Kumar, Assistant Professor-cum-Jr. Scientist, Animal Husbandry, MBAC, Agwanpur, Saharsa and BAC, Sabour Bhagalpur

Significance of ticks

Ticks are economically the most important pests of cattle and other domestic species in tropical and subtropical countries. Fungi are the most reliable source of tick control due to the following reasons.

1. The ability of entomic-pathogenic fungi to penetrate the cuticle of arthropods
2. The ability of a strain to kill several stages of ticks.
3. The relatively specific virulence of a single strain to one or agents.

Mechanism of Action:

EPNs penetrate engorged female B. annulatus ticks almost solely via the anus or genital pore. Heterorhabditid nematodes killed engorged B. annulatus females in Petri dishes after less than 2.5 h of exposure, whereas steinernematid nematodes needed more than 4 h to penetrate into ticks. The injection of a single heterorhabditid nematode into a tick can cause mortality.

Parasitoids

The majority of parasitoids employed to biologically manage plant pest insects are members of the Hymenoptera order. Ticks are known to be impacted by a small number of hymenopteran parasite species. Two species of chalcidoid wasps that were collected from ticks in Texas have been described. Both of these are now members of the family Encyrtidae, which has seven species of tick parasites, including the genus Ixodiphagus. I. hookeri is the most common species, with records from North America, Europe, Asia, and Africa. Although each strain of the EPNs may be highly specific to a limited group of hosts, their impact on the majority of beneficial insects have been shown to be minimal. The EPNs are known to be pathogenic to over 3000 insect species.

What the end result is?

The development of anti-tick biological control agents (BCAs) is still in its infancy. Furthermore, the various steps required for commercialization of these products, including adaptation by companies (production, storage and delivery) and education of consumers (storage, application and evaluation of results), are still in the future. Nevertheless, we believe that the need to develop alternative control methods will yield useful results.

Pest biocontrol is becoming one of the most hopeful replacements to chemical pesticides.

The fact that some BCAs and particular strains are far more specific in their selection of target pests than are acaricides and that many strains are effective only under specific ecological conditions, provide considerable advantages over pesticides, because harmful ecological effects are minimized. Partial or total replacement of chemical acaricides with extra use of tick pathogens and/or parasitoids would require considerable changes in the techniques of producers and suppliers. Biological control of plant pests, by means of parasitoids, predatory mites, viruses, B. thuringiensis, bugs, beetles, and others, has had several striking successes.

These include using many foes or infections at the same time or in a certain order. Nevertheless, only around 5% of all pest issues are resolved by biological management techniques, and numerous issues must be resolved before their application may be expanded. The existence of prospective tick natural enemies and their application against ticks in the majority of the world's regions have been the subject of very few research. Important advancements in tick biocontrol may result from cooperation between biocontrol specialists with expertise in controlling plant pests and tick specialists. Ticks may be managed in India using biological substances that are naturally occurring. These consist of parrots, crows, sparrows, and chickens.

To do this, however, we must approach nature in order to maintain its equilibrium. In a similar vein, we may buy birds like oxpeckers and create bacterial and fungal sources that prevent ticks. Until trustworthy solutions based on these nematodes are commercially accessible for the management of ticks or mites of veterinary concern, more research is still required.

Only a small number of tick species have been tested as tick biocontrol agents (BCAs), despite the fact that ticks have many natural enemies. The majority of tick predators are generalists with little capacity to control ticks. Given the variety of species that have great potential as tick BCAs, biological control is probably going to play a significant part in future IPM programs for ticks.

THE FUTURE OF FARMING IS AT STAKE: HERE'S WHY WE NEED INNOVATION NOW

Agriculture has always been the backbone of human civilisation, feeding billions and sustaining livelihoods across the globe. However, it's no longer just about growing crops but addressing a global food crisis that threatens our future. The challenges facing modern agriculture are daunting, and the statistics paint a sobering picture:

- 40% of pollinators are disappearing, jeopardising crop productivity and threatening food security.
- 35% of the world's soil is degraded, raising alarm over the sustainability of long-term agricultural output.
- 70% of global freshwater is consumed by agriculture, highlighting critical resource limitations.
- 30% of farmers report reduced yields, struggling to adapt to climate change and unpredictable weather patterns.
- 45% of small farmers lack access to modern technologies, preventing them from reaching their full potential and exacerbating inequality in global food systems.

These challenges affect farmers, growers, greenkeepers, foresters, and humanity. At Bionema Group Limited, we recognise the urgency of these issues and the role innovation must play in addressing them. The time to act is now, and the solutions must be bold, transformative, and inclusive.

The Agricultural Crisis: A Call for Action

The agricultural sector is at a pivotal moment. Decades of reliance on synthetic agrochemicals have delivered short-term gains at the expense of long-term sustainability. Soil degradation, water scarcity, and biodiversity loss have become systemic problems that climate change and population growth have exacerbated.

Decades of reliance on synthetic agrochemicals have delivered short-term gains at the expense of long-term sustainability.

The stakes are higher than ever:

1. Pollinator Decline: Pollinators, including bees, butterflies, and birds, are responsible for 75% of the crops we eat. Their disappearance would have catastrophic consequences for food production, yet pesticide overuse and habitat destruction drive them toward extinction.
2. Soil Degradation: Healthy soil is the foundation of agriculture, but poor management practices have left 35% of it degraded. Without intervention, farmers will struggle to grow enough food to meet demand.
3. Water Scarcity: Agriculture's heavy reliance on freshwater resources—70% of global usage—is unsustainable. With climate change intensifying droughts and water shortages, efficient water management has never been more critical.
4. Climate Change and Reduced Yields: Unpredictable weather, extreme temperatures, and increased pest pressures drive down yields for 30% of farmers globally, making it harder to feed a growing population.
5. Lack of Access to Technology: Smallholder farmers produce up to 80% of the food in Asia and sub-Saharan Africa but often lack the tools and technologies to improve productivity and resilience. This digital and technological divide perpetuates inequality and hinders progress.

About the **AUTHORS**

Dr Minshad Ansari, Founder and CEO, Bionema Group

Innovation: The Seed of Transformation

At Bionema, innovation is the key to transforming agriculture into a sustainable and resilient sector that feeds the world. Biological solutions and sustainable technologies are at the heart of this transformation. Here's how:

Reducing Dependency on Synthetic Agrochemicals

Synthetic pesticides and fertilisers have long been the default tools for boosting agricultural output. However, their overuse has harmed ecosystems, polluted waterways, and endangered human health.

1. Biopesticides: Our solutions precisely target pests and diseases,minimising environmental impact.
2. Biostimulants: These products enhance plant resilience and promote growth, reducing the need for fertiliser inputs.
3. Biofertilisers: These products fix nutrients from the atmosphere or form soil, reducing the use of synthetic fertilisers.

By shifting away from synthetic

agrochemicals, farmers can cultivate healthier crops while restoring balance to their ecosystems.

Restoring Ecosystems for a Sustainable Planet

Biodiversity and healthy ecosystems are critical for agriculture. Our approach focuses on:

1. Promoting Pollinator Health: By reducing harmful pesticides and providing habitats, we help protect the pollinators that agriculture depends on.
2. Improving Soil Health: Biological amendments improve soil structure and fertility, enabling long-term productivity and carbon sequestration.
3. Reducing Water Waste: Innovative irrigation techniques and water-efficient crop solutions ensure sustainable use of this precious resource.

Boosting Yields for Future Generations

Increasing agricultural productivity is non-negotiable, with the global population expected to reach 10 billion by 2050.

Increasing agricultural productivity is non-negotiable, with the global population expected to reach 10 billion by 2050. Technologies help farmers achieve higher yields sustainably:

1. Integrated Pest Management (IPM): Combining biocontrol agents with advanced monitoring systems to manage pests without excessive chemical use.
2. Resilient Crop Varieties: Partnering with seed developers to integrate biological solutions that enhance stress tolerance.
3. Technology Access: Expanding access to affordable, scalable innovations for smallholder farmers.

Partnerships: The Key to Progress

No single entity can solve these challenges alone. Collaboration is essential. Farmers, innovators, policymakers, and consumers must work together to reimagine agriculture to:

- Empower farmers with knowledge and tools
- Foster collaboration between public and private sectors to scale solutions.
- Raise awareness among consumers about the importance of sustainable food systems.

The Time to Act is Now

Agriculture is facing a pivotal moment. Our choices today will determine the future of food security, environmental health, and economic resilience. By embracing innovation and fostering collaboration, we can overcome the challenges that threaten the future of farming.

We need to aim to provide farmers and growers with the sustainable tools to reduce dependency on harmful chemicals, restore ecosystems, and secure food supplies for generations to come. But we can't do it alone. We need innovators, changemakers, and forward-thinking farmers to join us in building a resilient and prosperous agricultural future.

A Shared Vision for a Sustainable Future

The challenges may be immense, but so is the potential for change. Every seed planted today represents a step toward a world where agriculture and the environment coexist harmoniously. Together, we can:

1. Reverse pollinator decline and restore biodiversity.
2. Heal degraded soils and build resilience to climate change.
3. Reduce water consumption and preserve vital resources for future generations.
4. Ensure farmers worldwide can access the tools they need to thrive.

The future of farming is at stake. Let's act boldly, innovate relentlessly, and collaborate selflessly to secure it.

KARNATAKA STATE AGRICULTURE COUNCIL: TRANSFORMING AGRI-ECONOMY FOR 2032 - A ROADMAP TO $1 TRILLION ECONOMY

The Karnataka State Agriculture Council (KSAC), a pioneering initiative by the Indian Chamber of Food and Agriculture (ICFA), is redefining the agricultural landscape of Karnataka. The council aims to propel the state's agri-economy towards an ambitious target of contributing to a $1 trillion economy by 2032. By focusing on innovation, inclusivity, equity, and green growth, KSAC is setting a transformative agenda for Karnataka's agricultural sector.

The KSAC journey began with its launch on September 25, 2024, at the Taj West End in Bangalore. The event was inaugurated by Shri N. Cheluvarayaswamy, Karnataka's Agriculture Minister, who underscored the importance of millets, pulses, coffee, and spices in boosting processing and exports. The council also emphasized promoting agricultural startups and advanced digital technologies to establish Bangalore as a global hub for agri-tech innovations. The launch marked the appointment of visionary leaders such as Mr. K.S. Narayanasamy, Chairman of Geo Biotechnologies India, as KSAC's Chairperson, and Dr. Ashok Dalwai, Co-Chairman, ICFA, and the Council's Chief Patron and Mentor, driven by Shreyasi Agarwal, Director, Strategy & Organisation, ICFA.

KSAC's vision focuses on transforming Karnataka's agricultural ecosystem to ensure sustainable income growth for farmers.

Prominent members include Dr. V. Suresha, Professor Gopal Naik, Dr. Jitendra Kumar, and Dr. Khadarvalli, with Dr. Hena Hayat as its Convenor.

Ensuring Sustainable Income

KSAC's vision focuses on transforming Karnataka's agricultural ecosystem to ensure sustainable income growth for farmers. It aims to build robust market linkages, foster government-industry partnerships, and explore agri-business opportunities. The council also prioritizes state government policy initiatives for agri-food processing and strengthening supply chain infrastructure. These focus areas took center stage during its inaugural event, setting the foundation for subsequent meetings.

The first working council meeting, held at the UAS GKVK Convention Centre in Bangalore on October 21, 2024, presided over by Mr. K.S. Narayanasamy and attended by Dr. Ashok Dalwai as the Chief Guest, focused on drafting a vision document for Karnataka's agricultural transformation. Key decisions included initiating collaborations with government agencies, startups, FPOs, NGOs, and agribusinesses. Seven subgroups were formed to address specific domains, namely policy, technology, projects, partnerships, events, investments, and agribusiness.

Building on the momentum, the second working council meeting was convened on November 30, 2024, at the Indian Institute of Management (IIM) Bangalore. This pivotal gathering was chaired by Dr. Ashok Dalwai, Co-Chair, ICFA; Dr. Tarun Shridhar, Director General, ICFA; and Mr. K.S. Narayanasamy, Chair, KSAC, with Prof. Gopal Naik and other eminent members. The deliberations centered on structural reforms, emerging technologies, collaborative partnerships, infrastructure development, and sustainability. Key focus areas included addressing demand-supply gaps, promoting climate-resilient crops, and enhancing the state's agri-financing mechanisms. Innovations in horticulture, livestock, fisheries, and allied sectors such as apiculture and sericulture

were also explored.

The Roadmap

KSAC's ambitious roadmap aligns with its mission to create a collaborative platform uniting government entities, private sectors, agribusinesses, cooperatives, and NGOs. The council's objectives include developing actionable policy frameworks, advancing biofortified crops, advocating climate resilience, and encouraging cooperative farming for rural inclusivity. It also seeks to diversify rural incomes through ventures like aquaculture and apiculture while ensuring food and nutrition security.

As Karnataka strives to become a $1 trillion economy, KSAC is committed to leveraging innovation, technology, and sustainable practices to address critical challenges. These include food and nutrition security, climate change, employment generation, and sustainable livelihoods. Through collaboration, entrepreneurship, and knowledge-sharing, KSAC is poised to lead Karnataka's agricultural sector into a prosperous future, with farmers as the central stakeholders and beneficiaries.

Developing Actionable Solutions

The second working council meeting at IIM Bangalore exemplified KSAC's dedication to actionable solutions. Discussions highlighted structural reforms like lease aggregation and value chain enhancement. Emerging technologies such as hydroponics and post-harvest innovations were identified as pivotal to modernizing agriculture. The council emphasized strengthening public-private partnerships (PPPs) to build capacity and enhance rural economies. Efforts to develop robust market linkages aim to empower rural communities and boost global competitiveness.

By addressing demand-supply gaps and leveraging technology, KSAC envisions a prosperous agricultural ecosystem that supports Karnataka's growth aspirations.

The council's holistic approach integrates sustainability and biotechnology, promoting climate-resilient farming practices and soil health preservation. By addressing demand-supply gaps and leveraging technology, KSAC envisions a prosperous agricultural ecosystem that supports Karnataka's growth aspirations. Farmers remain at the heart of this transformation, with KSAC working tirelessly to ensure their economic empowerment and social upliftment.

As the council moves forward, its unwavering commitment to sustainable practices, innovation, and inclusive growth will continue to shape Karnataka's agricultural future. Collaboration with stakeholders across sectors will be the cornerstone of its success, paving the way for a resilient and thriving agri-economy.

With Karnataka as the first initiative and rollout, ICFA aims to take the initiative to all the states, starting with Karnataka in the South and Uttar Pradesh in the North, to Tamil Nadu, Telangana, Andhra Pradesh, Maharashtra, Gujarat, Rajasthan, Bihar, Odisha, Himachal Pradesh, Jammu and Kashmir, and beyond. The next year will be critical for all the state rollouts, and we look forward to establishing a good partnership between the entire ecosystem, truly signifying and representing what ICFA stands for: the development, enhancement, and prosperity of agriculture and its stakeholders.

CULTIVATING PRIDE IN FARMING

3RD ALL INDIA PROGRESSIVE FARMERS CONVENTION 2024

Agriculture is the largest employer in India with more than half the population engaged in the vocation directly or indirectly. With an annual output of $500+ billion, agriculture is a pre-dominant sector of India's economy. About 60% of India's population live in rural areas and a major share of them find a source of livelihood in agriculture. Agriculture is thus a driving force of rural livelihood and development.

However, agriculture in India is fast evolving. Confronted with challenges such as depleting natural resources, climate change, eroding soil health, new plant health threats and increasing cost of cultivation, new models are constantly emerging powered by policies and substantially enhanced engagement of the industry, banks and government institutions. Educated youngsters are engaging in farm ventures and agribusinesses, progressive farmers in many parts of the country are innovating conventional practices to become successful farm entrepreneurs by leveraging upon the strengths of the markets, industry and institutions and new start-ups are emerging empowering farmers and agriculture.

It becomes pertinent to provide exposure to farmers by sharing with them successful agribusiness models and sensitizing them with policies, schemes, technologies and markets. The 3rd All India Progressive Farmers Convention 2024 organized by Agriculture Today Group on 23rd December, 2024, New Delhi aimed to establish a national level platform for progressive farmers to share their success stories and connect with the industry and key stake-holders for collaboration and growth opportunities.

The convention was inaugurated by Shri Pilot Neeraj Sehrawat, National incharge, Research & Policy Kisan Morcha, BJP in the presence of Navneet Ravikar, CMD Leads Connect; Ajeet Singh Chahal, Rice Team Lead – Asia, Crop Science Division Bayer; Bharat Bhushan Tyagi, Padma Shri Awardee, Progressive Farmer and Haris Khan, CEO, Agriculture Today Group.

The event saw enlightening discussions centered around pertinent topics of Government Flagship Programs; Enhancing Inputs, Credit and Insurance Outreach; Fostering Market Linkages : Farmer-Industry Interaction and Sharing Agri Business Models and Farmers' Success Stories. The event concluded with presentation of 3rd India Progressive Farmer Awards 2024. The awards were presented by Smt. Rekha Sharma, Member of Parliament, Rajya Sabha, and Former Chairperson, National Commission for Women. She was joined by Ashok Dalwai, Chairman PM Task force of DFI, Ministry of Agriculture, GOI; Tarun Sridhar, Former Secretary DAHD, GOI and Kanwal Singh Chauhan, Padma Shree Awardee, Progressive Farmer.

The event saw an impressive gathering of farmers from across the country and interactions among industry CEOs, banks, institutions, officials and farmers. Confronted with newer challenges farmers are constantly innovating and upgrading their agricultural skills. The 3rd All India Progressive Farmers Convention was converted into a national level platform for progressive farmers to share their success stories and connect with the industry and key stake-holders for collaboration and growth opportunities.

ICFA

भारतीय कृषि एवं खाद्य परिषद्

INDIAN CHAMBER OF FOOD AND AGRICULTURE

FPOs - INDUSTRY PARTNERSHIP PROGRAM 2.0

10 Events I 10 States I 2000+ FPOs I Connecting 20 Crore+ Farmers

Farm Services I Inputs I Technologies I Produce Sourcing I Exports
Contract Farming I Agri-Processing I Partnerships

27th February 2025 - 17th October 2025

Workshops | Exhibitions | Business Meets

For More Details, Please Contact :

Mr. Tushar Sharma | *+91 – 8874184076* | *tushar.sharma@icfa.org.in*

Mr. Syed Areesh Hussain | *+91 – 8448698320* | *areesh.hussain@icfa.org.in*

www.fpo.icfa.org.in | ***www.icfa.org.in***

Scan the QR

Regular Posting Date 27-28
Date of Printing 23
Post Office: Lodhi Road

DL(ND)-11/6128/2024-25-26
RNI No. 68745/98

SBI
The banker to every Indian

KISAN KI UNNATI SE HAI DESH KI PRAGATI.

SBI Agri Loan Products for your every agricultural need

AGRI GOLD LOAN
- Digital sanction on YONO KRISHI
- Low interest rate

KISAN CREDIT CARD
- Interest rate at 7% p.a., up to ₹ 3 Lakhs*
- 3% incentive for prompt paying farmers, up to ₹ 3 Lakhs*
- Collateral-free loan for up to ₹ 1.6 Lakhs

MUDRA LOAN
- No collateral up to ₹10 Lakhs
- Simple documentation

LOAN FOR SELF-HELP GROUPS
- Loan for livelihood
- Flexible repayment

AGRI ENTERPRISE LOAN
- Loan range: ₹1 Lakh - ₹100 Crores
- Covers all facilities, including fund-based and non-fund-based
- Features for exporters: EPC, PCFC, Post Shipment Credit, Bill discounting, etc

KISAN SAMRIDDHI RIN
- Higher loan limit for modern farming: ₹5 Lakhs - ₹50 Crores
- Open to all farmer types: Individual, Non-Individual, or Corporate

ATMA NIRBHAR BHARAT SCHEMES:
- Loans available under Agri Infra Fund, PMFME scheme, AHIDF scheme
- To establish cold storage, warehouses, silos, food processing units, etc.
- Credit Guarantee available
- Interest subvention available

FARMER PRODUCER COMPANIES (FPCs)
- Loans available for all activities of FPCs
- Attractive interest rates
- Credit guarantee available
- Interest concession available

T&C Apply

For more details, visit bank.sbi or contact Branch Manager

Follow us on