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From Dairy Farmer to Agripreneur

How India Can Build More Profitable Rural Enterprises

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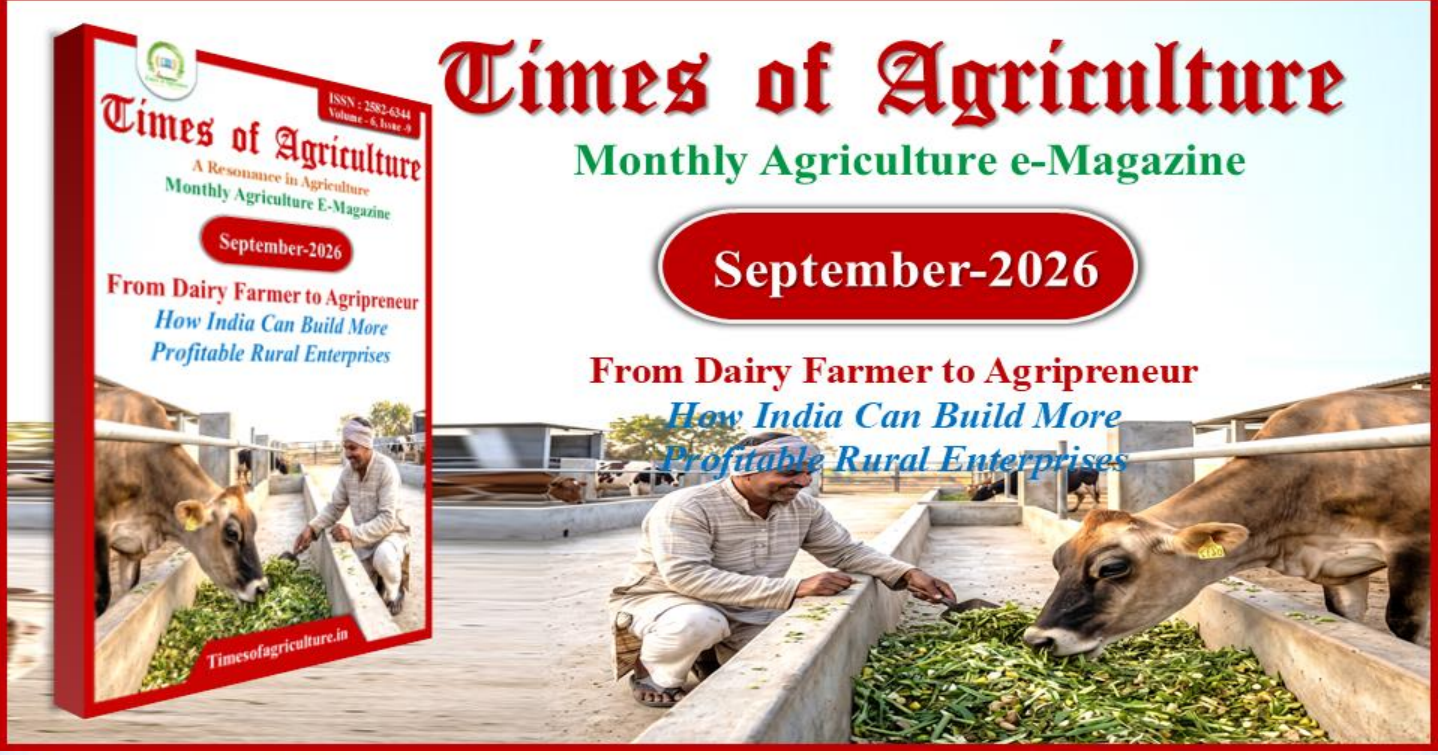


CONTENT

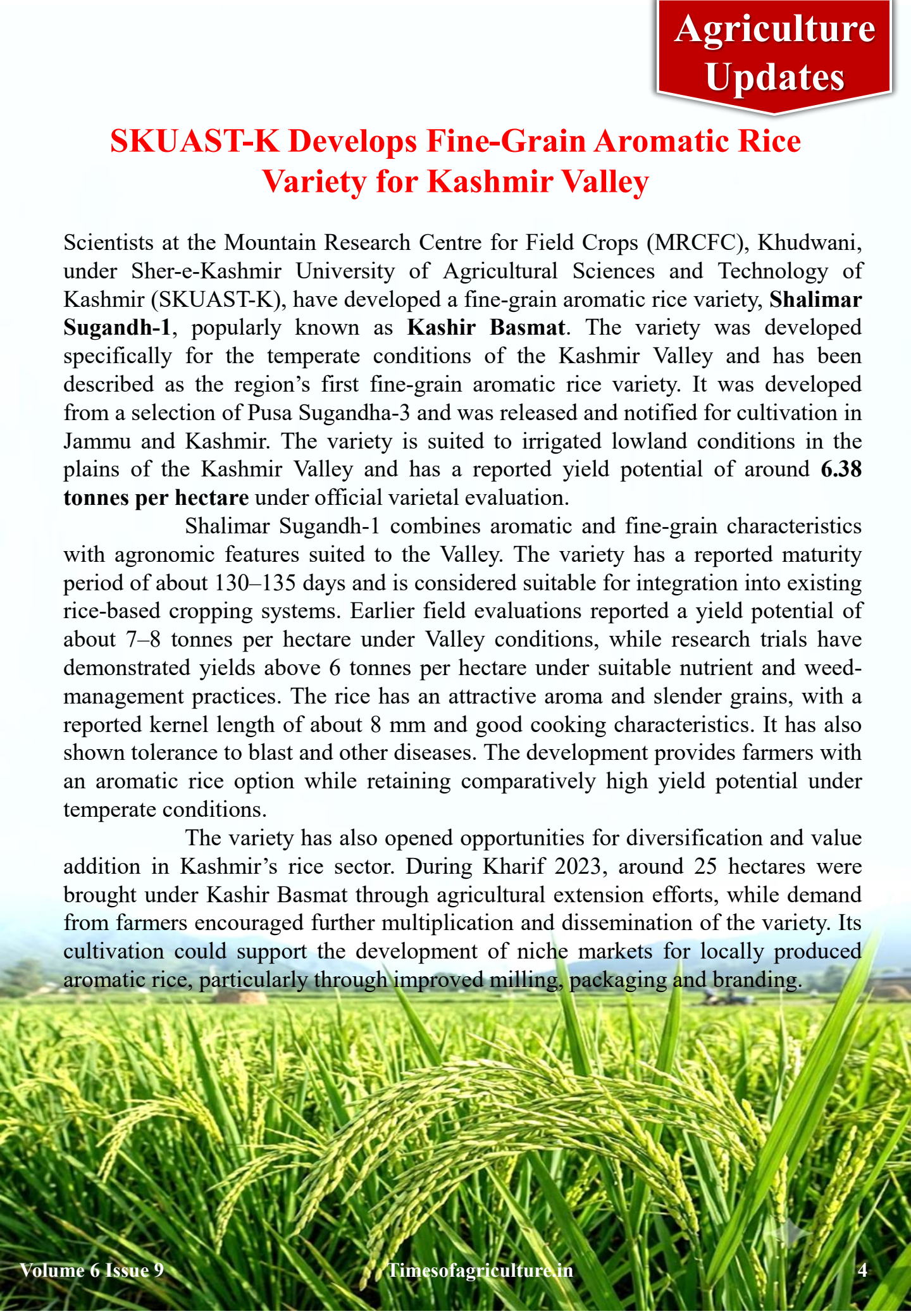

AGRICULTURE
UPDATES

SKUAST-K Develops Fine-Grain Aromatic Rice Variety for Kashmir Valley

Scientists at the Mountain Research Centre for Field Crops (MRCFC), Khudwani, under Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir (SKUAST-K), have developed a fine-grain aromatic rice variety, **Shalimar Sugandh-1**, popularly known as **Kashir Basmat**. The variety was developed specifically for the temperate conditions of the Kashmir Valley and has been described as the region's first fine-grain aromatic rice variety. It was developed from a selection of Pusa Sugandha-3 and was released and notified for cultivation in Jammu and Kashmir. The variety is suited to irrigated lowland conditions in the plains of the Kashmir Valley and has a reported yield potential of around **6.38 tonnes per hectare** under official varietal evaluation.

Shalimar Sugandh-1 combines aromatic and fine-grain characteristics with agronomic features suited to the Valley. The variety has a reported maturity period of about 130–135 days and is considered suitable for integration into existing rice-based cropping systems. Earlier field evaluations reported a yield potential of about 7–8 tonnes per hectare under Valley conditions, while research trials have demonstrated yields above 6 tonnes per hectare under suitable nutrient and weed-management practices. The rice has an attractive aroma and slender grains, with a reported kernel length of about 8 mm and good cooking characteristics. It has also shown tolerance to blast and other diseases. The development provides farmers with an aromatic rice option while retaining comparatively high yield potential under temperate conditions.

The variety has also opened opportunities for diversification and value addition in Kashmir's rice sector. During Kharif 2023, around 25 hectares were brought under Kashir Basmat through agricultural extension efforts, while demand from farmers encouraged further multiplication and dissemination of the variety. Its cultivation could support the development of niche markets for locally produced aromatic rice, particularly through improved milling, packaging and branding.



ICAR-CMFRI Develops Smartphone App to Measure Fish Without Physical Handling

The ICAR-Central Marine Fisheries Research Institute (ICAR-CMFRI), Kochi, has developed **MatsyaMetri**, a smartphone application that enables users to measure the length and width of fish without physically handling them. The application uses an intelligent camera and augmented-reality-based measurement system to estimate fish dimensions from images. It has been developed as part of a project focused on automated measurement of aquatic resources and the generation of standardised length-frequency data, which are important for fisheries population analysis, stock assessment and resource monitoring. The application is intended primarily for fisheries scientists, researchers and field survey teams involved in collecting biological information.

MatsyaMetri allows users to measure multiple individuals of the same fish species during a single sampling session. After measurements are completed, the application automatically records the observations and generates length-frequency distributions using suitable class intervals. Photographs and measurement data can be stored with the sampling session and exported as a CSV file for further scientific analysis. The system is designed to make field-based biological data collection faster and more systematic while reducing the need for manual recording. The application was developed by Dr Eldho Varghese, Senior Scientist and ICAR-National Fellow at ICAR-CMFRI, as part of research aimed at improving automated measurement and fisheries assessment.

The application is designed for **ARCore-supported Android smartphones**. Users can register and create a sampling session before pointing the smartphone camera towards a flat surface and placing the fish within the camera's field of view. The application detects the surface and provides an on-screen measuring guide for estimating the fish's length and width. MatsyaMetri is now available as an Android application, with its current release supporting fish measurement, sampling-session records, length-frequency analysis and CSV export.

Google Signs Five-Year Agreement with Mitti Labs to Scale Low-Emission Rice Farming Across India

Google has signed a five-year carbon credit agreement with climate-tech company Mitti Labs to expand climate-smart rice farming practices across **100,000 hectares of smallholder farms in India**. Under the agreement, Mitti Labs will deliver **one million high-integrity rice methane credits to Google by 2030**, in what has been described as the largest publicly announced rice-methane credit offtake to date. The programme is expected to involve more than **70,000 farmers**, particularly in major rice-growing regions, by encouraging irrigation practices that reduce the period for which rice fields remain continuously flooded. The partnership is aimed at reducing methane emissions from rice cultivation while improving water-use efficiency and maintaining crop yields.

The programme centres on **Alternate Wetting and Drying (AWD)** and related water-management practices, in which rice fields are periodically allowed to dry rather than being kept continuously flooded. According to the companies, this approach can reduce methane emissions from rice fields by **up to 50%** and lower irrigation water use by **close to 40%**, without reducing rice yields. The five-year partnership is projected to eliminate about **3 million tonnes of near-term warming impact on a GWP20 basis**, equivalent to around **1 million tonnes on a GWP100 basis**. It is also expected to conserve billions of gallons of water across water-stressed agricultural regions. Mitti Labs said the programme could ultimately deliver approximately **1.5 trillion litres of water savings by 2030**.

To monitor farming practices and environmental outcomes at scale, Mitti Labs uses a **GeoAI platform** that combines satellite radar imagery with field-level data to track crop conditions, soil moisture and flooding across individual smallholder plots. The technology enables remote monitoring of irrigation practices and supports the measurement, reporting and verification of emission reductions associated with the projects.

Tea Board, ISRO and NIT Rourkela Join Hands to Develop AI-Based Tea Plantation Monitoring System

Tea Board India has signed a tripartite Memorandum of Understanding (MoU) with the National Remote Sensing Centre (NRSC) of the Indian Space Research Organisation (ISRO) and the National Institute of Technology (NIT) Rourkela to undertake **CHAAYANKAN — Comprehensive AI-based Geospatial Data Analytics for Tea Plantation Monitoring**. The MoU was signed on August 27, 2026, for a three-year research and development project scheduled to run from April 2026 to March 2029. The initiative will cover major tea-growing regions of India and combine satellite- and UAV-based remote sensing with field observations, weather information and entomological data to develop AI and machine-learning applications for tea plantation monitoring.

A major objective of CHAAYANKAN is to develop AI and machine-learning algorithms for automatically mapping tea-growing areas and monitoring crop health. The project will use hyperspectral and optical imagery from satellites and unmanned aerial vehicles to identify **biotic and abiotic stresses** affecting tea plantations. It will also focus on forecasting major pests and diseases and estimating green-leaf yield using hyperspectral indices generated from satellite and UAV observations. By combining remotely sensed information with ground-level observations and weather and insect-related data, the project is expected to provide a more integrated approach to monitoring large and geographically dispersed tea-growing areas.

Tea Board India will provide technical and field-level support through its existing administrative framework and facilitate the integration of ground data into the project. The collaboration is also expected to create a structured data repository containing information relevant to tea plantations, crop health, weather conditions, pest and disease occurrence and yield. Such a database could support scientific analysis and provide information for future planning and policy development in the tea sector.

NABARD Launches RSVC-AMRIT Platform to Accelerate Rural Technology Adoption

The National Bank for Agriculture and Rural Development (NABARD), in collaboration with the Office of the Principal Scientific Adviser to the Government of India, has launched the **RSVC-AMRIT platform** to strengthen rural innovation, technology transfer and the adoption of appropriate technologies. Principal Scientific Adviser Prof. Ajay Kumar Sood launched the platform on **15 August 2026**, during the 80th Independence Day celebrations. NABARD Chairman Dr Shaji Krishnan V. was also present. The platform will serve as the digital backbone of the **RuTAGe Smart Village Centre (RSVC)** ecosystem, connecting rural communities with innovations and technologies developed by research institutions, startups and other technology providers.

RSVC-AMRIT is designed to support the complete lifecycle of rural technologies, from **technology discovery and validation to deployment, monitoring, collaboration and knowledge management**. It will bring together innovators, technology providers, startups, academic and research institutions, validators, accelerators, implementation partners, funding agencies and rural communities on a common digital platform. The initiative aims to address the gap between technologies available through India's scientific and innovation ecosystem and their adoption at the grassroots level. The broader RSVC programme focuses on transferring affordable and appropriate technologies to rural communities through village-level technology hubs, with applications spanning **agriculture, rural enterprises, renewable energy, education, assistive technologies, water and sanitation, and citizen services**. The platform is expected to progressively develop into a **national repository of rural innovations, technologies, best practices and collaboration opportunities**. It will also support monitoring and impact assessment of RSVCs, enabling stakeholders to track technology deployment and outcomes in rural areas.

India Develops Genome-Edited Rice Varieties to Boost Yield and Climate Resilience

India has developed two genome-edited rice varieties, **DRR Rice 100 (Kamala)** and **Pusa DST Rice 1**, using CRISPR-Cas-based technology to improve productivity and tolerance to environmental stresses. Developed by scientists under the Indian Council of Agricultural Research (ICAR), the varieties were created by making targeted changes in existing genes without introducing foreign DNA. DRR Rice 100 was developed at the ICAR-Indian Institute of Rice Research in Hyderabad using Samba Mahsuri (BPT 5204) as the parent variety, while Pusa DST Rice 1 was developed at the ICAR-Indian Agricultural Research Institute in New Delhi using MTU 1010. The two varieties were formally announced in April 2025 as India's first genome-edited rice varieties.

DRR Rice 100 has been reported to provide around a **19% increase in yield** and mature approximately **20 days earlier** than its parent variety. Its shorter duration can contribute to savings in irrigation and fertiliser use and help reduce methane emissions from rice cultivation. Pusa DST Rice 1 was developed by editing the DST gene associated with drought and salt tolerance. Field evaluations have recorded yield increases ranging from **9.66% to 30.4% under saline and alkaline soil conditions**, with potential production gains of up to 20%. The varieties have been evaluated for different agro-ecological regions, including several major rice-growing states.

The development comes as rice improvement faces increasing demands from climate stress, water limitations and the need for continued productivity gains. A study published in *Scientific Reports* in August 2026 found that the contribution of improved international rice germplasm to yield growth in India has declined since 2005, while also documenting the substantial contribution of national rice research to varietal development. Genome editing offers breeders a way to make targeted genetic changes while retaining much of the genetic background and characteristics of established varieties.

COVER STORY

From Dairy Farmer to Agripreneur

How India Can Build More Profitable Rural Enterprises

About the Author

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India's dairy economy has a strong foundation. It is built on millions of small farmers, family-owned herds and daily milk production.

But the economics of dairy need to evolve. The future cannot depend only on adding more animals or producing more litres. The bigger opportunity is to make every animal more productive and every litre more valuable.

This is where the idea of the dairy farmer as an agripreneur becomes important.

An agripreneur does not have to leave farming behind. The farmer can build a business around dairy itself. That business can include better animal nutrition, fodder, breeding, milk quality, value addition and other allied activities. The objective is simple. **A larger share of the value created by dairy should stay within the rural economy.**

The first business decision is the animal itself

The profitability of a dairy farm starts with the health and productivity of its animals. This sounds basic, but it has major economic implications. An animal that produces more milk from the same resources can improve farm economics. The same applies when better feeding reduces the cost of producing each litre.

India has already seen the impact of this approach through scientific ration balancing. NDDB reports that its Ration Balancing Programme increased milk yield and fat content while reducing feeding costs. Its programme data shows an average increase of ₹25.5 in net daily income per animal.

This is the kind of intervention that can change rural economics.

It does not require every farmer to own a larger herd. It requires farmers to get more from the herd they already have. That means better feed planning, balanced rations, fodder availability and timely animal healthcare. It also means treating animal nutrition as an investment rather than simply another farm expense.

Fodder can become a rural business

Feed is one of the largest recurring costs in dairy farming. Fodder availability also changes with seasons and local conditions. This creates an opportunity that is still underdeveloped in many rural areas. Farmers can come together to cultivate fodder. Local entrepreneurs can develop silage enterprises. Producer groups can create shared feed and fodder systems.

The idea is already gaining institutional attention.

The dairy sector is looking at decentralised silage and fodder enterprises as a way to improve feed availability. Recent government programmes have also supported fodder seeds, chaff cutters and silage units at the village level.

This is important because fodder should not be viewed only as an input. It can become an enterprise in itself. A farmer with suitable land can grow fodder for neighbouring dairy farmers. Another entrepreneur can convert surplus green fodder into silage. A producer organisation can aggregate demand and reduce input costs.

That creates business opportunities around the dairy farm without taking farmers away from dairy.

Quality must begin at the village

There is another area where the farmer can create greater value: milk quality. Milk quality is determined long before the milk reaches a processing facility. Animal health matters. Feed matters. Milking hygiene matters. The time between milking and chilling matters.

This is why village-level milk testing and chilling infrastructure are so important.

The National Programme for Dairy Development specifically focuses on organised milk procurement, village-level milk testing, cold-chain infrastructure and clean milk production. Its objective is also to strengthen access to organised markets and improve returns to milk producers.

For the farmer, this can change the relationship with the market. Milk is no longer treated simply as a quantity. Quality becomes measurable. That creates an opportunity for better practices to receive better commercial recognition. The result can be a stronger chain from farm to consumer.

Procurement should create participation, not dependence

A farmer needs a reliable market. But access to a market is only the starting point. The stronger model is one where farmers have a more meaningful relationship with the organised dairy system. Collection infrastructure, transparent testing and predictable payments can provide that foundation.

Producer-owned institutions can take this further. When farmers participate through cooperatives or farmer producer organisations, they can collectively access infrastructure that would be difficult to build individually.

A bulk milk cooler is one example. An automated milk collection system is another. A testing laboratory is another. These assets can improve efficiency across hundreds or thousands of farmers at once.

Government data shows that digital milk collection systems are already being expanded. The Department of Animal Husbandry and Dairying reported deployment of Automated Milk Collection System solutions at 290 locations under recent dairy development projects.

The next step is to use these systems not only for collection, but for better decision-making. Farmers should be able to understand their milk quality, production patterns and payment history. That information can help them improve the business at farm level.

Value addition should move closer to producers

India already has a diverse dairy consumption culture. Milk is consumed as curd, paneer, ghee, buttermilk and several other products. This creates an opportunity beyond the sale of liquid milk.

But value addition has to be approached carefully. Not every farmer can or should establish a processing plant. Food processing requires capital, technology, testing, packaging and distribution.

The answer lies in scale through collective models.

A group of farmers can aggregate milk. A producer organisation can invest in common infrastructure. Local enterprises can specialise in processing, packaging or distribution. This creates several layers of rural entrepreneurship. One entrepreneur can focus on milk collection. Another can manage chilling. Another can work in feed and fodder. Another can operate a small value-added dairy unit.

The dairy economy then creates businesses around itself. That is a more sustainable model than expecting the individual farmer to manage every part of the value chain.

Nutrition gives dairy a larger purpose

Dairy is not simply another agricultural commodity. It is part of the daily food basket of millions of Indian households. That places a responsibility on the entire value chain. The objective should be to deliver dairy that is safe, nutritious and suitable for everyday consumption. This starts with the quality of milk produced at the farm.

It continues through testing, chilling and processing. It extends to packaging and distribution. The consumer sees the final product. The farmer is connected to the first part of that product's journey.

This connection needs to be understood better. When rural entrepreneurship is linked to food quality, the farmer is not only producing a commodity. The farmer is contributing to the country's food and nutrition system. That makes quality a business priority as well as a social responsibility.

Sustainability has to work for the farmer

Sustainable dairy cannot be built through targets alone. It has to make economic sense at farm level. A farmer is more likely to adopt a better practice when it improves productivity, reduces cost or creates another source of income.

Better feed efficiency is one example. Manure management is another. Crop residue can become animal feed instead of being wasted. Manure can support composting or biogas. Better water and energy management can reduce operating costs.

These practices can create a circular rural economy. The animal produces milk. Agricultural residues can support the animal. Manure can return nutrients to the soil. Energy can be generated from farm waste. The system becomes more efficient because fewer resources are wasted.

This is particularly relevant for small farmers. Sustainability cannot become another cost imposed on them. It should become a way of making the farm more resilient.

Women can become dairy entrepreneurs

The dairy economy also offers an important opportunity for rural women. Women are deeply involved in daily livestock activities in many farming households. Their work includes feeding animals, milking, cleaning and caring for calves.

The next step should be greater economic participation. Women can lead enterprises around fodder, animal care, milk collection and value-added dairy products. They can also take greater responsibility for financial decisions and business management.

This can create a stronger rural enterprise model.

The focus should not only be on creating more dairy jobs. It should be on creating ownership and decision-making opportunities. That distinction matters.

The next dairy revolution is about value

India has already demonstrated that it can build scale in dairy. The next challenge is different. It is about improving the economics of the farmer while meeting the expectations of the consumer.

That requires attention to the entire chain.

It begins with a healthy animal and better nutrition. It continues with clean milk production and scientific collection. It requires reliable chilling and testing. It needs efficient processing and responsible value addition.

It also requires strong market linkages. Each part of the chain creates an opportunity for entrepreneurship. The farmer can grow fodder. A local entrepreneur can produce silage. A producer organisation can operate collection infrastructure. A rural business can support cold-chain logistics. A processing unit can create value-added products.

This is how a dairy ecosystem becomes an economic ecosystem. The farmer remains at its centre.

From producer to participant

The real measure of progress should not be how many farmers have been connected to dairy markets. It should be how much stronger those farmers have become because of that connection. A profitable dairy enterprise needs more than a buyer for milk. It needs access to knowledge, quality systems, infrastructure, finance and markets.

It needs opportunities to capture value.

Most importantly, it needs a long-term view of dairy development. The farmer of the future should be able to look at an animal and understand its productivity. Look at fodder and understand its economics. Look at milk quality and understand its market value. Look at waste and identify another resource.

That is the agripreneurial mindset India's dairy sector should encourage. The goal is not to replace traditional dairy farming. It is to strengthen it with better science, better systems and better commercial opportunities.

When that happens, dairy can do more than provide a daily income. It can create resilient rural enterprises, support better nutrition and build a stronger connection between the farmer and the consumer.

The future of Indian dairy should not be measured only in litres produced. It should also be measured in the value, opportunity and prosperity created around every litre.

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PRECISION EXTRACTION

Turning India's Botanical Wealth into High Value Global Ingredients

For generations, India has understood the value locked inside its plants.

Turmeric, Ashwagandha, Boswellia, Coleus, Moringa, Ginger, Holy Basil, Silymarin and countless other botanicals have long been woven into the country's traditional health practices.

Today, that inherited knowledge sits at the edge of a much larger opportunity.

Across the globe, the food, nutrition, pharmaceutical, personal care and wellness sectors are shifting decisively toward ingredients derived from plants. Consumers now expect products that are natural, clean label, traceable and backed by credible science. For companies that manufacture ingredients, however, simply having access to a medicinal plant no longer guarantees success.

The true value lies in transforming a naturally variable plant into an ingredient that is consistent, measurable and ready for use in a formulation.

That transformation happens where precision extraction, standardisation, advanced analytical science and scalable manufacturing intersect.

Dr. S. Vijaya Kumar
CEO – Wellness
Agrizy

A market expanding at pace

Estimates place the global plant extract market at roughly 46.37 billion US dollars in 2025, rising to

about 52.12 billion US dollars in 2026, with a compound annual growth rate of close to 12.4 percent projected through 2034. Studies that apply narrower definitions arrive at considerably smaller figures. Botanical extracts alone, for instance, have been valued at around 6.91 billion US dollars in 2025.

These variations matter. The botanical sector spans several overlapping categories, ranging from crude herbal material and simple extracts to phytochemicals, standardised ingredients and finished botanical supplements. Whichever definition is applied, one trend is unmistakable: demand for plant based functional ingredients continues to grow across food, nutraceuticals, pharmaceuticals, beverages, cosmetics and personal care.

The question, then, is no longer whether the market will expand. It is:

Who will capture the most valuable share of that growth?

India holds the raw material advantage, but not yet the full value chain advantage

India is home to one of the richest collections of medicinal and aromatic plants found anywhere in the world. It has a strong farming base, generations of traditional knowledge, a wide range of agro climatic zones and a substantial domestic market for Ayurveda and natural products.

The country already ranks among the leading global suppliers of medicinal and aromatic plant material. Even so, a large share of India's exports still consists of raw herbs and relatively simple extracts rather than highly standardised, differentiated ingredients.

This gap represents both a challenge and a substantial opportunity.

When a botanical is sold mainly as a commodity, competition tends to centre on how readily it is available, its price, the cost of extracting it and short term supply conditions.

Selling a standardised ingredient changes this equation entirely. The customer begins paying for a defined level of active markers, the technology behind the product, consistency from batch to batch, validated analytical methods, traceability, scientific or clinical substantiation, bioavailability, how well the ingredient performs in a formulation, regulatory documentation, sustainability credentials and dependable supply.

In short, the value of a botanical rises sharply as science and quality are built into its supply chain.

Moving from plant material to a precision ingredient

Conventional extraction usually begins with a simple idea: take the plant, add a solvent, apply heat or agitation, separate the extract and concentrate it.

At laboratory scale, this can look deceptively simple.

Industrial production tells a very different story.

Raw botanical material varies with geography, cultivar, soil type, rainfall, the timing of harvest, storage conditions, drying temperature and particle size. As a result, the same botanical sourced from two different suppliers can behave quite differently once processing begins.

This natural variability can influence extraction yield, colour, moisture content, marker concentration, impurity levels, stability and, ultimately, how the finished ingredient performs.

Modern extraction technology is changing this picture.

Depending on the botanical and the target compound, manufacturers today can draw on optimised solvent extraction, counter current extraction, supercritical carbon dioxide extraction, pressurised extraction, membrane based concentration, enzymatic pre treatment, microwave or ultrasound assisted extraction, adsorption and resin purification, along with advanced drying and encapsulation methods.

The goal is never simply to obtain more extract.

The real objective is to secure the right molecules, at the right concentration, with the right purity and physical characteristics, at the lowest sustainable cost.

That, in essence, is precision extraction.

Yield matters, but recovery is only part of the picture

One of the most frequent errors in botanical processing is judging a process by extraction yield alone.

A process may deliver a high percentage of extract and still fall short commercially if the concentration of the desired active compound is low.

For example, a process yielding 20 percent extract containing 5 percent of the target marker may be less valuable than one yielding 10 percent extract containing 20 percent of that marker.

Industrial process development must therefore look at the full picture, starting with raw material quality and moving through extraction yield, recovery, purification, concentration, stability, final specification and, ultimately, cost per kilogram of active ingredient.

This holds particular importance for high value standardised ingredients such as curcuminoids, berberine, forskolin, silymarin, boswellic acids, carotenoids and other phytochemicals.

The commercial question, ultimately, comes down to this:

How much value can be extracted from each kilogram of good quality botanical raw material?

Bridging the gap between laboratory and factory

One of the greatest challenges in botanical extraction lies in reproducing laboratory success at industrial scale.

A process that yields an excellent extract from one kilogram of material may perform quite differently at 100 kilograms, one tonne or ten tonnes.

Heat transfer, mass transfer, solvent to solid ratios, mixing behaviour, filtration and drying characteristics all shift with scale. Even the physical behaviour of the botanical material itself can change substantially.

This is precisely why scale up cannot be treated as simply enlarging a laboratory process.

A sound development pathway typically moves through laboratory experimentation, process optimisation, pilot scale validation and, finally, commercial scale qualification.

Pilot plants play a critical role in this journey, forming the bridge between scientific feasibility and manufacturing reliability. Increasingly, process modelling and digital tools are also helping predict how extraction, heat transfer, solvent recovery and other operations are likely to behave as production scales up.

The outcome is a far more disciplined approach: discover, optimise, pilot, validate, scale and continuously improve.

Standardisation: converting biological variability into commercial consistency

Extraction alone does not create a high quality ingredient.

The next major challenge is standardisation.

Plants are living systems, and their chemistry is inherently variable. The concentration of an active compound can shift with species and cultivar, geographic origin, soil conditions, climate, season, maturity, harvesting time, drying conditions, storage and post harvest handling.

A modern botanical ingredient manufacturer must therefore control variability from the farm all the way to the finished powder or liquid, beginning with raw material specifications and supplier qualification and continuing through extraction, purification, concentration, drying, packaging and storage.

Analytical science as the backbone

Marker based standardisation underpins much of today's botanical industry.

Rather than simply describing an ingredient as turmeric extract or Boswellia extract, manufacturers are increasingly expected to demonstrate, in quantitative terms, exactly what the extract contains.

Depending on the ingredient, the analytical toolkit can include HPLC and UHPLC, HPLC-MS/MS, GC and GC-MS, quantitative NMR, UV visible spectroscopy, FTIR, ICP-MS for elemental analysis, microbiological testing and increasingly sophisticated chemometric and data analysis tools.

The direction of travel points toward even greater reliance on data.

One notable example combined multiple analytical techniques with machine learning. Research covering 78 batches of a botanical injectable found that pairing HPLC-UV, HPLC-ELSD and quantitative proton NMR data with a machine learning model could distinguish normal from abnormal batches with a high degree of reliability.

The significance of this extends well beyond a single product.

The botanical industry is moving away from testing isolated parameters and toward building a complete, multidimensional chemical fingerprint for each ingredient.

In time, this could allow manufacturers to detect subtle shifts in raw materials or processes long before they develop into a commercial quality issue.

Traceability as a competitive advantage

Quality does not begin inside the extraction plant. It begins in the field.

For customers around the world, the question increasingly asked is: where did this botanical come from, how was it grown, how was it harvested, and can that be proven?

This matters even more as international buyers place growing emphasis on traceability, sustainable sourcing, organic certification, good agricultural and collection practices, control of pesticides, management of heavy metals, authenticity, geographic origin and responsible engagement with farmers.

Government initiatives that support the cultivation of medicinal plants, quality systems and good agricultural and collection practices can therefore have a direct impact on commercial outcomes.

As international markets become more demanding, the link between controls at the farm level and specifications for the finished ingredient will only grow in importance.

From standardised extract to a formulation ready ingredient

A further shift is underway.

Customers are no longer simply looking for a drum of botanical extract. They are looking for an ingredient that performs reliably inside their own formulation.

That distinction carries real commercial weight.

A nutraceutical company developing a gummy may need a specific particle size, taste profile, stability and dispersion. A beverage manufacturer may require good water dispersibility with minimal sedimentation. A capsule manufacturer may prioritise flowability, bulk density and dose concentration. A cosmetics company may focus on colour, odour, solubility and compatibility with its formulation system. A pharmaceutical customer is likely to demand an even higher standard of characterisation, impurity control and regulatory documentation.

The next generation of botanical companies will therefore compete not only on extraction capability, but increasingly on formulation and application science.

Bioavailability: the next battleground

Standardisation tells a customer how much of a marker compound is present.

It does not necessarily indicate how much the human body can actually absorb and use.

For this reason, the industry is increasingly turning to technologies designed to improve solubility, dissolution, absorption, stability, permeability and, ultimately, bioavailability.

Approaches such as micronisation, amorphous dispersions, phospholipid complexes, liposomes, nanoemulsions, cyclodextrin complexes and other delivery systems are opening the door to converting conventional extracts into genuinely differentiated ingredients.

This marks an important shift: the premium of the future may not go to the company offering the highest purity extract, but to the one able to demonstrate superior performance once the ingredient is in its finished application.

The rise of evidence backed botanical ingredients

Buyers are also becoming more discerning about claims.

The word natural is no longer sufficient on its own.

Customers and consumers alike are asking for evidence.

This is driving a shift along a clear pathway: from botanical, to extract, to standardised extract, to clinically supported ingredient, to application specific solution.

The strongest ingredient platforms typically combine a clearly defined botanical source, controlled extraction, reproducible standardisation, robust safety and quality data, mechanistic research, information on bioavailability, compatibility with formulations and, where appropriate, human clinical evidence.

Together, these elements create a meaningful barrier to entry and, with it, a significant opportunity for companies prepared to invest in science.

India's path from supplier to global ingredient innovator

India's competitive advantage is not simply its biodiversity.

It lies in the combination of biodiversity, traditional knowledge, agricultural capability, process engineering, analytical science, manufacturing scale and cost competitiveness.

What has often been missing is integration.

A globally competitive botanical ingredient platform needs to connect the entire chain, from the farm to quality raw material, through extraction, purification, standardisation, characterisation, formulation, clinical evidence, regulatory support and, finally, the global customer.

When these capabilities operate in isolation, value is lost at every handover point. When they are brought together, the same botanical can generate substantially greater economic value.

What will separate the winners

Over the coming decade, the botanical industry is likely to become increasingly divided. At one end will be commodity suppliers competing mainly on raw material and manufacturing cost. At the other will be specialised ingredient companies offering differentiated, evidence backed solutions.

The companies that succeed are likely to share several common traits.

They will build strong, long term relationships with growers and set clear specifications at the source. They will focus on superior extraction economics, optimising recovery, solvent consumption, energy use, cycle time and waste generation rather than laboratory yield alone. They will develop deep analytical capability, understanding the full chemical profile of their ingredients rather than relying on a single marker. They will invest in pilot scale and process development capability, learning how to convert laboratory innovation into reproducible commercial manufacturing. They will build genuine

application expertise, understanding how their ingredients behave in capsules, tablets, gummies, beverages, foods and personal care products. They will commit to evidence, funding scientific and, where commercially justified, clinical substantiation. They will maintain traceability and sustainability, able to demonstrate exactly where their raw materials came from and how they were produced. And they will approach regulatory readiness early, designing products with target market requirements in mind from the outset rather than treating compliance as an afterthought.

The real opportunity lies in moving up the value chain

The global botanical opportunity is not simply about extracting more plants.

It is about extracting more value from every plant.

India already holds much of the raw material advantage needed to become a global powerhouse in botanical ingredients. The next stage is to build the scientific, technological and commercial infrastructure required to convert that advantage into genuinely differentiated products.

The industry is moving from herb supply to ingredient science.

And, in time, from ingredient science to solution science.

A company able to tell a customer exactly where its botanical source comes from, how it is controlled, how it is extracted, precisely what it contains, how consistently it can be manufactured, how it performs in the customer's formulation, and what evidence supports its intended use, is no longer simply an extract manufacturer.

It is an ingredient technology company.

That is the opportunity now open to India.

The country's botanical wealth has already laid the raw material foundation. The next chapter is about adding precision extraction, advanced analytics, process engineering, formulation science and evidence.

The future of botanical manufacturing will not be measured by how many tonnes of herbs India exports. It will be defined by how much value, science and intellectual property India builds into every kilogram it produces.

Can AI Finally Bridge the Gap Between CORPORATE SUSTAINABILITY GOALS AND FARM REALITY?

In the early 2000s, a large Indian bank decided to digitise its customer service operations. The IT team built what looked, on paper, like an impressive system: ticketing software, dashboards, escalation workflows. The problem was that not a single person who built the system had spent time at a bank branch watching how a customer actually walked in, explained a problem, or got passed from one person to another. The system went live. Branch staff worked around it within weeks. Customer complaints continued to pile up, now in two places: the physical queue and the digital queue. The gap was not technology. It was that nobody had understood the operational reality before building the solution on top of it.

Agriculture is living through an almost identical moment right now, except the stakes are higher and the gap is wider.

Across boardrooms in Mumbai, Amsterdam, Toronto, and Singapore, sustainability commitments are being made with increasing seriousness. Net-zero by 2035. Scope 3 emissions reduced by 40 percent. Regenerative sourcing across 100 percent of contracted acreage by 2030. These are not hollow announcements. The leaders making them mean it. The investors and regulators demanding it mean it. And yet, when you follow that commitment downstream, all the way to the contracted farm where the crop is actually grown, you often find something that looks nothing like what the boardroom described.

This is not a story about bad intentions. It is a story about a broken data layer.

Vinay Nair
Co-Founder & CEO
KhetiBuddy

The gap is not intention. It is instrumentation.

Here is what the gap actually looks like in practice. A mid-sized agribusiness in western India, working with thousands of contracted farmers across three crops, had made a genuine commitment to reduce chemical inputs as part of their sustainability agenda. Their CSR report referenced it. Their ESG disclosure referenced it. Their buyer contracts referenced it. When we started working with them, one of the first things we mapped was the data flow between their sustainability team and their field operations team. There was none. The sustainability team was working from survey-based estimates, seasonal averages, and third-party benchmark data. The field operations team was working from field agent call logs and paper-based scouting reports. The two teams had different numbers for the same farms, for the same season, for the same crops.

Neither team was wrong in isolation. Both were working with the best information they had. The problem was that their information systems were never designed to talk to each other. Sustainability was a reporting function. Operations was a delivery function. And between them sat the farm, generating data that neither system was structured to capture in a way the other could use.

This is the norm, not the exception. Across the enterprise agribusinesses we work with, the sustainability team and the data or operations team almost always sit in separate silos. Sustainability reports upward to leadership and outward to regulators and buyers. Operations reports inward to procurement and supply chain. The farm is the common denominator, but nobody built a common data layer to connect what happens there to both functions simultaneously.

What AI can and cannot do here

Now comes the part where most conversations about this topic reach for artificial intelligence as the answer. And AI is relevant here. But the honest version of that answer requires a qualifier that most technology conversations skip over.

AI can bridge the gap between corporate sustainability goals and farm reality. But only if you have a structured data layer feeding it. Without that, the word artificial is doing most of the work and the word intelligence is doing very little.

AI models trained on satellite imagery can estimate crop cover. AI models trained on weather and soil data can generate risk alerts. AI models trained on market and input price data can generate advisory recommendations. All of that is genuinely useful. But if the farm-level data going into those models is unstructured, inconsistent, or missing, the output is a sophisticated estimate, not an intelligence. It is still a proxy. And when a European buyer asks you to prove your sustainability claim at the farm level, a proxy does not pass the audit.

The sequence matters enormously and it is usually inverted in practice. Most agribusinesses reach for the AI layer first because it is visible, exciting, and easy to demonstrate in a boardroom. The data layer is invisible, unglamorous, and takes time to build. But the data layer is the foundation. AI is the intelligence that sits on top of it. Build the foundation first and AI becomes genuinely powerful. Skip the foundation and AI becomes an expensive way to generate better-looking estimates.

What bridging actually looks like

We have seen what it looks like when an agribusiness gets this right. Another customer, a large processed food company sourcing from contract farmers across multiple Indian states, came to us with a specific problem. They had committed to a major international retail buyer to demonstrate a reduction in water usage across their sourcing base. They had a sustainability team that wanted the data. They had a field operations team that was already collecting irrigation records, inconsistently, across different formats in different regions. And they had an AI vendor pitching them a satellite-based crop stress monitoring solution.

The satellite solution was technically sound. But it could only tell them where crop stress was occurring. It could not tell them why, it could not connect to their specific contracted farms without a ground-truth data layer, and it could not produce the farm-level verification their buyer actually needed. We spent the first three months of that engagement not building AI features but building a farm master: unique farm

identifiers, standardised field boundary data, consistent input and irrigation logging protocols across their field agent network. Only once that layer existed did the AI layer become meaningful. The satellite data could now be correlated with ground-truth records at individual farm level. The operations data could now feed directly into the sustainability reporting workflow. The two teams were reading from the same source for the first time.

That buyer commitment was met. Not because of AI alone. Because of what the AI had to work with.

India's specific challenge and opportunity

For India, this challenge arrives at a particularly interesting moment. On one side, the government is building digital public infrastructure for agriculture at scale. Bharat-VISTAAR, launched in early 2026 as a multilingual AI-powered platform, is beginning to create a connected data environment for farmer-facing advisories and scheme access. AgriStack is building the digital identity and land records layer. These are meaningful steps toward a structured national data foundation.

On the other side, Indian agribusinesses are facing growing pressure from international buyers. EU deforestation regulations, carbon traceability requirements, and sustainability disclosure frameworks are moving from aspiration to contract requirement. Indian exporters who cannot demonstrate farm-level compliance will lose access to premium markets, not gradually but abruptly.

The window between now and when those requirements become non-negotiable is the window in which the data layer needs to be built. The agribusinesses that use this period to instrument their supply base, connect their sustainability and operations teams to a common farm data backbone, and build the verification infrastructure that global buyers will demand are the ones that will retain and grow their international market access. The ones that wait for the regulation to arrive and then scramble will find the runway too short.

The architecture of the answer

So what does the answer actually look like? Not as a technology pitch, but as an organisational and data architecture.

First, bring sustainability data and operations data to the same place. That means a shared farm data platform that both teams access, not separate reporting tools with periodic data exports between them. The farm is the unit of truth. Every measurement, every input record, every satellite observation, every soil test, every agronomy visit should resolve back to a unique, verified farm identity.

Second, build the data layer before the AI layer. Define what needs to be captured at farm level, standardise how it is captured across field agents and farmer touchpoints, and create the digital infrastructure to store and structure it. This is the unglamorous part. It is also the only part that makes everything else work.

Third, let AI operate on real data. Once the structured layer exists, AI can do what it is genuinely good at: pattern recognition across thousands of farms, predictive risk alerts, automated sustainability metric calculation, anomaly detection in input usage. These are not small benefits. They represent a step-change in how agribusinesses can manage supply base sustainability at scale, in ways that were practically impossible with manual methods.

The gap between corporate sustainability goals and farm reality is real. It is not a gap of intent or even of technology. It is a gap of data infrastructure. The good news is that it is a solvable problem. The architecture exists. The technology exists. What is required now is the organisational will to build the foundation before reaching for the intelligence layer on top of it.

AI can finally bridge this gap. But it needs somewhere to stand.

Farming the Future

CAN YOUNG ENTREPRENEURS MAKE AGRICULTURE PROFITABLE AND SUSTAINABLE ?

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The next big idea may grow from a farmer's problem.

Agriculture is no longer limited to growing crops. It is also a space for scientific discovery, technology, business creation and green employment. From smart irrigation to biological fertilisers, young innovators can turn practical farm challenges into sustainable business opportunities.

1. Agriculture: From traditional occupation to innovation-driven enterprise

Agriculture supports livelihoods, food systems and rural economies, but farmers face interconnected challenges: unpredictable rainfall, rising input costs, soil degradation, pest pressure, post-harvest losses and changing market demands. These challenges create opportunities for entrepreneurs to develop solutions that are practical, affordable and suited to local farming conditions.

An agricultural startup is not simply a company selling seeds or fertilisers. It may develop a new product, improve an existing process, connect farmers with markets or provide a service that reduces production risks. The most meaningful innovations begin by understanding what farmers actually need.

The central question is not just "What can we invent?" but "Which farming problem can we solve, and can the solution work reliably at an affordable cost?"

2. Can innovation make farming more profitable and sustainable?

Profitability and sustainability can support one another when innovations improve resource efficiency, reduce avoidable losses and create value without shifting excessive costs or risks to farmers.

Smart farming and precision agriculture: Soil-moisture sensors, weather information, satellite imagery and decision-support tools can help farmers manage irrigation, fertiliser application and crop monitoring more precisely. Startups can offer sensor installation, farm advisory services and locally adapted digital tools.

Biological inputs and sustainable fertilisers: Biofertilisers, microbial consortia, biostimulants and controlled-release nutrient products are areas for research-led innovation. Products must be tested for nutrient effectiveness, crop response, shelf life, safety and performance under field conditions.

Waste-to-wealth entrepreneurship: Crop residues and food-processing by-products can be explored for compost, biochar, growing media, bioenergy and other value-added products. Ventures should assess feedstock availability, processing costs, product quality and environmental impacts.

Post-harvest and market innovation: Storage, processing, packaging, grading and digital market connections can help reduce losses and improve access to buyers. Entrepreneurs can develop village-level collection centres, small processing units and crop-specific supply-chain services.

3. The entrepreneur's opportunity: turning farm problems into business ideas

A successful agri-startup does not always require expensive machinery or advanced artificial intelligence. Sometimes, a simple innovation that addresses a local problem can create meaningful value. The following are potential business ideas, not guaranteed-profit ventures.

Soil-health and nutrient advisory services: Help farmers understand soil-test results and develop crop-specific nutrient plans. Revenue could come from testing services, farm advisory subscriptions or institutional partnerships. Innovation opportunity: affordable testing, digital soil records and field-specific recommendations.

Next-generation fertiliser products: Develop nutrient-enriched granules, bio-based coatings, microbial nutrient carriers or crop-specific fertiliser blends. Innovation opportunity: improve nutrient synchronisation while testing crop response, cost, safety and environmental performance.

Farm-waste processing enterprises: Convert locally available residues into compost, biochar, mulching materials or other quality-controlled products. Innovation opportunity: decentralised processing units that create value from locally available biomass.

Precision-farming service providers: Offer drone-based crop monitoring, irrigation scheduling, pest surveillance or digital farm mapping. Innovation opportunity: shared, pay-per-use services for small and marginal farmers.

Post-harvest and rural processing units: Establish small-scale grading, drying, packaging or processing facilities for fruits, vegetables, grains and other local produce. Innovation opportunity: reduce avoidable losses and develop products with longer shelf life or higher market value.

4. From an idea to a viable agri-startup

Identify a real problem. Talk to farmers, farmer producer organisations (FPOs), input dealers and agricultural extension professionals.

Develop a practical prototype. Create a minimum viable product (MVP)—a simple version that can be tested with real users.

Validate scientifically and commercially. Conduct field trials where required. Measure performance, affordability, user acceptance and production costs.

Build a sustainable business model. Identify customers, pricing, distribution, recurring costs and the value delivered to farmers.

Seek incubation and scale up. Approach an agricultural university, incubator or relevant startup programme for mentoring, facilities and potential funding.

A promising laboratory result is only the beginning. A startup becomes viable when the innovation is reproducible, affordable, safe, legally compliant and accepted by its intended users.

5. New jobs: agriculture as a career beyond farming

Agri-startups can create direct employment within their businesses and indirect opportunities across the agricultural value chain. India's agricultural startup ecosystem includes ventures in precision agriculture, logistics, food processing, waste utilisation and biological inputs.

Career area	Skills and possible roles
Research and development	Soil scientists, agronomists, microbiologists, product developers
Digital agriculture	Data analysts, GIS specialists, software and AI professionals
Manufacturing	Production supervisors, quality-control analysts, process technicians
Rural services	Soil-testing technicians, drone operators, field advisers
Business development	Marketing executives, supply-chain managers, sales professionals
Entrepreneurship	Startup founders, consultants, agri-service providers

An important opportunity for young agricultural graduates is to combine subject knowledge with business, communication and digital skills. A soil scientist can become a product developer; a microbiologist can establish a biological-input venture; an agricultural engineer can build a farm-machinery service.

6. Where can aspiring agripreneurs find support?

- Agricultural universities and incubators: Universities can provide access to scientific expertise, laboratories, technical mentorship and opportunities for product validation. Young innovators can explore Tamil Nadu Agricultural University and other agricultural institutions for entrepreneurship, incubation and technology-transfer opportunities.
- RKVY-RAFTAAR agribusiness incubation: The Government of India's agricultural innovation and entrepreneurship programme provides incubation, technical guidance and financial assistance to eligible agricultural startups. Recent government information indicates that 2,282 startups had received financial and technical assistance, with ₹186.55 crore in cumulative grants, during FY 2019–20 to FY 2025–26.
- MANAGE Centre for Innovation and Agripreneurship: MANAGE-CIA provides incubation, mentoring, networking, market linkages and business-development support. Its Startup Agri-Business Incubation Programme under PM-RKVY provides up to ₹25 lakh to

eligible startups with a minimum viable product, subject to evaluation and selection.

- New opportunities for young innovators: In 2026, MANAGE-CIA is conducting Agri-Eureka, a national-level agricultural innovation and business-plan competition for students, farmers, rural innovators, aspiring agripreneurs and startups. The programme offers the selected top four innovators technical and financial assistance of up to ₹4 lakh as a one-time fund, along with incubation preference and expert mentoring.

control staff, field demonstrators, distributors and agricultural advisers. One validated innovation can support an entire network of rural and technical jobs.

7. The road ahead: innovation with responsibility

The future of agricultural entrepreneurship depends not only on new technologies but also on trust, affordability and measurable benefits. Startups must avoid exaggerated claims, test products under relevant field conditions and consider the needs of small-scale farmers. Technologies should complement farmers' experience rather than replace their role in decision-making.

Young entrepreneurs can contribute by developing climate-resilient technologies, improving nutrient-use efficiency, creating value from agricultural residues and strengthening local food systems. Collaboration among researchers, farmers, industries, universities and government agencies can help promising ideas move from research laboratories to real farms.

An entrepreneur developing a biofertiliser, for example, may create a business that also employs laboratory technicians, production workers, quality-

Agriculture can become a field where young people are not only job seekers but also job creators—building enterprises that support farmer livelihoods, environmental sustainability and rural development.

A question to inspire the next generation

What if the next breakthrough in agriculture comes not from a large corporation, but from a young researcher who notices a problem in a nearby village and decides to solve it?

The opportunity is there. The next step is to observe, experiment, collaborate and build.

PLANT BASED MILK

India's Next Big Agri-Export Opportunity

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Introduction

A quiet shift is under way in the world's dairy aisles. Oat, almond, soy and coconut beverages that were niche health-store items a decade ago now occupy prime refrigerated shelf space in supermarkets across North America, Europe and East Asia. The global plant-based milk market was valued at close to USD 22.7 billion in 2025 and is projected to reach roughly USD 24 billion in 2026, growing at 7 to 8 per cent annually to cross USD 43 billion by the mid-2030s. Almond-based beverages account for the largest single share, while oat-based products are the fastest growing segment.

For India, this is not simply a consumption trend to observe. It is an export market being built on raw materials that Indian farmers already grow in world-leading quantities, and one where the country is currently a marginal supplier. Closing that gap is an agribusiness opportunity of real size.

India's Raw Material Advantage

The economics of a plant-based beverage are dominated by the cost and availability of its base crop. On that measure, India is unusually well placed. The country ranks first globally in coconut production, accounting for 31.24 per cent of world output, with about 20,301 million nuts produced across 2.19 million hectares in 2024-25. It is among the world's largest producers of groundnut, cashew, soybean and, increasingly, millets. Oats are the one major gap, though domestic acreage in the north-western states is expanding.

The coconut sector already demonstrates what happens when a traditional crop is repositioned as a processed export. Coconut product exports surged 62 per cent to Rs 7,038.35 crore (USD 794.70 million) in 2025-26, up from Rs 4,349.03 crore the previous year, and against just Rs 25.3 crore in 2001-02. Crucially, the growth has come from value-added lines, coconut milk among them, rather than from raw nuts. The export basket has moved beyond the

traditional Middle East market into Europe, the Americas and Australia, with the United States, UAE, Germany, the United Kingdom and the Netherlands among the leading destinations.

The Current Scenario: A Startup-Led Domestic Market

India's own plant-based dairy category has been built almost entirely by young companies rather than legacy dairy processors. Goodmylk, founded in Bengaluru in 2017, began with affordable cashew and oat beverages and has since extended into peanut curd, plant-based butter and millet-based formulations chosen for their low water footprint. Alt Co. introduced a high-protein oat beverage for the fitness segment, and Only Earth has built its positioning around water-efficient production. Sofit, under Hershey India, and Raw Pressery have used established retail networks to reach modern trade in tier-2 cities, while Epigamia has taken coconut-based products into the café channel.

Two structural features of this market matter for exporters. First, growth has been driven by direct-to-consumer websites and quick-commerce platforms rather than conventional distribution, which means these firms have built brand and formulation capability without heavy fixed distribution costs. Second, no single brand dominates. The category is fragmented and still maturing, which leaves room for a manufacturer to build export volume without first winning the domestic shelf.

Where the Export Opportunity Actually Lies

Fresh, chilled plant-based beverages travel badly and compete against well-entrenched local brands in Western markets. The realistic openings for Indian exporters lie in three places: aseptic long-life beverages, powder and concentrate formats that dramatically reduce freight cost per serving, and contract or private-label manufacturing for overseas brands seeking a lower-cost Asian supply base.

Table 1. Indian raw material base and indicative export product lines

Base crop	India's position	Export product line	Lead markets
Coconut	Rank 1 globally, 31.24% of world output	UHT coconut beverage, coconut milk powder	USA, EU, UK, Australia
Cashew	Major producer and processor	Cashew beverage, barista-grade blends	Gulf, EU, Singapore
Groundnut	Among top global producers	Peanut beverage, high-protein powder	USA, Africa, ASEAN
Soybean	Large domestic crop, established processing	Aseptic soy beverage, soy protein base	ASEAN, Japan, Africa
Millets	Rank 1 globally in production	Millet beverage, blended millet-oat drinks	EU, USA, Gulf
Oats	Emerging domestic acreage	Oat beverage using imported and domestic grain	Gulf, ASEAN, Africa

The Millet Angle: An Innovation India Alone Can Lead

Millet-based beverages deserve separate attention because they are the one product in this category where India can define the global category rather than follow it. India is the world's largest millet producer, and the International Year of Millets has already built recognition of Shree Anna in overseas health-food channels. Millets need a fraction of the water demanded by almonds, which is the single most persistent sustainability criticism levelled at the largest plant-based milk segment worldwide.

A fortified ragi or bajra beverage carries a genuine and defensible story: low water footprint, naturally gluten-free, rich in calcium and iron, and sourced from smallholder farmers in semi-arid regions. No competing origin can tell that story as credibly, and the space is wide open.

The Technology That Makes Export Possible

Three processing capabilities separate an exportable product from a local one. Enzymatic hydrolysis, using amylase to convert oat or millet starch into naturally sweet, smooth-textured liquid, is what gives premium oat beverages their characteristic body without added sugar. Ultra-high-temperature treatment combined with aseptic packaging delivers six to nine months of ambient shelf life, removing the cold chain from the export equation entirely. Barista formulation, involving controlled fat and protein levels so the product foams and does not split in hot coffee, opens the café channel, which is where much of the global category's volume growth is now occurring.

Spray-dried powder deserves particular emphasis: shipping water across oceans is expensive, which makes powder the sensible entry format for most first-time exporters.

The Regulatory Hurdle Nobody Warns You About

The word milk is the problem. Under the Food Safety and Standards Act, 2006, milk is defined as a product of mammalian secretion, and plant extracts cannot legally be described as milk in India. The European Union takes the same position: dairy denominations such as milk, cream, butter and yoghurt are reserved for animal-origin products, and a plant beverage marketed in the EU as milk will be rejected regardless of its composition.

This must be settled before the first artwork is printed, not after a consignment is stopped. Exporters solve it with terms such as drink, beverage, or the altered spelling mylk. Alongside this sit allergen declarations for soy, tree nuts and peanuts, fortification rules that differ by destination, and organic certification where a premium is sought.

What Needs to Happen

- Build aseptic and spray-drying capacity in producing clusters, so that value addition happens near the coconut, cashew and millet belts rather than in metro contract facilities.
- Position millet beverages as a distinct global category with a water-footprint story, backed by APEDA-led buyer-seller meets and participation in international food expos.
- Target contract and private-label manufacturing first, which is faster and less capital-intensive than launching an Indian brand abroad.
- Settle destination-market labelling, allergen and fortification compliance at the product development stage, not at the shipping stage.
- Link Farmer Producer Organisations in coconut, cashew and millet regions directly to processors, so farm-gate prices reflect the value created downstream.

Conclusion

India exports coconut milk today because somebody decided, two decades ago, to sell processed coconut products rather than raw nuts. The result is a Rs 7,000 crore export line growing at 62 per cent a year, and the same logic now applies across a far wider basket.

The global market is expanding at 7 to 8 per cent annually, the raw materials sit in Indian fields, and the formulation capability already exists inside a generation of Indian startups. What is missing is processing capacity in the right locations, regulatory preparedness for destination markets, and the decision to treat plant-based beverages as an export category rather than a domestic urban niche.

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