



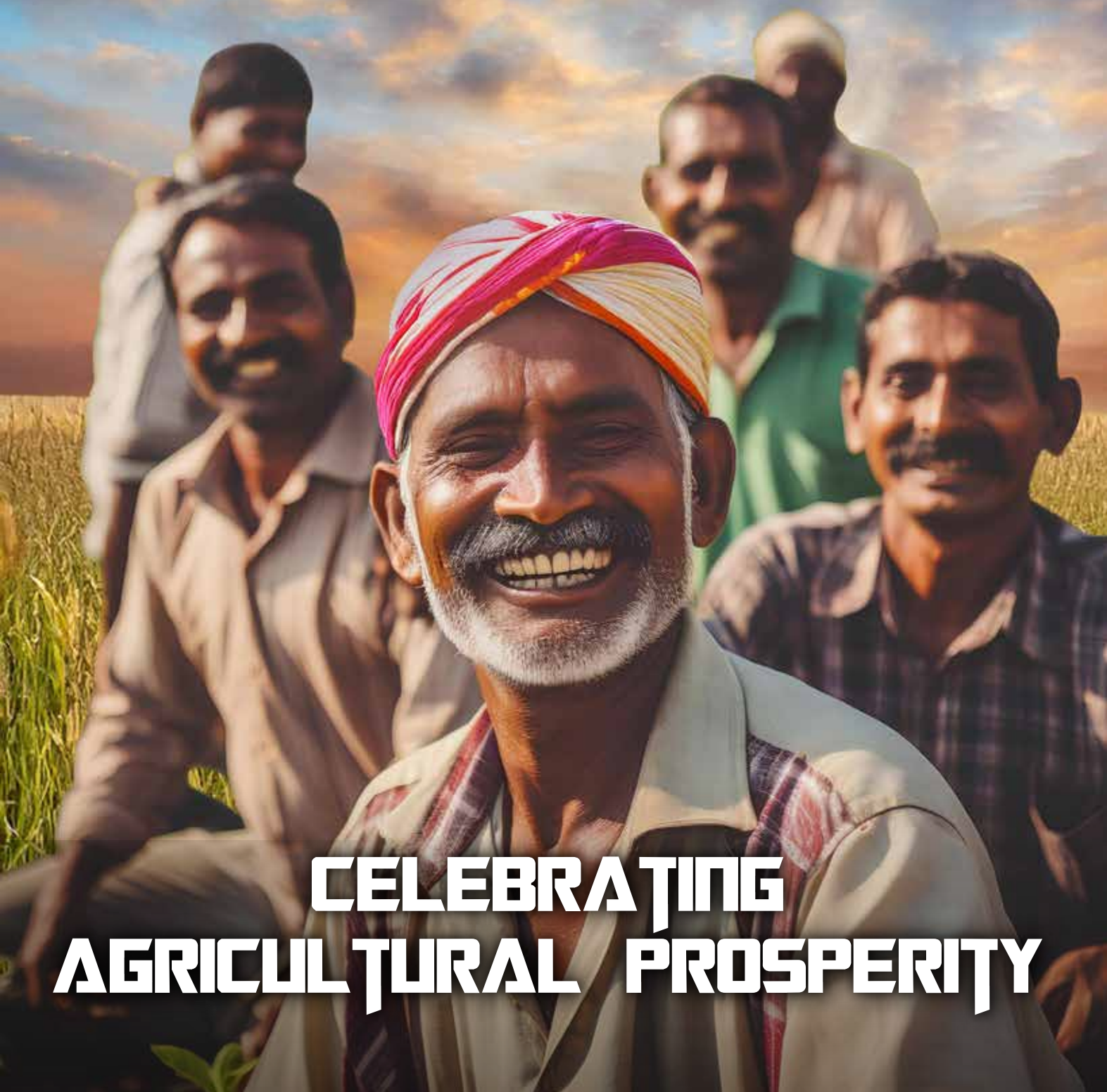
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# THE VISION



## Agricultural Prosperity in India

**A**gricultural prosperity is vital not only for ensuring food security and driving inclusive growth. As a land of diverse agro-climatic zones, India is endowed with fertile soil, ample water resources, and a long growing season, making it suitable for the cultivation of a wide variety of crops. Agricultural prosperity is essential for ensuring food security, generating employment, and promoting sustainable economic growth in the nation.

Agricultural prosperity is also essential to drive India to a leading global economy. Agriculture contributes around 18–20% to GDP and is critical for rural development. Crops such as rice, wheat, sugarcane, cotton, tea, and spices are not only essential for domestic consumption but also form a substantial portion of India's export basket, earning valuable foreign exchange.

Enhanced irrigation infrastructure, combined with innovations in farm machinery, precision agriculture, and mobile-based advisory services, have improved productivity. The use of satellite-based weather forecasting and drone technology has further modernized farming practices.

Diversification into horticulture, dairy farming, fisheries, and poultry has boosted incomes and created employment opportunities, particularly for small and marginal farmers. India is the largest producer of milk and one of the top producers of fruits and vegetables globally. The rise of agri-tech startups and digital platforms has enabled farmers to access better markets, financial services, and modern farming tools. These initiatives promote efficiency and reduce post-harvest losses.

Greater impetus to farmer-producer organizations (FPOs) shall enhance market access and bargaining power. Investments in rural infrastructure, cold storage facilities, and supply chains shall further minimize post-harvest losses.

Financial literacy and digital inclusion is greatly empowering farmers and ensuring sustained agricultural prosperity. We are witnessing that with the right mix of policy interventions, technological innovation, and farmer-centric approaches, India is transforming its agricultural sector into a global powerhouse while ensuring environmental sustainability and rural development.

**M C Dominic**  
Founder & Editor-in-Chief



## Millionaire Farmers Awards of India - Celebrating Agriculture's Heroes

## MFOI - Celebrating Visionary Farmers Who Have Redefined Agricultural Success



The Millionaire Farmers Awards of India (MFOI), instituted by the Krishi Jagran Group, is an initiative to recognize and celebrate the success stories of farmers who have achieved remarkable financial prosperity through innovative and sustainable agricultural practices. This award acknowledges the critical role of farmers in driving India's agricultural economy and inspiring others to adopt modern techniques for better yields and profitability.

Agriculture is the backbone of India's economy, and despite numerous challenges, many farmers have emerged as role models by transforming traditional farming into highly productive ventures. The Millionaire Farmers Awards aims to highlight such success stories, including those who have excelled in organic farming, integrated farming systems, agritech adoption, and high-value crop cultivation.

Recipients of the award often showcase unique approaches, such as leveraging advanced technologies like drones, AI-based crop

monitoring, or precision irrigation. Many have successfully diversified into allied activities like horticulture, dairy farming, floriculture, or aquaculture. Some awardees have tapped into global markets through exports of specialty crops or organic produce, while others have created direct-to-consumer models that bypass intermediaries and maximize profits.

The award also recognizes farmers who prioritize sustainability, resource optimization, and community development. These individuals often focus on practices like water conservation, soil health improvement, and reducing dependency on chemical fertilizers and pesticides.

By honouring these achievers, the Millionaire Farmers Awards not only applaud their efforts but also provide a platform for knowledge-sharing and motivation. The initiative encourages the farming community to innovate and align with India's vision of becoming an agricultural powerhouse. It further reinforces the belief that farming can be both rewarding and a viable path to financial independence when supported by innovation, hard work, and effective market strategies.

**Shiny Dominic**  
Managing Director



The Millionaire Farmers Awards of India, instituted by the Krishi Jagran Group, marks two successful years of recognizing and celebrating the achievements of visionary farmers who have redefined agricultural success. This initiative honours farmers who have not only achieved financial prosperity but have also become role models in adopting sustainable and innovative farming practices.

Over the past two years, the Millionaire Farmers Awards has emerged as a prestigious platform, shining a spotlight on the extraordinary stories of farmers who have turned challenges into opportunities. The awardees have demonstrated exemplary use of modern technologies, including precision farming, drone-based crop management, and AI-driven solutions, to achieve significant productivity and profitability. Many winners have showcased innovations in areas such as organic farming, horticulture, aquaculture, and agribusiness, proving that agriculture can be both sustainable and lucrative.

The initiative also emphasizes the importance of social impact and sustainability. Several awardees have actively contributed to their communities by creating employment opportunities, promoting resource-efficient farming, and fostering environmentally friendly practices like water conservation and minimal use of chemical inputs. Their success stories inspire others in the agricultural sector to explore innovative methods and adopt a forward-looking approach to farming.

The Krishi Jagran Group, the leading voice in Indian agriculture, has used this platform not only to honour achievers but also to promote knowledge-sharing. By showcasing these success stories, the awards encourage other farmers to break barriers and replicate similar success models.

As the initiative enters its next phase, it continues to align with the vision of making Indian agriculture globally competitive and financially rewarding, while also fostering sustainability and resilience in farming practices. The Millionaire Farmers Awards of India (MFOI) stands as a testament to the power of innovation, perseverance, and strategic agricultural practices.

**Mamta Jain**  
Group Editor & CEO



# A Journey from Engineering to Multi-Faceted Farming

## Achieving Economic Success Through Organic Farming, Livestock, Millet Processing, Multigrain Flour

**M**r. Rahul Kumar Vasule, a progressive farmer from Chhindwara district, stands as a shining example of someone who left a successful engineering career to embrace natural, cow-based organic farming and livestock rearing. A B.Tech and MBA graduate, he spent nearly 15 years working in the power sector before making the life-changing decision in 2018 to quit his high-paying job and dedicate himself to sustainable agriculture.

In alignment with the International Year of Millets, he established a processing unit for millet-based foods, particularly his unique "Navratna Atta" (Multigrain Flour), which has earned him significant recognition. Beyond millet, he also engages in cultivating grains, vegetables, and mushrooms, alongside dairy farming, which has inspired many other farmers in the region to adopt organic and natural farming practices.

Mr Vasule left behind a lucrative job with a renowned company where he was earning a package of ₹15 lakh annually. Today, through organic and natural farming, he generates a turnover exceeding ₹1.5 crore annually.

### Personal Tragedy Leading to Transformation

Mr Vasule holds a B.Tech and an MBA. The turning point in his life came when he lost his father to colon cancer and his three-year-old son to a brain tumour. These tragic incidents made him realize that

the root cause of these fatal diseases was chemically grown food. This realization drove him to quit his job and focus on organic farming.

To master the techniques, he took extensive training from various institutions, including the Regional Centre of Organic Farming, Scientific Dairy Farming, Mushroom Farming, and the Indo-Israel Project for Protected Cultivation. He actively participated in workshops organized by the Agriculture Department to learn how to make organic inputs like "Jeevamrut," "Ghanjeevamrut," and "Neem Astra" using cow dung, urine, and neem leaves.

Today, he practices organic farming on his 10-acre land. The shift to organic methods has significantly improved soil fertility, as evidenced by the increased presence of earthworms and organic carbon in his fields.

### Diverse Agricultural Ventures

Mr. Vasule cultivates various vegetables, including tomatoes, French beans, broccoli, cauliflower, watermelon, and cucumbers, as well as grains like wheat, maize, pigeon peas, and millets (sorghum, pearl millet, and finger millet). Additionally, he is involved in dairy farming and mushroom cultivation. He harvests crops in all three seasons—Rabi, Kharif, and Zaid—ensuring year-round productivity. He frequently consults with agricultural experts to stay updated on the latest techniques.



“Mr Vasule feels that the MFOI Award shall inspire many others and bring about a significant transformation in the agricultural sector

The results of his organic farming are impressive, attracting other farmers from nearby villages who are now motivated to practice chemical-free farming. His produce, including wheat, chickpeas, green gram, sorghum, and millets, along with organic jaggery powder, turmeric, and chili powder, is in high demand and is exported to major cities like Gurgaon, Noida, Pune, Mumbai, and Nagpur. These are all PGS-certified organic products, ensuring their high quality.



### Employment and Community Impact

Mr Vasule's initiative has created direct and indirect employment for around 25 to 30 people. He also serves as the District Minister of the Indian Farmers Association (Bhartiya Kisan Sangh) and has formed the "Shri Ram Organic Farmers Group," which includes about 600 to 700 farmers. Through a buy-back agreement, he purchases produce from these farmers at rates higher than the market value, thereby ensuring better income for them. He personally visits all 13 tehsils in the district to inspire farmers and assure them of market support for their organic crops.



### Family Support and Recognition

Living in a joint family, Mr Vasule has always received strong support from his family, including his mother Neelima Vasule, wife Snehal, son Kartik, younger brother Vishal Vasule (a manager at Aditya Birla Group), his sister-in-law Rupali, and their son Anvik. This family backing has enabled him to focus wholeheartedly on producing toxin-free grains.

Rahul's dedication to organic and sustainable farming has earned him numerous accolades, including first place at the Organic India Awards held at the Taj Hotel, Agra, on September 23, 2022, and recognition for cow-based organic farming in memory of Prabhakar Rao Kelkar in 2023.

### Navratna Flour Processing Unit

Currently, Mr. Vasule is also running a processing unit for his signature "Navratna Atta," a multigrain flour made using cold-pressed technology to retain nutrients. The flour is a blend of sorghum, pearl millet, finger millet, green gram, moth beans, black wheat, chickpeas, pigeon peas, and premium Sharbati wheat—all sourced from organic, cow-based farming. By engaging in buy-back agreements with other organic farmers, he ensures a steady supply of high-quality grains, contributing to the popularity of his toxin-free flour.

To establish this processing unit, he developed a project plan worth ₹35 lakh and secured a loan from the agricultural branch of the State Bank of India in Chhindwara. He has also benefited from the PMFME scheme initiated by Prime Minister Narendra Modi to support farmers. The unit has provided direct and indirect employment to around 50 people in the area.

### Acknowledgment and Future Prospects

Mr. Vasule finds immense satisfaction in his work, supported by the guidance of agricultural scientists and officials. He expresses his gratitude towards the administration, the Chief Minister of Madhya Pradesh, Mr. Mohan Yadav, Union Agriculture Minister Mr. Shivraj Chouhan, and especially Prime Minister Narendra Modi for their farmer-centric policies.

Mr Rahul Kumar Vasule is delighted and greatly encouraged to receive the National Award as part of the Millionaire Farmers of India (MFOI) Awards instituted by the Krishi Jagran Group and supported by ICAR, and various Agricultural Science Centres.

Mr Vasule feels that this initiative to honour farmers is bound to inspire many others and bring about a significant transformation in the agricultural sector in the years to come.

**Mr. Rahul Kumar Vasule**  
Progressive Farmer from Chhindwara,  
Madhya Pradesh



# The Journey of a Farmer's Son from Gir Somnath, Gujarat to Global Markets

## Success Story Of A 25-Year-Old



**Chetan Kanjibhai Mendpara**

This is the inspiring story of a young farmer from Jasapur village in Talala Gir, who has taken the world-renowned Kesar mango from Talala Gir to both national and international markets. Chetan Kanjibhai Mendpara, who pursued a master's degree in Horticulture from Navsari Agricultural University, decided to forgo a job and instead focused on exporting Kesar mangoes from his own

orchards, as well as promoting Gujarat's Kesar mangoes globally. Starting with his own farm, Chetan gradually expanded his venture, which proved beneficial to many farmers in the region. He began exporting not just his own produce but also the mangoes of farmers from neighbouring villages, ensuring they received better prices. Today, he exports Kesar mangoes to countries like Dubai, Canada,

“THE FUTURE LOOKS PROMISING AS GUJARAT'S KESAR MANGOES ARE SET TO SPREAD THEIR UNIQUE AROMA WORLDWIDE. THE INCOME OF FARMERS WILL TRULY DOUBLE WHEN EDUCATED INDIVIDUALS GUIDE AGRICULTURE TOWARDS NEW DIRECTIONS.



London, Europe, the USA, and Australia.

### Flourishing Mango Export

Chetan's company now has two branches—one in Australia and one in the USA. He has signed MoUs with various Farmer Producer Companies across different districts. His company directly procures agricultural commodities from farmers and provides them with the necessary guidance to produce export-quality goods. What began with mango exports has now grown into a business exporting a wide range of Indian agricultural commodities, including



fruits, vegetables, spices, and grocery items.

### A Vision that Transformed Farmers' Lives

Chetan's vision has become a boon for the farmers, aligning with Prime Minister Narendra Modi's mission to place Indian produce on every table across the world. Modi's vision is for Indian grains and food items to reach every corner of the globe.

The future looks promising as Gujarat's Kesar mangoes are set to spread their unique aroma worldwide. The income of farmers will truly double when educated individuals guide agriculture towards new directions.

Unlike many agriculture graduates who end up in marketing jobs for pesticide and fertilizer companies, Chetan had a different mindset. Times have changed; today, more people are choosing to be farmers, inspired by such success stories.





# Passion For Sustainable

## Success Story of a Progressive Farmer in Sustainable Natural Farming and Leadership in the Hills of The Nilgiris, South India



**M**r Ganesan Arunasalam, affectionately known as "Ganny," is a natural farmer, mentor, and leader with a remarkable career that spans over 25 years. His expertise lies in B2B technology sales and marketing, with a career that includes roles in leading global technology companies such as HP, Dell, and Canon. However, Ganny's contributions extend beyond the corporate world. Embracing his passion for sustainable living, he has dedicated his later career to promoting natural farming and agricultural education in India.

### Early Career and Corporate Achievements

Ganny's extensive experience in B2B sales and marketing has set a foundation for his success. Working with prominent companies like HP, Dell, and Canon, he honed his skills in managing complex technology solutions and leading teams. His corporate background gave him invaluable insights into global business, customer needs, and the importance of innovation. However, despite his success in the corporate world, Ganny sought a more fulfilling path that allowed him to make a direct impact on the environment and society.

### Transition to Sustainable Farming

Currently residing in Semmanarai, Kotagiri in the Nilgiris district of South India, Ganny embarked on a new venture by founding and managing Wild Eden Organic Farms Pvt Ltd. His farm, located in a forested area, is a permaculture-based natural farm focused on nurturing and practicing sustainable farming techniques. At Wild Eden Organic Farms, Ganny grows over 40 types of hilly exotic

**“Mr Ganesan promoted nature tourism. By offering accommodation in a heritage lifestyle farm stay, he allows visitors to experience sustainable living firsthand**



vegetables and fruits, promoting biodiversity and ecological balance. His transition from a corporate executive to a sustainable farmer highlights his commitment to environmental preservation and sustainable agriculture.

### Promoting Sustainable Living and Agricultural Education

Ganny's influence extends beyond his own farm. By offering accommodation in a heritage lifestyle farm stay, he allows visitors to experience sustainable living firsthand. Moreover, Ganny has



founded a Farm Finishing School, where he provides training to young agricultural graduates. Through this program, he equips graduates with practical farming skills and connects them with job opportunities on farms in India and abroad. Ganny's Farm Finishing School demonstrates his dedication to empowering the next generation of farmers and fostering a global network of agricultural professionals.

### Contribution to Nilgiri's Organic Mission and Circular Economy

Currently Ganny also serves as the Vice President of TOHFA (The Nilgiris Organic Horticulture Farmers Association), a prime organization promoting Nilgiris Organic Mission started six years back in the mountains. He is also spearheading the marketing division of TOHFA and conducts Weekly Organic markets in Ooty and Coonoor towns in the hill station thereby contributing to the local circular economy. Under his leadership 30 farmers from four blocks bring chemical free/residue free exotic hilly vegetables, fruits and value added products like speciality White Tea, Green Tea, Yellow Tea, Eulong Tea and Black Tea. A local economy of twelve plus lakhs money was generated for the past nine months through this chemical residue free market by



the farmers selling directly to the consumers.

### Recognition and Awards

Ganny's contributions to sustainable farming have not gone unnoticed. He was honoured with the title of Best Farmer, and his farm was recognized as the Best Organic Farm by the district collector of Nilgiris, Tamil Nadu in 2021. Additionally, he received the "Nammalvar Award" from the Erode District Rotary Club and UEIR Organics in Tamil Nadu, a testament to his efforts in promoting organic farming practices. Furthermore, he was awarded the "Velan Vithagar Award" by the Rise Organization and Nanban Foundation in the USA, solidifying his reputation as a leader in sustainable agriculture. These awards reflect the impact of his work and his dedication to advancing eco-friendly farming techniques.

In December, 2023, Ganny was awarded the prestigious GOPIO International Business Excellence Award in Kuala Lumpur, Malaysia for the Natural Farming sector, a recognition that underscores his significant contributions to agriculture and sustainable practices. In addition he was awarded as the Millionaire Farmer of India in 2023 by the Krishi Jagran Group, the largest agri-media group of India. Ganny's journey from a corporate executive to a leader in sustainable farming is inspiring. His commitment to environmental conservation, agricultural education, and community development has made a lasting impact on his region and beyond. As Ganny continues to nurture his farm and educate future farmers, his legacy will undoubtedly inspire others to pursue sustainable and impactful careers in agriculture.





# The Visionary Behind Ozat Agro Link

Mr Ajay Lunagariya's entrepreneurial journey is a true testament to the power of innovation, hard work, and a commitment to quality. Starting with a simple yet bold idea, Ajay has transformed his passion for spices into a successful business, Ozat Agro Link, which is now a recognized name in Gujarat's agricultural landscape.

## The Beginning

Ajay's journey began with a deep understanding of the spice industry, paired with his belief in creating sustainable and mutually beneficial relationships between farmers and consumers. Hailing from a family with farming roots, he was no stranger to the challenges farmers face—unpredictable weather conditions, fluctuating market prices, and limited access to high-quality seeds and agricultural inputs. He knew there had to be a better way to bridge the gap between farmers and the growing demand for quality, locally sourced spices.

In 2023, Ajay founded Ozat Agro Link with the vision to provide premium, adulteration-free spices to the market, while ensuring fair pricing and timely payment to farmers. His approach was simple yet revolutionary: sourcing directly from farmers and working with Farmer Producer Organizations (FPOs) to ensure both quality and consistency in production.



## Building the Foundation: Contract Farming and Direct Sourcing

One of the first major decisions Ajay made was to embrace contract farming. Through partnerships with local Farmer Producer Organizations (FPOs), he was able to establish a reliable supply chain of spices such as turmeric, cumin, and chili, sourced directly from the fields of Gujarat's farming community. By doing so, he was able to secure fresh, high-quality raw materials for his brand while also providing farmers with a stable income, access to agricultural knowledge, and better access to markets.

Ajay's model of direct sourcing also cut out intermediaries, allowing him to offer better prices to both farmers and consumers. His transparency and integrity in dealing with farmers quickly earned him trust and loyalty, making him a preferred partner for many FPOs in the region.

## Commitment to Purity: Adulteration-Free Spices

A core value that Ajay instilled in Ozat Agro Link from the very beginning was the commitment to providing pure, adulteration-free spices. In an industry plagued by the widespread issue of spice adulteration, Ozat Agro Link stood out by ensuring that every product



that left its facilities was of the highest quality and free from harmful additives. Through stringent quality control measures and advanced testing technologies, Ajay ensured that consumers could trust his brand for purity.

This commitment to quality and integrity has been a significant driver of Ozat Agro Link's growth, as more and more consumers and businesses seek safe, pure, and authentic spices. By focusing on this niche, Ajay was able to build a loyal customer base that values the trustworthiness of the brand.

## Expanding the Network: Distribution Across Gujarat and Beyond

With the supply chain in place and the promise of purity, Ajay focused on building a robust distribution network. By partnering with local distributors, Ozat Agro Link was able to expand its reach throughout Gujarat, supplying spice retailers and wholesalers with premium quality products. Ajay's attention to detail in both the sourcing and packaging of his spices helped the brand stand out in the market. His products became synonymous with purity, flavor, and reliability. Recognizing the growing demand for quality spices beyond Gujarat, Ajay also began expanding his reach to national markets. This move, combined with the increasing global interest in Indian spices, led to Ozat Agro Link venturing into international markets. The production volume amounted to over 8-10 tons per month and 45+ distributor in Gujarat region.

## Overcoming Challenges and Achieving Growth

Like any entrepreneurial journey, Ajay faced several challenges along the way. One of the biggest hurdles was managing the logistics of sourcing spices directly from rural farmers while ensuring timely delivery and consistent product quality. However, Ajay's solution was



“Through partnerships with local Farmer Producer Organizations (FPOs), Mr Lunagariya was able to establish a reliable supply chain of spices such as turmeric, cumin, and chili, sourced directly from the fields of Gujarat's farming community



simple: invest in building strong relationships with his farmers and distributors and adopt technology to streamline operations. By using data analytics and supply chain management tools, Ozat Agro Link was able to predict demand, track inventory, and ensure the freshness of their products. This allowed Ajay to stay ahead of market trends and provide a continuous supply of top-quality spices to his growing customer base.

## Impact and Legacy

Today, Ozat Agro Link stands as a symbol of Ajay Lunagariya's entrepreneurial success. The company not only supplies high-quality spices to homes and businesses across Gujarat but also plays a significant role in improving the livelihoods of the farmers it works with. Through its contract farming model and collaboration with FPOs,

## Mr Ajay Mansukhbhai Lunagariya

M.Sc in post Harvest Technology.

He is engaged in the business of Ozat Spices in Gondal, Gujarat.

Ozat Agro Link has created a sustainable ecosystem that benefits both producers and consumers.

Ajay's success is also a reflection of his commitment to social responsibility. By empowering local farmers and providing them with access to better agricultural practices and fair markets, he has contributed to rural development in Gujarat. His story inspires other entrepreneurs to think beyond profit and consider the broader impact of their businesses on society.

## The Road Ahead

Ajay's entrepreneurial journey is far from over. With plans for further expansion into other states and a growing presence in online and international markets, Ozat Agro Link is poised to become a household name in the spice industry. Ajay's vision remains clear: to continue building strong relationships with farmers, offer premium-quality products that are guaranteed to be free of adulteration, and foster innovation in the spice business.

In a rapidly evolving market, Ajay Lunagariya's story is a beacon of success for aspiring entrepreneurs, showing that with a clear vision, integrity, and a focus on quality, it's possible to build a thriving business while making a meaningful difference in the community and the world. His website is [www.ozatagro.com](http://www.ozatagro.com)





# Mechanisation and the Future of Indian Agriculture

Smart Farm Revolution by 2029



India's agricultural sector has long been the backbone of its economy. However, despite its significance, farming practices in the country remain largely traditional, limiting productivity and efficiency. This is particularly concerning as agriculture still provides employment to around 50 per cent of India's population and contributes approximately 20 per cent to the national GDP. As the global population grows and climate change introduces new challenges, India's agricultural sector faces increasing pressure to innovate. Mechanisation, combined with smart farming technologies, offers a path forward, and by 2029, India's agricultural landscape could undergo a revolution akin to the Green Revolution of the 1960s.

Smart farming – using data-driven insights to optimise agricultural operations at a micro level – would play a crucial role. Precision farming, enabled by AI, sensors, and satellite imagery, empowers farmers to monitor crop health, predict weather patterns, and make real-time decisions. Research suggests that precision farming can boost crop productivity by 30-40 per cent, fostering sustainable, high-yield farming. India can learn from global leaders in smart farming. In the U.S. and Europe, precision agriculture leverages Global Positioning System (GPS), sensors, and satellite technology to manage resources like water and fertilisers efficiently. In Japan, automated tractors and IoT solutions tackle labour shortages, while the Netherlands excels in vertical farming and precision irrigation, optimizing resources and conserving water. Drawing from these models, India can fast-track its own transition towards technology-driven agriculture by 2029.

However, smart farming alone is not enough to meet future demands. Mechanisation – using machinery to streamline farming processes – minimises manual labour and enhances efficiency. While U.S. and China have mechanisation rates of 95 per cent and 57 per cent respectively, India's level lags at about 40 to 45 per cent. Regional disparities further highlight this gap – states like Punjab and Haryana, where agriculture is more industrialised and farms tend to be larger, have embraced mechanisation at a faster pace. Meanwhile, some states have much lower mechanisation rates due to smaller average landholdings, limited resources, and a lower maturity in adopting agricultural technology. This intra-country disparity underscores the need for region-specific approaches to make mechanisation accessible and effective for all farmers across India.

Addressing these regional disparities requires not only technology and financial support but also strategic policies that consider the unique challenges faced by each state. While programs like the Sub-

“With the right investments, policies, and innovations, India has the potential to become a global leader in sustainable agriculture

Mission on Agricultural Mechanisation (SMAM) and Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) have already made strides, a more targeted approach could prioritise regions with smaller, fragmented farms. Offering higher subsidies or tailored loan schemes for machinery in these regions can enable small and marginal farmers to afford essential equipment.

Promoting cooperative models and Farmer Producer Organisations (FPOs) is vital for pooling resources in states with small and fragmented landholdings. FPOs can enable farmers to jointly purchase and share expensive machinery, such as tractors and harvesters, reducing the per-farmer cost of mechanisation. Additionally, support for community-operated Custom Hiring Centers (CHCs), where farmers can rent equipment as needed, could be expanded. This solution provides small farmers in under-mechanised states with access to modern equipment without the financial burden of ownership.

Leveraging digital technology, a platform similar to ride-sharing models could be established specifically for hiring farm machinery. Such a platform would allow farmers, especially in remote areas, to book equipment on-demand. Several pilot programs in India have shown the viability of this concept, where mobile apps and digital hubs connect farmers with equipment owners nearby, bringing transparency and accessibility to the leasing process. This model could be scaled up to include a broader range of equipment and regions, ensuring that even the smallest farmers can access the latest machinery.

Addressing digital and physical infrastructure gaps is critical for any mechanisation solution. While the Digital India initiative has made significant progress, increasing rural broadband and mobile network penetration remains essential to support digital platforms for equipment sharing and smart farming solutions. Expanding rural electricity and ensuring reliable power supply is equally important, as much of the modern machinery relies on consistent energy. Government investment in rural infrastructure can make mechanisation and technology-driven farming viable for farmers across all states.

Education and awareness programs are equally crucial to help farmers understand the benefits of mechanisation and adopt new technologies confidently. Expanding the scope of the National e-Governance Plan for Agriculture (NeGPA) to include region-specific training programs can empower farmers with the skills needed to use mechanised tools and interpret the data generated by smart farming technologies. Additionally, awareness campaigns highlighting successful mechanisation models in similar-sized farms or regions can demonstrate the potential benefits and encourage adoption among hesitant farmers.

Finally, sustainable practices must guide the shift to mechanised, smart farming. Technologies such as precision agriculture and water-efficient irrigation techniques – used in countries like the Netherlands and Australia – can conserve resources and protect the environment. Indian agriculture must similarly adopt methods that boost productivity without compromising soil, water, or biodiversity. In sum, with the right investments, policies, and innovations, India has the potential to become a global leader in sustainable agriculture, ensuring food security for its population and contributing to global agricultural supply chains. The journey to 2029 will require a concerted effort from the government, private sector, and farmers alike, but the rewards for Indian agriculture and its future generations are well worth the pursuit.

**Mr Nilachal Mishra**  
Partner and Head of the  
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India.



# Building Vegetable Clusters

## Empowering Farmers



### Insights

Insights centered on critical interventions and technologies are essential for the sustainable development of vegetable clusters. Below are the key themes that can be explored.

#### Maximizing Yield and Quality with Strategic Interventions

Achieving higher yields, quality and within MRL's is at the heart of successful vegetable cultivation. There is need to focus on a stage-by-stage approach for crop cycle management, highlighting the importance of crop protection at every step. Through targeted interventions in areas such as pest control, nutrient management, and post-harvest handling, farmers can unlock the full potential of their crops while maintaining a sustainable approach.

#### Leveraging Market Intelligence for Informed Decision-Making

Market intelligence plays a pivotal role in bridging the demand-supply gap and guiding farmers in crop selection.

There is need for data on:

- Demand vs. supply metrics, which allow for better crop selection and planning.
- Planted area data for vegetables, categorized by sowing dates, to align production cycles with market needs.

#### Digital Platforms

A digital platform for farmers to share crop pest statuses and track farming practices, especially regarding pesticide usage and post-harvest processes, can ensure safe, low-residue produce for consumers.

#### Integrating Advanced Technology into Vegetable Farming

Modern technology can revolutionize crop management. A suite of

digital and precision agriculture tools can help in this regard.

Drones, pest imaging, and data analytics can monitor crop health and target interventions.

Real-time auto alerts and best-practice recommendations tailored to each crop stage, empower farmers to make informed decisions quickly.

Such technologies provide an invaluable digital connection for farmers, offering insights to optimize productivity and reduce environmental impact.

#### Branding Vegetable Clusters for Market Advantage

By establishing NHB (National Horticulture Board) branding on produce, consumers are assured of the produce's safety and quality.

In addition, dedicating a portion of each cluster to organic farming (around 10% of the area) allows for premium pricing, benefiting farmers and offering authentic organic produce to consumers.

#### Building a Collaborative and Inclusive Ecosystem

The future of vegetable farming lies in a collaborative and inclusive ecosystem that brings together diverse stakeholders. We must all be conscious of the importance of upskilling farmers and fostering partnerships across sectors—from input providers and infrastructure firms to exporters, NGOs, and government agencies.

By empowering farmers and Farmer Producer Organizations (FPOs) at the core of every initiative, this approach fosters innovation, resilience, and long-term profitability.

**Moving Forward Together**

With the shared mission of a sustainable and profitable vegetable ecosystem, we look forward to collaborating closely with stakeholders across the agricultural landscape.

Together, we are committed to building a resilient framework that empowers India's vegetable farmers, strengthens supply chains, and delivers premium-quality produce to consumers across the nation.



BE SMART  
AGRI ENTREPRENEUR



Changing  
Farmers Life



AN ISO 9001 : 2015 CERTIFIED CO.

“The future of vegetable farming lies in a collaborative and inclusive ecosystem that brings together diverse stakeholders”



# AI Automation in Agriculture Cultivating the Future of Farming

“ AI automation is revolutionizing agriculture, offering innovative solutions to enhance productivity, sustainability, and efficiency

Agriculture, the backbone of global food production, is undergoing a transformative shift thanks to artificial intelligence (AI) and automation. As the world grapples with increasing food demands, environmental challenges, and a changing climate, AI-driven innovations are emerging as crucial tools for modernizing agriculture. This blog explores how AI automation is reshaping the agricultural landscape and what the future holds for this vital industry.

### The Role of AI Automation in Agriculture

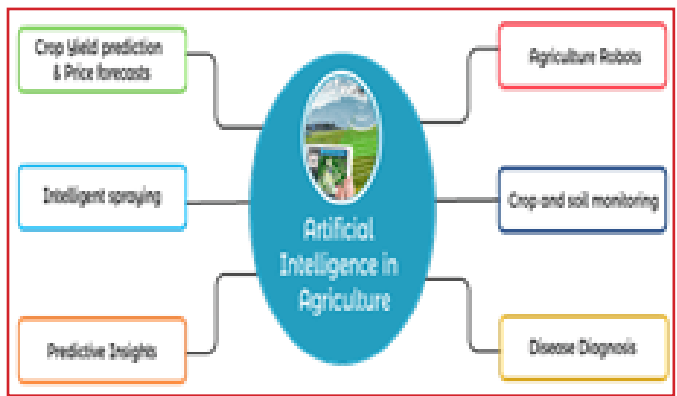
AI automation in agriculture leverages advanced technologies to optimize farming practices, improve productivity, and address challenges ranging from resource management to pest control. Here's how AI is making a difference:

- 1. Precision Agriculture:** AI-driven systems use data from satellite imagery, drones, and sensors to monitor crop health, soil conditions, and weather patterns. This data allows farmers to apply precise amounts of water, fertilizers, and pesticides, reducing waste and enhancing crop yields.
- 2. Predictive Analytics:** Machine learning algorithms analyze historical data and real-time information to predict crop performance, disease outbreaks, and weather impacts. These insights help farmers make informed decisions, from planting schedules to harvest timings, improving overall efficiency.
- 3. Automated Machinery:** Tractors, harvesters, and other farming equipment equipped with AI and robotics can perform tasks autonomously. These machines can plant, tend, and harvest crops with high precision, reducing labor costs and increasing productivity.
- 4. Supply Chain Optimization:** AI enhances the efficiency of the agricultural supply chain by predicting demand, optimizing logistics, and minimizing waste. Automated systems streamline the distribution of produce from farms to markets, ensuring fresher and more affordable food.
- 5. Smart Irrigation Systems:** AI-powered irrigation systems monitor soil moisture levels and weather forecasts to optimize water usage. This technology helps conserve water resources and ensures crops receive the right amount of hydration.

### The Future of AI Automation in Agriculture

The future of AI automation in agriculture promises to bring even more transformative changes:

- 1. Enhanced Crop Genetics:** AI will advance the field of genomics, allowing for the development of crop varieties that are more resistant to pests, diseases, and climate extremes. This innovation will improve food security and sustainability.
- 2. Autonomous Farms:** The concept of fully autonomous farms, where AI-powered robots and systems manage all aspects of farming, is becoming more feasible. These farms will reduce the need for human labor while increasing efficiency and reducing operational costs.
- 3. Integration with IoT:** The Internet of Things (IoT) will integrate with AI to create smart farming ecosystems. Sensors embedded in soil, crops, and equipment will continuously provide data, allowing for real-time monitoring and adjustments.
- 4. Sustainable Practices:** AI will play a crucial role in promoting sustainable agriculture by optimizing resource use, reducing environmental impact, and supporting regenerative practices. Technologies will focus on minimizing the ecological footprint of farming activities.
- 5. Global Collaboration:** AI-driven agricultural solutions will facilitate global collaboration to address food security challenges. By sharing data and insights across regions, farmers and researchers can tackle



issues like climate change and pest invasions more effectively.

### Challenges and Considerations

While the potential of AI automation in agriculture is immense, several challenges need addressing:

- 1. Data Privacy and Security:** The extensive data collection involved in AI-driven agriculture raises concerns about privacy and security. Ensuring that data is protected and used responsibly will be crucial.
- 2. Cost and Accessibility:** The adoption of AI technologies can be expensive, particularly for small-scale farmers. Making these technologies affordable and accessible will be essential for widespread adoption.
- 3. Skill Development:** As AI becomes more integrated into farming, there will be a need for training and education to help farmers and agricultural workers adapt to new technologies.
- 4. Ethical Implications:** The use of AI in agriculture must be approached with ethical considerations, including the impact on labor markets and the environment. Developing frameworks to address these issues will be important.

### Embracing New Technologies

AI automation is revolutionizing agriculture, offering innovative solutions to enhance productivity, sustainability, and efficiency. As we look to the future, embracing these technologies will be key to meeting the growing demands of global food production while addressing environmental and resource challenges. By navigating the associated challenges and investing in research and development, we can cultivate a future where agriculture thrives in harmony with technology and nature.



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**Mr Prakash, Mr Avinash Kumar Bhatia and Ms Saakshi are Ph.D. Research Scholars at , Department of Silviculture and Agroforestry, COF, Solan, HP Dr Ravindra Kumar Dhaka is Assistant Professor, Department of Tree Improvement and Genetic Resources, COH&F**



# FROM FIELDS TO FUTURES

## How Agricultural Challenges Drive Rural Youth Migration



Dr Ashok Kumar

Director of Farm Prosperity, Transform Rural India, Designers for Regenerative Development

“Climate-resilient crops, water management, soil conservation and better access to coping mechanism like insurances and entitlements are vital

**P**rem Minj is a 30 years old tribal youth from Bakikona hamlet of Kersai block in Simdega district of Jharkhand. Farming is the main livelihood of his family. The paddy is just harvested and the total yield from his 3 acres of farm land is 40 quintals this year (2024). There are 6 members in his family. There is no irrigation facility for his farms. Prem needs to migrate to Lucknow for around six months every year to look for cash earning work. He comes back every year just before monsoon to cultivate paddy in his farms. He returns with around 30,000 Rupees earning from his works at Lucknow.

The story of Manish Lakra a 20 years girl is similar, she also needs to go to Goa to searching for employment after kharif paddy harvest is over in December. The small hamlet of Bakikona has 83 households and around 10 families have members migrating every year searching for work after the rainfed agriculture season is over.

Simdega district has become one of the hubs of migrating youth and farmers in Jharkhand.

Agriculture has been the cornerstone of India's economy, providing employment to over 58% of the workforce and contributing 17–18% to the GDP. Despite its vital role, the sector faces mounting challenges that compel rural youth to migrate to urban areas in search of better opportunities. This report delves into the key agricultural challenges—generational debt, declining productivity, economic disparities, price fluctuations, and climate vulnerabilities—and examines how they influence rural youth migration.

### Agricultural Productivity

While India has seen moderate improvements in crop yields over the past decade, the gains are often outpaced by challenges such as resource depletion and climate variability.

Rice productivity increased from 2,394 kg/ha in 2011–12 to 2,659 kg/ha in 2020–21. Wheat productivity rose from 3,140 kg/ha to 3,493 kg/ha over the same period. Maize productivity grew from 2,550 kg/ha to 3,070 kg/ha.

However, these improvements are unevenly distributed across regions, with marginal and smallholder farmers who comprise 86% of India's farming population often missing out on the benefits. Factors such as erratic monsoons, deteriorating soil quality, and inadequate irrigation further undermine productivity. As agriculture becomes less lucrative, youth find little motivation to stay in rural areas. The seasonal nature of farm work also leads to underemployment, pushing many to migrate in search of steady income.

### Rural-Urban Divide

The disparity between rural and urban economic opportunities is stark. Urban areas offer higher wages, career growth, employment opportunities making them attractive to rural youth. The average annual income in urban areas is roughly double that in rural regions. While agriculture employs 58% of the workforce, its contribution to GDP is only 17–18%, it highlighting the sector's inefficiency.

For rural youth, the limited scope for financial growth in agriculture is a significant deterrent. The migration rate among rural youth is approximately 45%, driven by aspirations for better education and employment opportunities.

### Commodity Price Volatility

An Uncertain Livelihood, Unstable commodity prices further destabilize the agricultural economy. Despite the government's Minimum Support Price (MSP) mechanism, it benefits only a fraction of farmers. In 2018–19, around 38% of rice production and 20% of wheat production were procured at MSP. The remaining majority had to sell their produce at market rates, often lower than the cost of production. This unpredictability discourages young farmers from pursuing agriculture as a sustainable livelihood. With limited savings and no safety net, they are more likely to leave their villages for better-paying, less volatile jobs in cities.

### A Legacy of Financial Strain

For millions of Indian farming families, debt is a burden that passes from one generation to the next. Over half of agricultural households (52%, according to the NSSO) were in debt as of 2018. The root causes include high input costs, reliance on informal loans with exorbitant interest rates, and inconsistent incomes. The average monthly income of an agricultural household was ₹10,218 in 2018–19, barely sufficient to cover expenses, let alone pay off loans. Young members of these households, witnessing the financial stress endured by their elders, often choose to leave farming behind, seeking urban jobs that promise stable incomes and a chance to break the cycle of debt.

### Climate Change

Climate change is emerging as a critical challenge for Indian agriculture. The increased frequency of extreme weather events, such as high temperature, floods, droughts, and unseasonal rains, significantly disrupt farming activities. India experienced severe droughts in 2015 and 2019, affecting millions of farmers and resulting in substantial crop losses. Soil health is also deteriorating misuse of chemical fertilizers and pesticides. An estimated 30% of India's agricultural land suffers from soil degradation, leading to reduced yields.

### Lack of Mechanization

Farming in India is still largely labor-intensive, particularly for women and smallholder farmers. Approximately 90% of smallholder farmers rely on manual labor, which is both time-consuming and physically demanding. The lack of access to mechanized tools, coupled with inadequate infrastructure for irrigation and storage, makes farming unattractive to younger generations. Government efforts to promote mechanization have had limited reach, leaving many farmers reliant on outdated methods.

### Challenges

Agriculture in India faces immense challenges—generational debt, declining productivity, economic disparities, climate change, and infrastructural deficits. For rural youth, these issues make urban migration an attractive alternative. However, this trend has significant implications for rural communities, including labor shortages and weakened local economies and creating stress on urban infrastructure. By addressing these challenges and creating opportunities within agriculture, India can retain its rural workforce and ensure a more balanced, sustainable future.



# Policy Shifts Needed To Address Reverse Migration

India is trudging back to its villages. In the past five years, the policy-backed trend to push workers from low productive agriculture to seek better employment opportunities in the urban centres stands reversed.

An indication to the swing in reverse migration first came at the time Covid-19 pandemic when millions of urban poor traversed long distances, mostly on foot, in what was seen as the largest movement of people since the days of the partition. The unprecedented inter-State and intra-State migration was believed to be temporary but defying the expectations of the workforce returning back to the cities once the pandemic was over, a majority of the migrants preferred to stay back.

Based on the data generated from the National Sample Surveys and the Periodic Labour Force Surveys, the International Labour Organisation (ILO) and the New Delhi-based Institute of Human Development (IHD) had in a report first quantified an increase in agricultural employment.

Contrary to the popular perception, an estimated 56 million workers were added to the rural workforce between 2020 and 2022. It only showed that at a time of jobless growth, the employment opportunities available in the cities were no longer attractive for the migrants. Whether it was because of a slump in manufacturing and a decline in construction sector jobs, the migrants thought it better to move back to villages.

## Farmers' Anger Is Brewing

Subsequently, the Periodic Labour Force Survey (PLFS) 2023-24 showed a reversal of the population shift as per the economic design – moving a sizeable proportion of the agricultural workforce away from farming. Interestingly, while 66 million of the agricultural workforce migrated in search of menial jobs in the cities in a period of 13 years, between 2004-05 and 2018-19; economist Himanshu of Jawaharlal Nehru University estimated that in the next five years, between 2018-19 and 2023-24, more than 68 million people have returned to the villages. Not that agriculture suddenly has turned remunerative but the rate at which reverse migration has upturned the expected gains from the structural transformation underway, clearly showed that pushing people out of farm was not a viable strategy.

Although the PLFS survey report shows that the share of agriculture in the rural workforce has risen from 42.5 per cent in 2018-19 to 46.1 per cent in 2023-24, the absolute numbers added back to agriculture, and that includes a sizeable population of youth, sends a message that can

no longer be ignored. While the popular economic thinking was based on a faulty design that had kept agriculture deliberately impoverished over the years in a quest to push people out of agriculture, recent spate of farmers' protests following the iconic farmers protest for over a year at the borders of New Delhi, which has shown farmers anger brewing over the continuous denial of rightful income.

It was in 1996 that the World Bank had wanted India to move 400-million people out of agriculture – equal to twice the combined population of UK, France and Germany – forcing them to migrate to the cities. Instead of creating economic conditions that facilitate out migration to the urban centres, the emphasis should have been on rebuilding agriculture by making farming a viable enterprise. This is what Mahatma Gandhi had wanted, and the rate at which migrants have returned, only shows how right he was. It is therefore time to dispense with the World Bank thinking, and shift the focus to revitalising agriculture and turn farming into a sustainable, viable and a profitable enterprise.

## Changing Ground Realities

If you are still not convinced, let's look at the latest report of the All India Rural Financial Inclusion Survey 2021-22 of the National Bank for Agriculture and Rural Development (NABARD) that was released recently. Accordingly, the share of population engaged in agriculture has significantly grown over the years. From 48 per cent in 2016-17 to a high of 57 per cent in 2023-24, the quantum jump in the number of agricultural households clearly points to the return of the native. Barring Punjab, where the share of agricultural households has come down from 42 per cent in 2016-17 to 36 per cent in 2021-22; in Himachal Pradesh from 70 to 63 per cent; and by a trickle in Gujarat and Karnataka, the increase in farm household has been substantial in many States. In Goa, the percentage increase in agricultural households is from 3 to 18 per cent, Haryana from 34 to 58 per cent; Uttarakhand from 41 to 57 per cent; and Tamil Nadu from 13 to 57 per cent, most other States also show an increasing trend towards agriculture.

Whatever be the reasons, the three surveys and studies by the ILO, PLFS and the NABARD shows the importance of agriculture to meet the employment and livelihood challenges, and not to forget the sector's ability to ensure household food security.

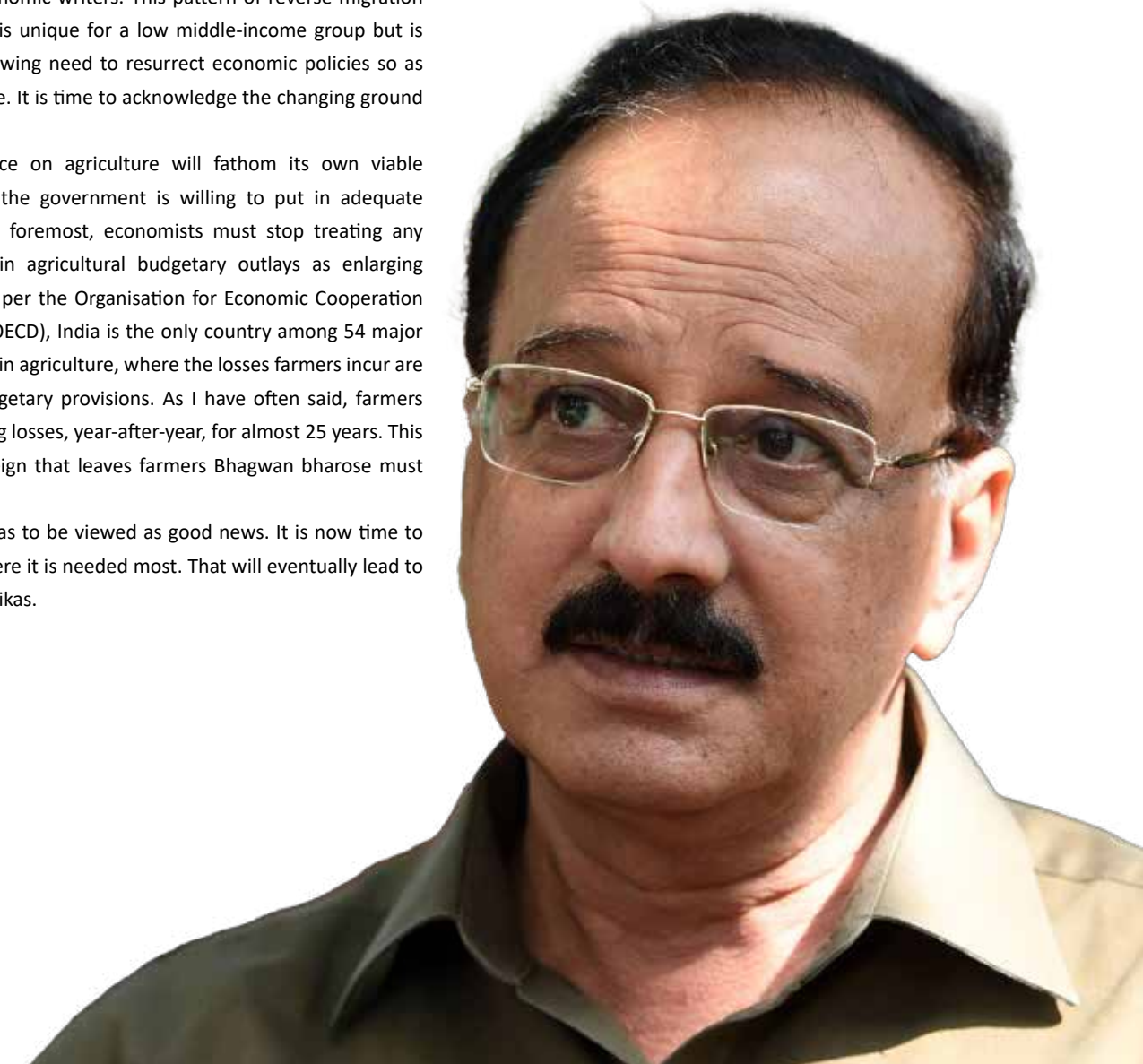
While the dominant economic thinking is dismayed at the rate at which reverse migration has upset all the previous estimates to reduce the numbers in agriculture, the rise in employment in agriculture is

*“The over-dependence on agriculture will fathom its own viable pathways, provided the government is willing to put in adequate resources”*

being viewed as “worrying” and as a “cause for concern” by mainline economists and economic writers. This pattern of reverse migration being seen in India is unique for a low middle-income group but is a pointer to the growing need to resurrect economic policies so as to rebuild agriculture. It is time to acknowledge the changing ground realities.

The over-dependence on agriculture will fathom its own viable pathways provided the government is willing to put in adequate resources. First and foremost, economists must stop treating any increase proposed in agricultural budgetary outlays as enlarging the fiscal deficit. As per the Organisation for Economic Cooperation and Development (OECD), India is the only country among 54 major economies engaged in agriculture, where the losses farmers incur are not covered by budgetary provisions. As I have often said, farmers have been harvesting losses, year-after-year, for almost 25 years. This flawed economic design that leaves farmers Bhagwan bharios must end.

Reverse migration has to be viewed as good news. It is now time to put in resources where it is needed most. That will eventually lead to Sabka Saath Sabka Vikas.



**Mr Devinder Sharma**  
is India's leading agriculture, food policy expert,  
researcher and writer



# Bayer Empowering India's Farmers to Grow & Earn More

The farming community has always been the backbone of our economy and the statement holds true now more than ever, as they take on the responsibility of not only feeding the world's largest population, but also meeting nutritional needs and providing the critical feed stock for bio-energy. Bayer recognizes the pivotal role they play in India's ambition of becoming a developed nation, keeping sustainability at the fulcrum of this exciting journey. Sustainability is not just a catch phrase for Bayer, an organization which has been empowering farmers in India for more than 127 years now. The seed-to-crop protection and integrated agri-solutions institution has been at the forefront of supporting and guiding more than 25 million farmers, an overwhelming majority of whom are small and marginal land holders, to grow more, with less, while restoring more.

## Bayer's Rice Carbon Program

Bayer's Rice Carbon Program is one such critical initiative. India has the largest acreage under rice cultivation in the world. The staple of choice, for not just Indians, but a very large section of the Asian continent, also happens to be largest agricultural contributor to greenhouse emissions, accounting for 25-33% of the total methane emissions in South & Southeast Asia. The crop is also the most water intensive crop, consuming 43% of the total 70% of freshwater used for agriculture in the world. Bayer has risen to the challenge of producing more rice to feed a growing population but doing so in a more climate friendly and resource efficient way.

Direct Seeded Rice (DSR), coupled with the latest agronomic practices not only helps reduce greenhouse gas emissions by up to 45%, but also reduce water consumption by at least 25%.

## Farmer Experience

Jyothi, a farmer in Tripuraram, a village in the Nalgonda district of Telangana, is one of approx. 20,000 strong and growing community of farmers who have chosen to become a part of the Bayer Rice Carbon Program. A relatively early adopter in her community starting with one acre in 2022, she has now convinced other farmers in her area to forgo the traditional transplanted puddled rice system for DSR coupled with the more efficient agronomic practices. "Each summer is hotter and water scarcity in our region is becoming a real problem affecting agricultural production and the lives of local citizens. Starting with one acre of land in 2022, and witnessing the benefits of DSR, I have expanded the practice to not just six acres being cultivated by me, but as well as four acres of my brother's land. This transition

“Bayer, the seed-to-crop protection and integrated agri-solutions institution, has been at the forefront of supporting and guiding more than 25 million farmers, an overwhelming majority of whom are small and marginal land holders, to grow more, with less, while restoring more



helped me save ` 60,000 per year just in labour costs and significant reduction on water consumption”, explains Jyothi.

Corn is another crop which has emerged as a critical row crop in the country, with multiple end uses including a more sustainable source of ethanol production, which is not just reducing fossil fuel dependence, but also helping India save precious foreign exchange by helping reduce crude imports into the country. It's farmers like Rapalla Rambabu who are making it possible.

Rapalla embraced Bayer's DEKALB® hybrids in 2008. The farmer in Manchala village, situated in Guntur district of Andhra Pradesh has successfully battled adverse weather, not only harvesting a bountiful crop but also witnessing a remarkable surge in yield — a leap from a meager 20-25 quintals per acre to an impressive 40-45 quintals per acre. The doubling of his earnings by ` 90,000 per acre bore witness to his newfound success. “I've been cultivating DEKALB® Corn for

the past 15 years. Before I used DEKALB® HYBRIDS, I experienced tough situations in my farming during the initial years due to the vagaries of the monsoon, crop lodging, and high levels of pest and disease infestations resulting in lower yields. Once I started cultivating DEKALB®, it provided me with mental satisfaction and psychological safety by giving better yields, raising my family's standard of living. Recently, for the past 2 years, I have been growing a new DEKALB® Hybrid DKC 9217 in the Rabi season, which has performed extremely well, giving consistent yield and standability. I have planted it in 6 acres and plan to expand the acres in the coming Rabi too.”

Jyothi and Rapalla are role models for not just their neighbours, but for the entire farming community, which is not just feeding more than 1.4 billion people, but also providing for fodder, feed and also energy, as India transitions to a sustainable and climate resilient ecosystem.





# TUBER CROPS IN KERALA

## Investment Opportunities and Market Demand for Sustainability



Tuber crops such as cassava, elephant foot yam, yams, sweet potato, colocasia (taro), Chinese potato (koorka) and arrowroot, are vital to Kerala's cultural, nutritional and economic landscape. Covering 68,247 hectares in 2022-2023 (about 8% of Kerala's food crop area), these crops are integral to local diets and provide essential income for small farmers and tribal communities. Thiruvananthapuram, Pathanamthitta, Kollam, and Palakkad districts are the leading districts for tuber crops cultivation in Kerala. Historically, tubers served as lifeline during food scarcity, offering a reliable, nutrient-dense food source. Today, as Kerala faces challenges from changing land use and climate variability, tubers remain crucial due to their resilience and adaptability. Thriving in diverse conditions with minimal inputs, they are hardy and drought tolerant, making them a sustainable choice for maintaining productivity amidst climate uncertainties. Rich in antioxidants, vitamins, minerals and dietary fibre, they also help in addressing malnutrition, particularly in rural and tribal areas. Furthermore, intercropping with plantation crops like coconut and banana enhances soil health, providing an insurance crop that mitigates risks from natural disasters and price fluctuations.



As demand for tubers are high in both domestic and international markets, these high-yielding and climate resilient crops offer good opportunities for sustainable economic growth and food security for the Kerala farmers.

### Elite varieties for agri-food systems

In the context of climate change and the prevailing issues of food insecurity, malnutrition, hidden hunger and low productivity of food crops, climate resilient tuber crops with valued traits suiting to different agrifood systems are the pressing needs of the hour. Thus, the aim was to develop disease and pest resistant tuber crops with early

maturity, longer keeping quality, high dry matter, starch,  $\beta$ -carotene, anthocyanin and low sugar contents. ICAR-CTCRI has so far released 71 improved varieties in tropical tuber crops and the popular tuber crops varieties grown in Kerala are .

- **Cassava:** Sree Jaya, Sree Vijaya, Sree Prakash, Sree Pavithra, Sree Swarna, Sree Reksha
- **Sweet potato:** Sree Nandini, Sree Vardhini, Sree Bhadra, Gouri, Sree Arun, Sree Varun, Sree Kanaka, Bhu Sona, Bhu Kanti, Bhu Krishna
- **Greater yam :** Sree Keerthi, Sree Roopa, Sree Shilpa, Sree Karthika,

Sree Neelima, Sree Swathy, Sree Nidhi, Sree Hima

- **White yam:** Sree Subhra, Sree Priya, Sree Haritha, Sree Dhanya (dwarf), Sree Swetha (dwarf)

- **Lesser yam:** Sree Latha, Sree Kala

- **Elephant foot yam:** Sree Padma, Sree Athira

- **Taro:** Sree Rashmi, Sree Pallavi, Muktakeshi, Sree Kiran

- **Chinese potato:** Sree Dhara

### Market demand of tuber crops

To assist farmers in making informed crop choices, a detailed analysis of the market demand and investment potential for Kerala's major tuber crops are presented

- **Cassava (Tapioca):** A staple food in Kerala, accounted for 55,713 hectares and produced 2.39 million tons in 2022-23, with a productivity of 42 tons/ha. The cost of cultivation is estimated at ₹1.5–2.0 lakhs per hectare, while the mean value of output is ₹4, 63,473 per hectare. Cassava's high productivity, low input cost, and growing market demand make it ideal for Kerala farmers. Processing and value addition in cassava offers profitable revenue generation to the farmers and entrepreneurs. The crop recorded a compound annual growth rate (CAGR) of 0.72% in area and 9.31% in production from 2017-18 to 2021-22, indicating a positive trend. The crop is also included in One District One Product (ODOP) of Thiruvananthapuram and Kollam districts of Kerala by Government of India recognizing its value.

- **Elephant foot yam:** Known for its nutritional profile, elephant foot yam is popular in local markets in its raw form. Resilient with stable demand, it yielded approximately 241 thousand tons from 4446 hectares in 2022-23. It's a high return crop due to its moderate input costs and consistent market demand. Despite, its negative ( -0.46%) CAGR in area, production increased by 22.46 % between 2017-18 and 2021-22, indicating efficiency gains.

- **Sweet potato:** Rich in fiber and nutrients, sweet potato has a growing consumer base, especially among health-conscious individuals. Its shorter duration and compatibility with organic farming make it ideal for smallholders targeting niche markets. While area under cultivation increased slightly by 0.21%, production saw a slight decline of -0.62% from 2018-19 to 2021-22. Owing to its nutritional value there lies a great demand, particularly in urban areas which makes it a promising crop for 2025.

- **Yams (Dioscorea spp.):** Valued for their high starch content, yams have strong demand in both local and regional markets. Though they require a higher initial investment, yams offer favorable returns due to their long shelf life and market value. They are best suited for farmers who can commit resources to longer-term cultivation and have access to reliable distribution channels.

- **Colocasia (Taro):** Widely used in Kerala's traditional dishes, colocasia is valued for its fibre and nutritional benefits. With robust adaptability to the local climate and low input costs, it is a reliable crop that provides stable returns, presenting a low-risk investment option for farmers.

- **Chinese Potato (koorka):** A seasonal speciality, koorka has high demand in Kerala, particularly in winter. Although labor-intensive, it commands premium prices due to limited seasonal availability, medicinal value and high consumer preference. Due to awareness among the people about its health benefits, it is becoming increasingly popular, making it a worthwhile investment for farmers..

- **Arrowroot:** Valued for its medicinal properties and as a gluten-free thickening agent, arrowroot is gaining attention in health food markets. While its yield is lower than other tubers, its high market value compensates, making it ideal for farmers focusing on niche or health-conscious markets. Arrowroot's minimal input needs and climate adaptability enhances its appeal as a speciality crop for 2025. Economic viability and investment options

Data from 2022-23 highlights the increased production and profitability of crops like cassava, elephant foot yam and others as given in Table below.

### Area, production, market value, cost of cultivation and gross income of tuber crops in Kerala

Crop	Area (ha)	Production (tonnes)	Market Value (₹ in lakhs)	Cost of cultivation (₹ in Lakhs/ha)	Gross Income(₹ in Lakhs/ha)
Cassava	55713	2390395	478.08	1.5-2.0	8.40
Sweet potato	150	2133	5.31	1.0-1.2	3.50
Elephant foot yam	4486	241435	48.29	2.0-2.5	9.40
Yams	1236	37080	11.12	1.5-2.5	9.00
Taro	5185	58024	11.60	1.0-1.3	2.20
Chinese potato	848	12720	3.82	1.5-2.0	4.50
Arrowroot	345	8625	3.02	1.0-1.5	8.75

Source: Department of Economics and Statistics, Govt. of Kerala and author's estimation

### The investment options for tuber crops are

- **Cassava:** With low input costs and high productivity, cassava suits medium-to-large scale farming operations focused on both local consumption and processing for export.

- **Elephant foot yam:** Its moderate costs and market potential makes it attractive for local markets.

- **Sweet potato:** Ideal for smallholders, particularly those targeting health-conscious consumers.



“Today, as Kerala faces challenges from changing land use and climate variability, tubers remain crucial due to their resilience and adaptability. Thriving in diverse conditions with minimal inputs, tubers are hardy and drought tolerant, making them a sustainable choice for maintaining productivity amidst climate uncertainties.”



● **Seasonal high-demand crops:** Chinese potato (Koorka) and colocasia offer steady income with potential for premium prices during peak seasons.

● **Long-term investments:** Yams provide high returns and are suitable for farmers with resources for long-term investment and stable distribution.

#### Conclusion

Tuber crops contribute significantly to Kerala's agricultural sector, ensuring food security, income, and resilience to climate variability. Covering a substantial share of Kerala's food crop area, crops like cassava, elephant foot yam, and sweet potato not only provide a reliable income for small-scale and tribal farmers but also enrich their diets. Their adaptability to Kerala's varied growing conditions, low input requirements, and drought tolerance make them suitable for sustainable farming, especially as demand grows in local and health-focused markets. A strategic focus on high-yield and speciality tubers handholds Kerala's farmers to meet market demands while achieving economic stability and food security for 2025 and beyond.

● **Yams:** Offering a high price point and long storage life, yams are a sound choice for farmers with resources for long-term investment.

● **Colocasia:** A low-risk, steady-income crop, colocasia is adaptable to various soil types and provides stable returns.

● **Chinese potato (Koorka):** A high-return seasonal crop, ideal for farmers ready to handle its labor-intensive cultivation.

● **Arrowroot:** Recommended for niche markets, especially those focused on health or gluten-free products, where demand is on the rise.

#### Crop Selection and Diversification

To maximize returns, farmers should consider diversifying their crop portfolios based on market demand, soil type, and available resources. The following recommendations can guide optimal selection for 2025:

● **Large farms:** Cassava and elephant foot yam are excellent for larger farms with access to both local and export markets.

● **Smallholders:** Sweet potato and arrowroot are ideal for those targeting organic or niche health markets.

*Dr P. Prakash, Dr D. Jaganathan, Dr Sheela Immanuel and Dr G. Byju*

*ICAR-Central Tuber Crops Research Institute, Sreekariyam, Thiruvananthapuram, Kerala*

## SUCCESS FROM RELIANCE ON JIVAGRO'S COMPLETE CHILLI PORTFOLIO

I have been cultivating chilli on 12 acres for the past 15 years. Over the years, I faced several challenges, primarily due to thrips infestations and fungal diseases.

Despite spraying multiple chemicals across several rounds, I could only achieve medium yields.

Three years ago, I began using Jivagro products for chilli cultivation, starting with Rapigro and Fantic M. After the first spray, by the 8th day, I noticed extraordinary results, which built my trust in Jivagro products.

Since then, I have consistently used their products, with regular guidance from the Jivagro team. Their frequent visits to my fields and with safe profile product recommendations have significantly improved both the quality and quantity of my yields.

When introducing Ultimare, I noticed substantial improvements, with the plants achieving optimal standards across all parameters. Additionally, Armatura which MRL exempted proved to be a game-changer. After using it, I achieved top-quality produce. Even when last year's market prices were low, my produce fetched the highest rates. Today, I rely entirely on Jivagro's complete chilli portfolio and am highly satisfied with their solutions. I extend my heartfelt thanks to Jivagro for providing such exceptional products that support chilli farmers like me.

Special Note: Thank you, Jivagro, for helping chilli farmers achieve sustainable results with your innovative products.



**Thuruva Srinivasulu,**  
Village Kiravadi,  
Mandal: Gonegandla,  
Kurnool district,  
Andhra Pradesh



# Successful Experience of Haryana Farmer With patented UPT technology of Alga Energy, Spain



Story of crop change with K-Max Energy, a bio-fertilizer of agricultural chemicals made from patented UPT technology of Alga Energy, Spain. Nitin ji's experience.

## Farmer of Karnal, Haryana

Mr. Nitin, a resident of Sheikhpura Khalsa, Karnal, Haryana is a progressive farmer who grows crops like wheat, mustard, paddy etc. in his 45 acres of land.

Nitin ji has been doing farming for the last 6-7 years and is leading in adopting better agricultural technology in his farm. About 4-5 years ago, Nitin ji started using K-Max Energy, made from patented UPT technology of Alga Energy, Spain and after adopting it, he saw amazing results in his crop.

## Challenge

Nitin was facing challenges like low yield in his crops, poor soil health and fertility, poor crop growth. Using K Max Energy not only improved the health of his crops but also increased the fertility of his land.

## Starting with K Max Energy

Nitin decided to use K Max Energy, a microalgae-based biofertilizer made from Alga Energy, Spain's patented UPT technology, on the recommendation of Krishi Rasayan representative. "I was told by Krishi Rasayan representative that K Max Energy is a microalgae-based biofertilizer of Krishi Rasayan made from Alga Energy's patented UPT technology, which not only improves soil health but also increases crop yield and quality, so I decided to use it in my crop," said Nitin.

## Results

Within a short time of using K-Max Energy, Nitin saw the following significant changes:

Increase in yield: "My yield increased by 10-15% compared to earlier. This was a great achievement for me."

Improvement in crop quality: "With the use of K-Max Energy, an agrochemical product made with the technology of Elga Energy, Spain, my crop yielded better quality crops and I got a good price for

my crop in the market."

Soil fertility: "With the use of K-Max Energy, the soil structure improved and it became friable. Now my land has become more fertile than before."

Stress tolerance: "With the use of K-Max Energy, the stress tolerance of my crop improved."

Benefits: With the use of K-Max Energy, made with the patented UPT technology of Elga Energy, Spain, the cost was reduced and profits were higher.

## Comparison with other products

Nitin said, "I had used other fertilizers earlier but they were not as effective as K-Max Energy. Using K-Max Energy has given me a very healthy crop and increased the yield."

## Recommendation

"I would recommend every farmer to use K-Max Energy, an agrochemical biofertilizer made from Elga Energy, Spain's patented UPT technology. It is great for both your crop and soil."

## Future plans

Nitin says, "I use K-Max Energy in all my crops and will continue to do so in future."

## Conclusion

Nitin's success story shows that farming can be revolutionized through modern techniques and scientific approach. Using K-Max Energy, made from Elga Energy's patented UPT technology, not only improved his crop yield and quality but also revived the soil fertility. This not only reduced the cost of production but also increased profits.

This story is inspiring for other farmers who can make their farming more sustainable and profitable by adopting new technologies along with traditional methods. Narend Patel's experience is proof that choosing the right product and technology can bring positive change in the agriculture sector.





# Success story of K-Max Super made from Elga Energy, Spain's patented UPT technology

## Rajesh Anjana's experience



### Introduction

Rajesh Anjana, a resident of Gatia, Ujjain, Madhya Pradesh is a progressive farmer who grows crops like potatoes, onions, garlic etc. in his 27 acres of land.

Rajesh ji has been doing farming for the last 16 years and uses better agricultural techniques like drip irrigation and sprinkler irrigation in his farm. In 2019, Rajesh ji came to know about K-Max Super made from Elga Energy, Spain's patented UPT technology from the representative of Krishi Rasayan and after using it, he saw amazing results in his crop.

### Challenge

Rajesh was facing challenges like low yield in his crops, poor soil health and fertility, poor crop growth, high cost. Rajesh says that he tried many products like chemical fertilizers, mycorrhiza, humic acid and seaweed products to provide the right amount of nutrition to the plants but it increased his cost a lot and he did not get the benefit in production and profit.

### Starting with K Max Super

Rajesh decided to use microalgae-based K-Max Super made from Alga Energy, Spain's patented UPT technology on the recommendation of the representative of Krishi Rasayan. Narendra said, "The representative of Krishi Rasayan told me that K-Max Super is a microalgae-based product made from Alga Energy's patented UPT technology which not only improves the quality of soil but also increases the yield and quality of crops, so I decided to use it."

Rajesh ji first used K Max Super in 2-3 acres and today he uses it in his entire land which includes 27 acres of his own farm and 80-90 acres of leased land.

### Results

Soon after using K Max Super, Narendra saw significant changes:

Increase in yield: "My yield has increased by 15-20% compared to earlier."

Increase in root development and plant growth: The use of K Max Super, an agrochemical product from Alga Energy, Spain, increased root development.

Improvement in crop quality: "The use of K Max Super, an

agrochemical product from Alga Energy, Spain, increased the quantity of my potato tubers. I got 3-4 more tubers in one plant and I got uniform bulbs and uniform colour of onion crop."

Improvement in soil fertility: "The use of K Max Super improved the soil structure and made it friable. Now my land has become more fertile than before."

Stress Resistance: "Use of K Max Super has improved the stress resistance of my crop and also increased the shelf life of my crop."

Cost Reduction & Profit: Use of K Max Super, an agrochemical made from patented UPT technology of Alga Energy, Spain has reduced costs as I do not have to use additional products to nourish my crop resulting in higher profits.

### Comparison with other products

Rajesh said, "I have used other fertilizers before but their effect was not as effective as K Max Super. The effect of K Max Super is visible within 5-6 days of use which is very effective and its continuous use improves the health of the soil and makes the land more fertile"

### Recommendation

"I would recommend it to every farmer. It is very easy to use, it can be done by broadcasting method by mixing it with urea and its effect is visible very quickly in the crop, which is very effective. K Max Super is very good not only for your crop and soil but also for the environment."

### Future Plans

Rajesh says, "I use K Max Super in all my land and will continue to do so in future too"

### Conclusion

The success story of Rajesh Anjana shows how adopting advanced agricultural techniques and innovations can achieve excellent results in farming. The use of K Max Super, made with patented UPT technology from Alga Energy, Spain, has transformed every aspect of his farming—increased yield, improved crop quality, improved soil fertility and reduced costs. Rajesh ji's experience is proof that by choosing the right technology and products, both the income of farmers and the future of farming can be improved.

His experience is an inspiration for all farmers that they too can make their farming more profitable and environmentally friendly by adopting modern products and techniques.



## SMALL SPACES BIG IMPACT

### *Terrace gardens for climate resilience*

“By integrating greenery into urban planning, we can create cities that withstand climate extremes while supporting a sustainable and healthier environment

India's 2024 Climate Report highlights an urgent crisis: the country endured extreme weather events on nearly every day in the first nine months of this year, claiming more than 3,000 lives and damaging over 3.2 million hectares of crops. These severe conditions affected nearly all Indian states and Union Territories, underscoring the need for adaptable and immediate solutions. For urban communities—especially for those who work outdoors or live in temporary shelters—the risks of extreme temperatures are even more pronounced.

#### Strain Upon Cities

Cities across India are facing increased strain as temperatures continue to rise, overwhelming infrastructure and public health resources. Though state governments are implementing night shelters, adjusting school timings, and running awareness campaigns, these measures alone are insufficient against the mounting climate challenges.

Urban areas are increasingly looking toward green solutions like terrace and balcony gardens, which can play a crucial role in adapting to climate extremes. Studies reveal that integrating greenery into cityscapes can naturally regulate temperatures and contribute to urban resilience. Around the world, cities are finding success with similar strategies; for example, Copenhagen in Denmark has transformed its environment by promoting green roofs and encouraging residents to maintain these spaces themselves. This approach not only cools urban spaces but also encourages community responsibility and engagement. India has a real opportunity to adopt similar practices with terrace and balcony gardens, which are versatile enough to be incorporated into various types of housing and accessible across economic groups.

#### Benefits of Terraces

Terrace and balcony gardens offer significant benefits in the fight against climate extremes, especially during heat waves, which have become more intense in Indian cities. Vegetation on rooftops and balconies can reduce the surrounding temperature through natural shading and evapotranspiration, the cooling process of water evaporating from plants. Studies show that a green roof can lower surface temperatures by up to 20°C compared to traditional concrete, creating more comfortable conditions. This cooling effect not only improves air quality but also reduces energy consumption by cutting down the need for air conditioning, indirectly curbing greenhouse gas emissions. Urban balconies and terraces can easily host vegetables, herbs, and other plants, providing residents with fresh produce while also addressing the urban heat island effect. These spaces offer a

chance to reconnect with nature, supporting better mental well-being and stress relief.

Beyond temperature control, terrace and balcony gardens provide insulation benefits during colder months, reducing indoor heating needs. Green walls and roofs act as a natural buffer, retaining warmth and helping to cut energy costs.

#### Green Roofs

Additionally, green roofs serve as windbreaks, softening the impact of chilly winds. While often valued for their cooling properties, these green solutions offer year-round benefits, helping to stabilize indoor temperatures and making them a valuable strategy for climate adaptation in urban spaces.

The environmental impact of these green spaces goes further by creating small ecosystems that attract birds, pollinators, and insects, which support biodiversity. Terrace and balcony gardens offer an opportunity to enhance ecological stability in urban centers, enriching daily city life and creating connections to the natural world. These gardens often become gathering points for neighbors to share gardening knowledge, exchange seeds, and collaborate, nurturing a shared sense of purpose and building community bonds around sustainability.

India's cities could become leaders in adopting green spaces as a central strategy for climate adaptation. Supportive policies and incentives would help drive the adoption of green roofs and balcony gardens. Updating building codes to encourage green rooftops in new construction and offering subsidies or tax breaks to households retrofitting their terraces with plants would make these green spaces more common across urban areas. With the right backing, terrace and balcony gardens could quickly become a familiar sight in Indian cities, creating a low-cost, high-impact response to the immediate challenges of climate change.

Green roofs, terraces, and balcony gardens offer more than just aesthetic value; they are essential for strengthening cities against climate challenges. Expanding these practices can transform Indian cities into cooler, healthier spaces that soften the impacts of rising temperatures and unpredictable weather. With climate change posing serious threats, India's cities have an opportunity to adopt green spaces on rooftops and balconies as a straightforward, effective approach. By integrating greenery into urban planning, we can create cities that withstand climate extremes while supporting a sustainable and healthier environment.

*Dr. Eilia Jafar  
is a Development  
Professional*



# BioE3 Policy

## THE BIOTECHNOLOGICAL ECONOMY AHEAD

The union cabinet under the chairmanship of Prime Minister Narendra Modi approved the Biotechnology for Economy, Environment, and Employment Policy (BioE3) aimed towards 'Building High Performance Biomanufacturing' through with National mission of the Government of India including 'Net Zero' carbon economy and Mission LiFE (Lifestyle for environment). The policy was officially launched by S&T Minister Dr Jitendra Singh while addressing the media he also said "BioE3 policy will be a landmark not only for bio economy but a disruptor for Viksit Bharat @2047".



Union Minister Dr. Jitendra Singh launching the BioE3 policy

**B**ioE3 (Biotechnology for Economy, Environment, and Employment) Policy is an initiative with an objective to lead biomanufacturing and biotechnology industry in the country of India. BioE3 policy is a step up from India's current biotechnology plan, aimed to capitalize on India's strengths in scientific human capital, biological resources, and growing economic prowess for a key global biotechnology player. This policy package aims at solving many national challenges at once: economic development, environmental protection, the food security challenge, the health challenge, and the challenge of employment.

It is expected that BioE3 policy will bring about revolutionary changes in food, energy and health sectors. Hence six themes have been identified and are provided as an overview of the policy, namely which are Bio-based chemicals and enzymes, Functional foods and Smart proteins, Precision biotherapeutics, Climate resilient agriculture, Carbon capture and its utilization and Futuristic marine and space research. In the agriculture sector the policy aims at established genetically modified crop varieties that is resistant to climate change and that have high yields. This covers biotech crops that exhibit traits such

as; drought resistance, pest resistance, and improved diet quality. As the means of decreasing chemical input in the agricultural system, the policy also extends the sale and utilization of biofertilizers and biopesticides. Precision agriculture is another important field due to the latest biotechnology-based sensors and diagnostics for soil and crops' health assessment in terms of diseases.

### Healthcare

For healthcare, BioE3 emphasizes the development of affordable diagnostics and therapeutics, particularly for diseases prevalent in India. This would involve promoting the biosimilars to reduce healthcare costs, generation of new vaccines and exploration of traditional medicine through modern biotechnology. The policy also encourages genomics and proteomics research with a view to applying precision medicine, based on the genetic differences of the Indian population.

The policy in the industrial biotechnology sector fosters the use of bio-products as substitutes for products derived from petroleum. This comprises of bioplastics, bio-lubricants and the construction-based bio materials. Another thematic focus area is enzyme technology with its application in textile and Leather processing and food processing sectors. The policy also supports the application of biotechnology in waste and emission management, bioremediation, contaminated sites, as well as commercialization of biofuel processes.

### Marine Biotechnology

One of the major areas defined by the BioE3 policy as a focus area of research is marine biotechnology which would involve programmes to prospect the extensive Indian coastline and marine species for new biologically active molecules of drug interest. The policy also seeks to develop the sustainable aquaculture and the new generation of mariculture products such as nutraceuticals.

In order to achieve such lofty objectives, more focused investments in infrastructure are planned and spelled out in the policy. This includes the setting up of one stop biotechnology park with necessary infrastructure for research and development and Pilot scale production. Biotechnology incubation centers are intended to promote biotechnology startups by offering them resources and mentorship. The policy also calls for establishment of regional biotechnology clusters, so as to facilitate biotechnology collaboration between universities, industry and the government.

Education and skill development are critical key drivers in the BioE3 strategy.

In the policy, special emphasis is placed on the issue of the regulation. It proposes streamlining approval processes for biotech products while ensuring safety and ethical considerations. This includes updating regulations to keep pace with emerging technologies like gene editing and establishing specialized committees for fast-track approvals of critical products. The policy also addresses the need for a robust intellectual property rights (IPR) regime, proposing measures to enhance patent filing from Indian institutions and companies.

### Funding

A significant aspect of the BioE3 policy is funding. It proposes more government support for biotechnology-related basic and applied research, with an emphasis on high-priority fields that are in line with domestic need. In order to encourage private investment in biotech R&D, the policy also suggests establishing venture capital firms with a biotechnology concentration and offering tax breaks. It also offers strategies for public-private cooperation to close the knowledge gap between laboratory research and finished goods.

The emphasis is on international cooperation as a way to boost India's biotech industry. The policy suggests bilateral and multilateral agreements for cooperative research initiatives, especially in fields in which India is not an expert. It also recommends strong involvement in international biotechnology projects and conferences, as well as student and researcher exchange programs with top biotech nations.

### Vision, Wider Targets

The BioE3 policy outlines a vision and challenging goals for the growth of India's bioeconomy. These are measurable outcomes that include more specific goals as to the intended contribution of the biotech sector to GDP, wider targets for biotech exports, and objectives for the generation of a set number of biotechnology start-ups and SMEs within a particular number of years. The policy also avows to align these goals with UN Sustainable Development Goals basically in the areas of food, health, energy and environment standards.

Public awareness and participation are yet another essential element of the policy. It suggests initiatives to raise public awareness of biotechnology and address genetically modified organism (GMO)-related issues by engaging stakeholders and maintaining open lines of communication. The strategy additionally endeavors to foster bio-entrepreneurship among young people by means of contests, mentorship initiatives, and early biotechnology exposure in educational settings.

The BioE3 policy gives special consideration to rural development. It suggests creating biotechnology-specific solutions to address issues in rural areas, like affordable water purification systems, biogas plants to meet energy needs in rural areas, and cottage industries centered around biotechnology. Additionally, the policy highlights the use of biotechnology to enhance health and sanitation in rural areas, including the creation of point-of-care diagnostic instruments for rural health centres.

A concerted effort involving many government agencies, academic institutions, and business associations is suggested to implement the BioE3 policy. The policy recommends setting up a high-level steering group to supervise its execution, with periodic evaluations and modifications made in response to advancements and new developments in the field of biotechnology worldwide.

### Role Of Biotechnology

To sum up, the BioE3 policy is a thorough and ambitious plan to use biotechnology to further India's growth. Its success will rely on how well it is implemented, how long it is funded, and how well it can change with the quickly changing global biotechnology scene. Like any long-term program, its full effects might not become apparent for years, thus continuing evaluation and modification will be essential to achieving its objectives.

**BioE3 policy is a thorough and ambitious plan to use biotechnology to further India's growth.**

#### Swapnil Srivastava

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# Seed The Change

## Cultivating Ideas For A Sustainable Tomorrow

**T**he future of our planet lies in the hands of today's innovators, thinkers, and everyday citizens who have the power to nurture ideas that drive sustainable progress. "Seed the Change: Cultivating Ideas for a Sustainable Tomorrow" underscores the importance of planting seeds—whether in the form of small actions, innovative solutions, or forward-thinking policies—that will grow into lasting environmental and societal transformations.

Sustainability is no longer just a buzzword; it is a necessity. Climate change, resource depletion, and social inequalities are urgent issues that require collective action. The change we seek begins with the cultivation of new ideas—ideas that challenge conventional wisdom, encourage responsible consumption, and promote ecological balance. These ideas must be rooted in the principles of environmental stewardship, social equity, and economic viability.

Innovation plays a crucial role in this process. From renewable energy technologies like solar and wind power to green agricultural practices and sustainable urban design, we are witnessing a wave of creative solutions that have the potential to reshape industries and

communities. However, innovation should not only be left to scientists or large corporations. Individuals, too, have a vital role to play by adopting sustainable habits, supporting eco-conscious businesses, and advocating for policies that prioritize long-term ecological health over short-term profit.

Ultimately, the key to a sustainable future lies in fostering a mindset that views change as an ongoing process—one that begins with each of us. Just as a seed requires nurturing to grow into something powerful, so too must our ideas for a sustainable tomorrow be nurtured with care, collaboration, and persistence. By seeding the change today, we can cultivate a world that thrives for generations to come.

### Gujarat Green Summit, An Initiative Of Caravan Classroom

On November 21, Caravan Classroom, a registered NGO based in Vadodara organised the Gujarat Green Summit. The theme of the summit was 'Seed The Change: Cultivating Ideas For A Sustainable Tomorrow.'

Padma Shri Dr MH Mehta delivered the keynote address at the conference. He emphasised on the importance of scientific endeavour



“ On November 21, we organised the Gujarat Green Summit. The theme of the summit was 'Seed The Change: Cultivating Ideas For A Sustainable Tomorrow' ”

and community effort to build a sustainable future.

In our current times of concerns over climate change and sustainable development goals (SDGs), the summit was relevant in many ways.

1. It provided a platform for addressing environmental challenges.
2. It brought together leaders, experts, scientists and activists on a common platform to discuss issues of vital interest.
3. It emphasised renewable energy, reducing carbon emissions and ecofriendly practices.
4. It fostered collaboration and shares innovative solutions for a sustainable future.

The summit featured panel discussions on important themes. These included the following.

1. Economic Viability of Sustainable Farming: Challenges and Opportunities
2. Sustainable Urban Development: Roadmap To Building Sustainable Cities
3. Environmental Policy and Advocacy: Environmental Awareness & Education Fostering Sustainable Culture in All Age Groups.

### Session On Promoting Social Impact Entrepreneurship

Author, Angel Investor, Mentor and Fund Advisor Nagaraja (Naga) Prakasam chaired the session on the vital need for promoting social impact entrepreneurship.

Mr Nagaraja Prakasam

is a versatile and passionate

leader with three decades of experience, of which he spent a decade in the US. Retired at 41, he is passionate about startups and as a lead angel investor, has invested in 31 startups, of which Uniphore became a Unicorn with 120x return. He has served on the boards of 12 companies, and has seen 8 exits and two write-offs.

Mr Prakasam has also authored a book "Back To Bharat - In Search of a Sustainable Future" that addresses the present economic dilemma for Indian entrepreneurs and consumers, looking at the past and present situation of both India and the developed world to find a way forward. He has also spearheaded impact thinking in Indian Angel Network and co-founded IAN Impact. His personal mantra is: "Startups should focus on India's strength - People, Problems, Tech (PPT)".

### Promoting Social Impact Entrepreneurship

Social impact entrepreneurship is a powerful force for addressing some of the world's most pressing issues, from poverty and inequality to environmental degradation and public health crises. Unlike traditional entrepreneurship, which focuses primarily on profit, social impact entrepreneurship is driven by the goal of creating positive, lasting changes in society. Promoting this form of entrepreneurship is essential for building inclusive, sustainable communities and empowering individuals to become agents of change.

At its core, social impact entrepreneurship merges innovation with social responsibility. These entrepreneurs develop solutions that address social, environmental, and economic challenges while generating measurable social value. For example, businesses that provide affordable healthcare, renewable energy solutions, or educational resources to underserved communities are examples of enterprises that align profit with purpose. The success of these ventures is measured not just in financial terms, but by their ability to improve the lives of individuals and communities.

To promote social impact entrepreneurship, it is crucial to provide the right ecosystem of support. This includes access to funding, mentorship, and networks that help entrepreneurs scale their ideas. Impact investors, who prioritize social and environmental returns alongside financial ones, can play a significant role in making these ventures viable. Furthermore, governments and nonprofits can support these businesses by creating policies that incentivize social entrepreneurship, such as tax breaks for companies that focus on social good or providing grants for innovative solutions to global challenges.

Education also plays a pivotal role in promoting social impact entrepreneurship. Encouraging young people to think creatively about solving societal problems, and equipping them with the skills needed to launch and manage impactful ventures, can lead to a new generation of changemakers.

By fostering an environment where social impact entrepreneurship can thrive, we empower individuals to create sustainable solutions, ensuring a brighter future for people and the planet alike.



*Ms Rajeshwari Singh*

Founder-Director of Caravan Classroom Foundation and Real Heroes Empowerment Association



# Empowering Farmers

## The Journey of Jaivik Sri Farmers Producer Company Ltd

Jaivik SRI Farmers Producer Company, Ltd was established in 2016, supported by Pragati, a NGO in Koraput District and NABARD with the vision "To empower and create dignified livelihood for the small and marginal farmers of South Odisha". The leaders of the company had the realisation that the small holder farmers faced huge challenges in accessing quality inputs, information, technology and above all the market. Working under very challenging situations, JSFPC has evolved gradually and now has 1876 shareholders spread across 197 villages in Koraput District due to the hard work of the dynamic Board of Directors.

### Business With Ethics

Business with ethics has been the driving force for JSFPC. The Company has a diverse range of business activities include selling of inputs like quality seeds, organic manures, small farm equipment, aggregation, value addition and marketing of produces like aromatic rice, finger millet, small millets, pulses and spices. The Company owns an agro- service centre with equipment and farm machineries like tractor, power tiller, sprayers, chain fencing machine and millet thresher which the farmers can hire/purchase at fair prices. The farmer shareholders can access services like climate advisory, trader and market information, crop insurance etc.

Ginger, one of the major spices produced in Koraput District is being planned for value addition and marketing and also taking the product to export market. Process has been initiated for development of organic ginger clusters and certification with the vision to link with

export market. With the support of Agriculture Market Development (AMD) an Indo-German Co-operation initiative and GAP Fund of IFAD, JSFPC has set the vision to export organic ginger to the EU market.



### GI Tag for Koraput Kalajeera Rice

One of the outstanding successes of JSFPC has been the Geographical Indication (GI) Tag for Koraput Kalajeera Rice, the finest variety of aromatic rice cultivated and conserved by the farmers of Koraput District over generation. It has given a unique brand to the Koraput Kalajeera rice and its popularisation in national and international market



“As JSFPC CONTINUES ITS JOURNEY, IT HAS BEEN HONoured WITH MANY AWARDS AND ACCOLADES



JSFPC has proved its success in production and marketing of millets as it is implementing the Special Programme for Promotion of Millets in Tribal areas of Odisha" supported by former Odisha Millet Mission, now known as the Shree Anna Abhiyan in Nandapur Block of Koraput District since June 2017. The Company has promoted System of Millet Intensification for more than 6000 farmers through support of quality seeds, trainings for adoption of improved package of practices, primary processing and enabling the farmers to access Minimum Support Price. JSFPC has been recognised as the best FPO for market linkage by the Government of Odisha, department of Agriculture & Farmers' Empowerment.

### Rice Intensification

System of Rice Intensification has been promoted in huge scale especially focussing on aromatic and indigenous rice, black rice and brown rice, enabling farmers to get additional income of 40% in comparison to their earlier practices. The visibility of the company has helped in mobilisation of projects from Government that included Direct Seeded Rice, Promotion of Indigenous and Aromatic Rice and Rejuvenating Watersheds for Agricultural Resilience through Innovative Development (REWARDS), recognition for its commitment and aptitude to work for the cause of small and marginal farmers. The commitment for green agriculture has been one of the motivating factors for Jaivik SRI FPC is promoting renewable energy for reducing

use of fossil fuels and GHG emission through creation of market for solar pumps and solar home lighting systems. More than 200 farmers have started using solar pumps and replaced diesel powered pumps. Home lighting systems are promoted through easy monthly instalments. A cadre of service providers, comprising local youth have been created for decentralised services and sustainability of green energy.

### Pisciculture

Allied sector, i.e. pisciculture has gained momentum under the patronage of the Company. In association with Central Institute of Freshwater Aquaculture, Bhubaneswar fish farming has been promoted for 434 farmers of Borigumma, Jeypore, Kotpad and Koraput blocks. The Company provides trainings, fingerlings and fish feed to the farmers at subsidized price.

As JSFPC continues its journey, many awards and accolades have come on the way. Krishi Alerts award for its contribution in Sustainable Agriculture and Organic farming, which is jointly awarded by ICAR, APEDA and NITI AAYOG, recognition as the best FPO under Brand of Odisha, Pride of India by the SAMBAD media house, best FPO Award by the Odisha University of Agriculture and Technology, Best FPO Award by Odisha Government, department of Agriculture, Food Production and Farmers' Empowerment for promotion and market linkage of millets are the small feathers in the cap that encourages the Company to march ahead towards materialisation of its vision and mission.





# Discovering Jivagro: A Game Changing Decision



*Jillellamudi Rambabu,  
Village Mandadi, Mandal Veldurthi, Palnadu  
district, Andhra Pradesh*

## The Challenge: Battling Black Thrips

In 2021, black thrips became a recurring problem, devastating my chilli crop season after season. Despite trying numerous insecticides available in the market, I struggled to control this pest. Each spray brought little to no relief, leaving me disheartened and uncertain about how to save my crop. The pest not only reduced my yield but also impacted the quality of the produce, making it harder to secure a good price in the market.

By 2022, I realized I needed a better solution to tackle this persistent issue. It was around this time that I heard about Jivagro products. Initially, I was sceptical, as I had already spent significant amounts on various solutions without success. However, I am convinced by Jivagro's Thrips management approach. It is really difficult to control thrips considering the nature of pest, and faster life cycles during the season, I understood that there should be thrips management programme.

## Remarkable Efficacy

I followed Jivagro thrips management program with Ultimare and Torpedo which helped to keep the thrips population low and ultimately control with fewer sprays when compared to others. The efficacy of these products was remarkable, and for the first time in years, I saw a significant reduction in the black thrips population in my chilli crop. This experience gave me the confidence to explore more products from Jivagro's portfolio.

Encouraged by the initial results, I began incorporating other Jivagro products into my crop management practices. Some of the key products I used included:

- **Armatura:** A highly effective biochemical fungicide that helped me control diseases in my chilli crop and helped grow healthy flowers and fruits.
- **Fantic-M:** A powerful fungicide that safeguarded my plants from fungal infections.
- **Siapton:** A product that boosted plant vigor and health.
- **Rapigro-L:** A growth enhancer that promoted healthy development and increased yield potential.

## Transforming My Crop and My Livelihood

The shift to Jivagro products proved to be transformative, not just for my farm but for my entire livelihood. Here's how:

### 1. Pest and Disease Control:

Jivagro products provided superior control over pests and diseases. Unlike other products in the market, these solutions delivered consistent and reliable results, significantly reducing the damage caused by black thrips and other pests.

### 2. Improved Quality of Produce:

The quality of my chilli improved noticeably. Buyers could clearly

differentiate my produce from that of neighboring farms, offering me a premium price of ₹800 more per quintal than other farmers in the area.

### 3. Higher Yields:

With the consistent use of Jivagro products, I achieved an impressive yield of 25 quintals per acre, a significant improvement over previous seasons.

### 4. Better Market Prices:

The high-quality produce fetched a price of ₹20,800 per quintal, allowing me to earn more profit from my harvest.

### 5. Financial Stability:

The increased income enabled me to clear all my debts, bringing a sense of financial security and peace of mind.

### 6. Recognition as a Progressive Farmer:

My success has not gone unnoticed. Farmers in my village now look up to me as a progressive farmer who has adopted modern and effective practices. Many of them have approached me for guidance, and I actively recommend Jivagro products to them for their chilli crops.

## Gratitude to Jivagro

The transformation in my farming journey would not have been possible without the support and innovation of the Jivagro team with safe and sustainable solutions. Their products not only help control pests and diseases but also contribute to sustainable and quality farming practices. I am especially grateful for their continuous efforts to develop solutions that improve the lives of farmers like me. Jivagro has shown me that with the right tools and guidance, farming can be not only a livelihood but also a rewarding and sustainable career. The use of their products has enhanced the quality of my yields and, in turn, the quality of my life.

My name is Jillellamudi Rambabu, and I am a farmer from Mandadi village, located in Veldurthi Mandal, Palnadu District, Andhra Pradesh, near Macherla town. My journey in farming began in 2004 under circumstances that were far from ideal. After the sudden demise of my father, I had to discontinue my education midway after completing my SSC to take up the responsibility of earning a livelihood through farming. My family owned 20 acres of agricultural land, and I stepped into the challenging yet rewarding world of farming.

For the past 20 years, I have been cultivating crops like chilli and cotton, gaining significant experience in managing and nurturing these crops. Currently, I focus on chilli cultivation, growing the crop on 10 acres of land. While I have faced many ups and downs in farming, the year 2021 brought one of the most severe challenges of my career—a massive outbreak of black thrips in my chilli fields.



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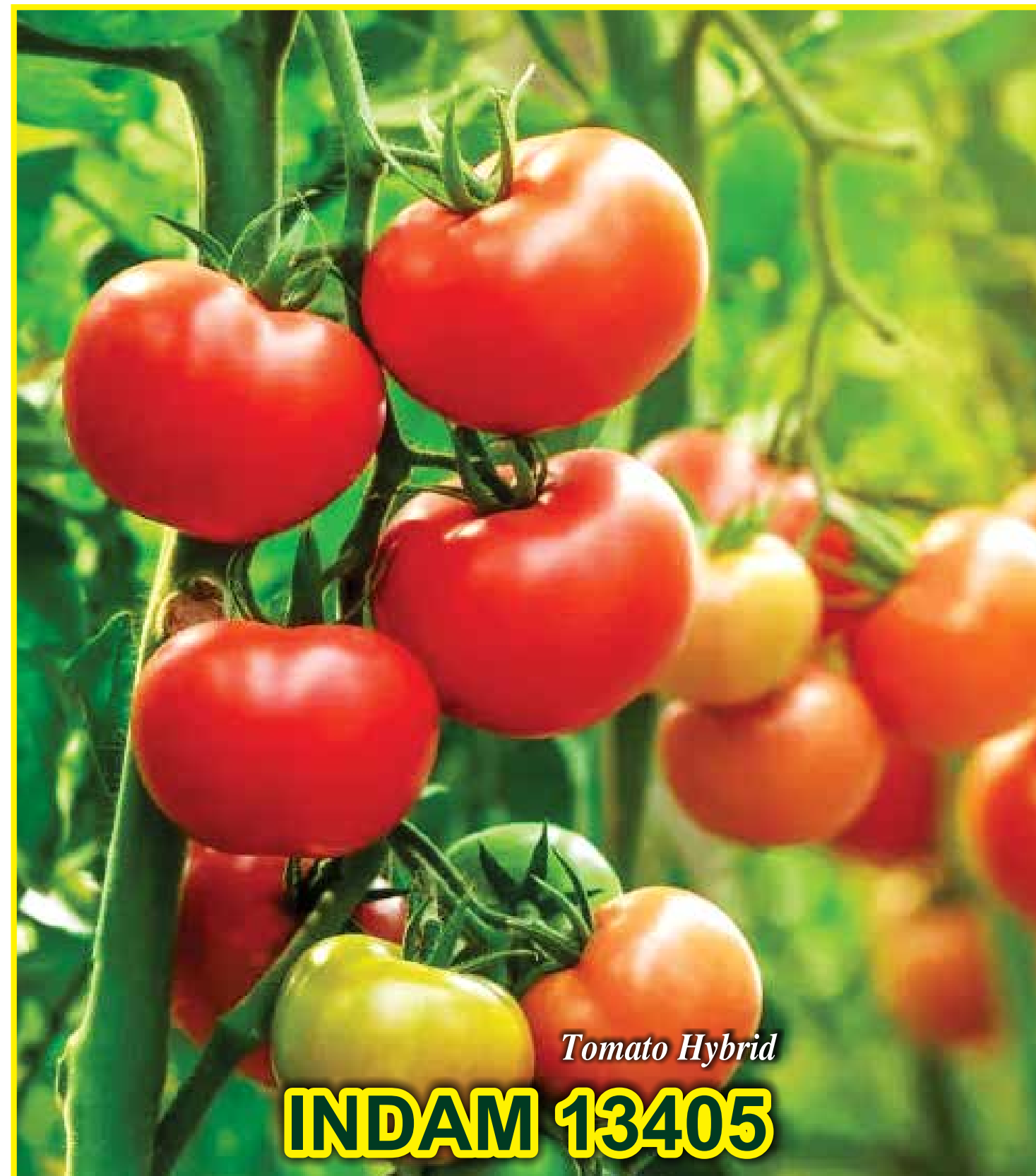


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