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TIME FOR INDIAN STARTUPS TO LEAD GLOBAL INNOVATION

For years, India has been celebrated as the world's back office. The country has been a reliable hub for IT services, low-cost engineering, and large talent pools. But that identity is now outdated.

India's startup ecosystem has matured, scaled, and toughened itself through fluctuating funding cycles, changing consumer behavior, and relentless competition. Today, Indian startups are not just ready to participate in global innovation; they are poised to lead it.

India's startup landscape has undergone a structural shift. The first wave, driven by e-commerce, fintech, and mobility, proved India could build and scale technology businesses. The second wave, unfolding now, is defined by deep-tech, climate-tech, AI/ML, and advanced manufacturing. These are not merely sectors of domestic importance; they are global priorities. The world is searching for solutions in affordable healthcare, resilient supply chains, clean energy, space technology, and responsible AI. Few ecosystems are better positioned to deliver than India's, where innovation is built around frugality, scale, and inclusivity.

The strength of Indian startups lies in their ability to innovate under constraints. The principle of frugal engineering is no longer a developing-world necessity; it is a global competitive advantage. Whether it's low-cost medical devices, AI models trained on diverse datasets, or energy solutions designed for unreliable grids, Indian entrepreneurs naturally think in terms of scalability and affordability. In a world facing inflation, resource shortages, and vast inequality, this mindset is indispensable.

Another advantage is India's talent pipeline. With the world's largest pool of STEM graduates, India has become a breeding ground for engineers, data scientists, and product builders. Global tech companies have already trusted Indians to run some of the biggest organizations in the world. The next logical step is Indian startups building products that redefine categories, much like how Silicon Valley once did. With AI democratizing development and lowering barriers to entry, Indian founders are entering a moment where the quality of ideas matters more than capital access.

In addition, India's domestic market serves as a perfect testbed for technology. If a product can work across India's linguistic, economic, and infrastructural diversity, it can work anywhere. This gives Indian startups a unique exportability advantage. From digital payments to ed-tech, electric mobility to agritech, India's models are increasingly being adopted or replicated in emerging markets, especially in Africa, Southeast Asia, and Latin America.

But to truly lead global innovation, Indian startups must shed any lingering hesitation about playing on the world stage. This means building products with global design principles, investing in IP and R&D, and cultivating leadership teams that understand international markets. It also requires policymakers to think boldly: creating smoother pathways for cross-border expansion, encouraging long-term capital, and supporting deep-tech with patient funding.

The world is entering a new innovation cycle, one shaped by AI, climate challenges, and a shift towards multipolar technology leadership. India is no longer a peripheral player in this race. The ingredients are in place: talent, scale, resilience, and ambition. What is needed now is a mindset that embraces global leadership.

The time has come for Indian startups not just to catch up with the world, but to define its future.

Rohit Wadhwaney
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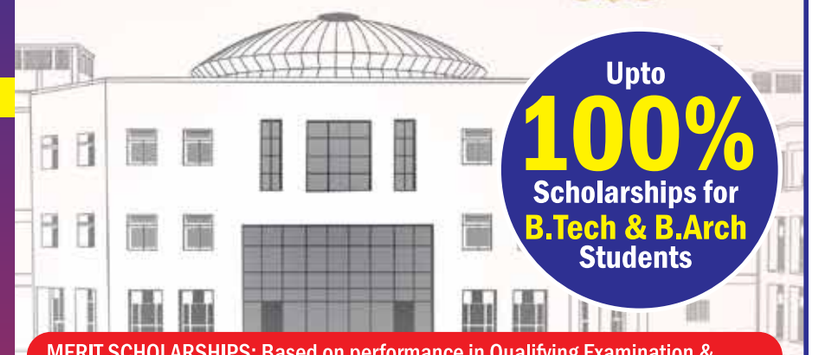
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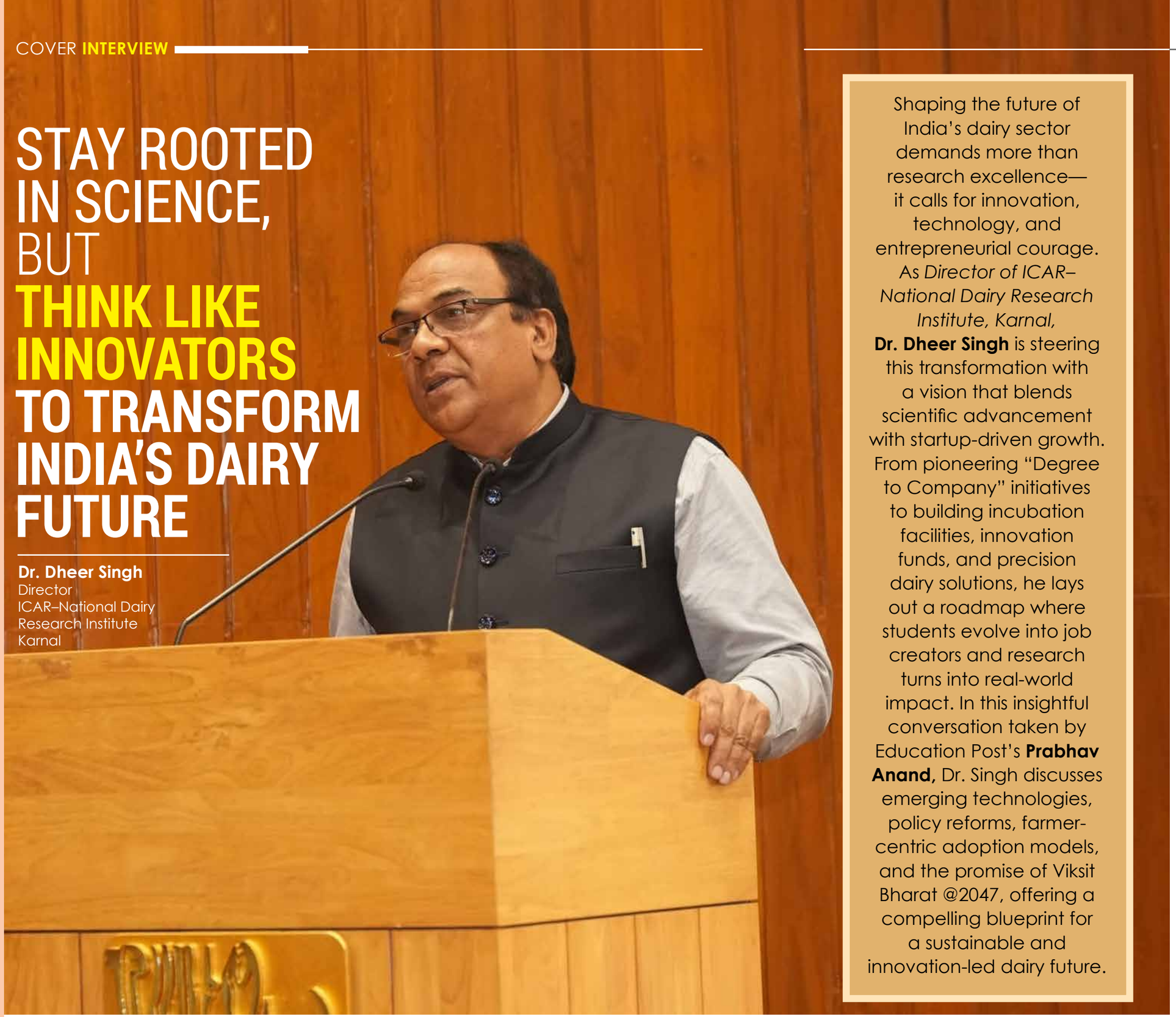
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STAY ROOTED IN SCIENCE, BUT **THINK LIKE INNOVATORS** TO TRANSFORM INDIA'S DAIRY FUTURE

Dr. Dheer Singh
Director
ICAR–National Dairy Research Institute
Karnal



Shaping the future of India's dairy sector demands more than research excellence—it calls for innovation, technology, and entrepreneurial courage. As *Director of ICAR–National Dairy Research Institute, Karnal,* **Dr. Dheer Singh** is steering this transformation with a vision that blends scientific advancement with startup-driven growth. From pioneering "Degree to Company" initiatives to building incubation facilities, innovation funds, and precision dairy solutions, he lays out a roadmap where students evolve into job creators and research turns into real-world impact. In this insightful conversation taken by Education Post's **Prabhav Anand,** Dr. Singh discusses emerging technologies, policy reforms, farmer-centric adoption models, and the promise of Viksit Bharat @2047, offering a compelling blueprint for a sustainable and innovation-led dairy future.



Q You took charge as Director of ICAR-NDRI on 8 December 2022. How has your vision for the institute evolved since then, particularly with respect to supporting entrepreneurship and startups in the dairy and allied sectors?

Since taking charge as the Director of ICAR–National Dairy Research Institute, Karnal on 8th December 2022, my vision has been to strengthen the institute's role as a national hub for innovation, entrepreneurship, and technology-driven growth in the dairy and allied sectors. Recognizing that the future of dairying depends not only on skilled professionals but also on innovative entrepreneurs, several initiatives have been undertaken to foster an entrepreneurial ecosystem within NDRI.

The institute has organized a series of Entrepreneurship Development Programmes (EDPs) aimed at sensitizing students, young professionals, and rural youth about opportunities in value-added dairy processing, product diversification, and agribusiness management. These programmes emphasize practical training, market linkages, and enterprise management skills. To further support innovation, NDRI has established incubation facilities that provide comprehensive support to budding





entrepreneurs and startups. The institute offers physical infrastructure, pilot-scale processing units, and state-of-the-art laboratory access to incubatees. In addition, mentorship and technical guidance are provided by NDRI scientists and industry experts to help refine business ideas, develop prototypes, and ensure regulatory and quality compliance.

A number of innovative dairy products have been successfully developed and launched through this incubation platform, demonstrating NDRI's commitment to translating research into viable commercial ventures.To promote entrepreneurship among students, NDRI regularly organizes events such as "Milkathon", an innovation challenge designed to nurture creativity and problem-solving skills among young minds.

The institute has also created an Innovation Fund to support quality research, encourage student-led innovation, and assist those who aspire to establish their own startups in the dairy and allied sectors. These collective efforts aim to make ICAR–NDRI not only a leader in dairy education and research but also a catalyst for entrepreneurship and sustainable development in line with the vision of Viksit Bharat @2047.

Q Your profile indicates you have published over 90 research papers and delivered numerous invited lectures. Which emerging scientific or technological areas (for example, biotechnology, precision dairy, animal nutrition, etc.) do you believe hold the greatest promise for startup-led transformation in the dairy sector over the next 5–10 years?

Over the next 5–10 years, the dairy sector is poised for a startup-led transformation driven by science, innovation, and technology integration. Several emerging areas hold immense promise for entrepreneurs and innovators. Startups focusing on assisted reproduction technologies—including advanced estrus detection, embryo transfer, and genomic selection—can play a pivotal role in improving animal productivity and genetic gain. Similarly, precision dairy farming supported by automation, sensors, and data analytics offers new opportunities to optimize feeding, health monitoring, and milk production efficiency.

The development of innovative dairy and farm equipment with embedded automation and IoT features can significantly enhance labour efficiency and resource management, particularly for small and medium dairy enterprises. In the area of value-added products, startups can explore novel dairy ingredients and functional foods derived from bovine and non-bovine milk, addressing health, nutrition, and export markets. Equally promising are ventures in rapid diagnostic tools for animal diseases,



contaminants, and pregnancy detection, as well as valorization of dairy wastes into high-value bioproducts, biofertilizers, and energy solutions. Together, these domains offer exciting avenues for scientific entrepreneurship, aligning with India's vision of Viksit Bharat @2047 through innovation-led growth in the dairy sector.

Q How is NDRI positioning itself as a hub for incubating or accelerating dairy/agri-tech startups or spin-offs? Could you share examples (or plans) of collaborations between NDRI and startups or industry in areas such as dairy processing, diagnostics, or genetics?

ICAR–National Dairy Research Institute, Karnal is steadily evolving as a hub for incubating and accelerating dairy and agri-tech start-ups, with a strong focus on nurturing innovation and entrepreneurial capacity among students and researchers. As a part of entrepreneurship promotion among the common man, ICAR-NDRI, Karnal organize Entrepreneurship Development Programmes (EDPs) through SINED-TBI and ABI with focus on the areas which have potential to become a business entity.

Willing entrepreneurs are assigned with the mentor support to guide the technological, economical and scale up aspects of identified technologies. Pilot scale production facilities available the institute mainly in processing and diagnostics are offered to entrepreneurs for manufacturing the products and test market them. It assists them to understand the intricacies of market, issues related to supply chain, positioning of the products in existing market and refinement required. Institute has also collaborated for the acceleration of incubatee with other incubation centre like e-Idea, ICAR-NAARM, Hyderabad, SINE, IIT, Mumbai and other BI's within ICAR system. Institute organize interactive meet with startups and industry every year at Karnal and its regional stations.

Q Given that our magazine focuses on education, what kind of curriculum, training programmes, or internships is NDRI offering or planning specifically to inspire and equip young graduates to become entrepreneurs or innovators in the dairy sector?

I have floated a concept "D to C" means "Degree to Company" for inspiring students to acquire all requisite skills to become a successful entrepreneur or start-up. To build an entrepreneurial mind-set, NDRI has integrated courses on entrepreneurship, artificial intelligence, communication skills, personality development, financial management, economic analysis, and business management into its curriculum. These are aimed at transforming students from job seekers into job creators. At the undergraduate level, students undergo skill enhancement and experiential learning programmes, covering the entire chain from product development to pilot-scale production, marketing, supply chain quality management, and product refinement—providing real-world exposure to enterprise operations.

At the postgraduate and doctoral levels, students have the unique option to work on entrepreneurial ventures in place of conventional research or internships, fostering a culture of innovation-led enterprise. Through these academic and practical interventions, coupled with active collaborations with industry and start-ups in areas like dairy processing, diagnostics, and genetics, NDRI is positioning itself as a national platform for dairy innovation



and entrepreneurship. E-cell of the institute is managed by the students of the institute for nurturing the creative ideas and solutions for the issues plaguing the Indian dairy sector.

Q From your vantage point, what are the key obstacles that dairy/agriculture startups face in India today — e.g. in funding, scale-up, regulatory hurdles, access to labs or field trials, market linkages? How could public institutions like NDRI or government policy better mitigate these?

Although the growth rate in number of start-ups in dairy sector is increasing rapidly thanks to the government initiative to create an enabling ecosystem, still the Dairy and agri-tech start-ups in India (mainly in tier 2 or 3 cities & rural pockets) face several key challenges — including limited access to early-stage funding, regulatory clearances, inadequate infrastructure for pilot-scale validation, and weak market linkages for scaling innovations. Many innovators also struggle to access advanced laboratories, testing facilities, and field trial opportunities essential for product validation.

Institutions like ICAR–NDRI can play a pivotal role by providing shared research infrastructure, mentorship, incubation support, and linkages with investors and industry partners. Simplifying regulatory frameworks and creating dedicated funding mechanisms for agri-dairy start-ups under government policies can further accelerate innovation. A coordinated ecosystem involving academia, industry, and policymakers is crucial to transform ideas into sustainable, market-ready solutions that strengthen India's dairy and agriculture sectors.

Q One perennial challenge is translating research into viable field-level solutions that farmers adopt. What strategies or institutional mechanisms do you champion (or would you like to introduce) to accelerate the adoption of NDRI-developed technologies by small and marginal dairy farmers?

One of the key challenges in the dairy sector is ensuring that research innovations reach and benefit small and marginal farmers. Often, there is limited awareness among stakeholders, insufficient field testing of technologies under diverse farming conditions, and a lack of incentives for early adopters — all of which slow down technology diffusion. To address these issues, there is a need for stronger coordination between research institutions, government departments, and development agencies, which are expected to act as bridges between innovation and implementation.

Strengthening extension mechanisms, conducting on-farm demonstrations, and developing region-specific technology validation models are essential steps. Moreover, introducing incentive-based adoption programmes, capacity-building initiatives, and digital platforms for technology dissemination can further enhance outreach. Collaboration with dairy cooperatives, FPOs, and private sector partners can also play a vital role in scaling up NDRI-developed technologies for wider and faster adoption at the grassroots level.

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Q In the recent changes such as GST reforms on dairy products, how do you see the policy environment evolving for the dairy/agri startup ecosystem? What policy changes would you advocate to better support innovation and entrepreneurship in dairy?

The recent policy reforms, including GST rationalization on dairy products, reflect the government's progressive and supportive approach toward strengthening the dairy and agri-startup ecosystem. These changes aim to streamline taxation, encourage value addition, and improve competitiveness in both domestic and export markets.The overall policy environment is becoming increasingly innovation-friendly, with initiatives such as Startup India, Atmanirbhar Bharat, PM Formalization of Micro Food Processing Enterprises (PM-FME), and Animal Husbandry Startup Grand Challenge, which are creating enabling conditions for young entrepreneurs.

To further accelerate growth, policies could focus on easing access to finance, simplifying regulatory and licensing procedures, and offering tax incentives for R&D-driven startups. Additionally, support for incubation facilities, public–private partnerships, and market linkage programmes would greatly enhance innovation adoption and entrepreneurship in dairying. These forward-looking measures will help build a vibrant, technology-driven dairy sector, aligned with the national vision of Viksit Bharat @2047.

Q Looking ahead, what do you see as the next 5–10 years' big shifts in dairy science and business? And what advice would you give to the next generation of agri/dairy startup founders who want to make a lasting impact?

Over the next 5–10 years, I foresee a transformative phase in dairy science and business — driven by technology, sustainability, and consumer-centric innovation. The sector will witness significant shifts towards precision dairying, data-driven herd management, nutritional optimization of milk, and value addition through functional and health-oriented dairy products.



Integration of artificial intelligence, IoT, genomics, and climate-smart practices will redefine how we produce, process, and deliver milk and milk products. Sustainability will remain the guiding principle — whether it is reducing the carbon and water footprint, enhancing animal welfare, or developing circular bio-economy models that turn waste into resources. At the same time, entrepreneurship and innovation in areas like alternative dairy ingredients, nutraceuticals, indigenous breed conservation, and digital dairy platforms will create new business frontiers.

For the next generation of agri- and dairy-startup founders, my advice would be: stay rooted in science, but think like innovators. Understand farmers' realities, value the diversity of our livestock systems, and build solutions that are inclusive, scalable, and sustainable. Collaboration with research institutions like ICAR–NDRI can help bridge the gap between laboratory and livelihood. Most importantly, pursue entrepreneurship not merely as a business venture but as a mission to strengthen India's dairy ecosystem — ensuring nutritional security, rural prosperity, and global leadership in sustainable dairying. EP

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ADMISSIONS OPEN-2025



Upto 100% Scholarships for B.Tech Students

100% Placement Assistance

Faculty supervised academically integrated Internships

MERIT SCHOLARSHIPS: Based on performance in Qualifying Examination & Semester-wise Performance in respective programs

Programs offered

B.Tech (CSE | Civil | CSE (Data Science and Artificial Intelligence) | CSE (Internet of Things) | Mechatronics Engineering
B.Tech (LE)
B.Sc. (Medical & Non-Medical)
BCA | BCA (Data Science | Cyber Security AI & IoT)
BA (English | Psychology | Political Science | Sociology | History)
B.Com
BBA | BBA (Logistics)
B.Pharmacy | B.Pharmacy (LE)
Ph.D (Physics | Chemistry | Mathematics Computer Science & Engineering | Management | Commerce Law | Pharmaceutical Sciences
BBA-LL.B. (Hons)
BA-LL.B. (Hons)
LL.B. | LL.M.
M.Sc (Physics | Chemistry | Mathematics | Botany | Pharmaceutical Chemistry)
MCA | MBA
M.Com

Early Bird Scholarships available for the first few admissions only

HIGHLIGHTS

- Faculty supervised internships
- Case-based Learning
- Classrooms equipped with Projectors
- Language development sessions
- Wi-Fi enabled campus
- Spacious auditorium and conference halls for presentations and discussions
- Assistance for Bank Loans
- Career Counseling Cell for Higher Studies and Competitive Examinations
- Emphasis on Personality Development and Soft Skills

www.iuhimachal.edu.in | /icfaiuniversity.himachal | Toll-free: 1-800-121-2201

Campus: The ICFAI University, Himachal Pradesh, # 5, HIMUDA Education Hub, Kalujhanda, P.O. Mandhala, Barotiwala, Baddi, District - Solan, Himachal Pradesh, PIN - 174103

ICFAI GROUP

11 Universities • 9 B-Schools • 9 Law Schools • 7 Tech Schools • 3 Pharma Schools • 4 Decades in Flexible Learning



Dr. Abhijit Dasgupta
Director – Bachelor of Data Science, SP Jain School of Global Management

INDUSTRY-READY DATA SCIENTISTS EMERGE WHEN RIGOROUS CODING CULTURE BECOMES NON-NEGOTIABLE

SP Jain School of Global Management's Bachelor of Data Science program stands out for its rigor, global industry alignment, and unwavering emphasis on coding excellence. In his conversation with Education Post's **Prabhav Anand, Dr. Abhijit Dasgupta** explains how the curriculum is continuously benchmarked against Big Tech standards, refreshed each semester, and supported by workshops, impactful capstone projects, and international internships. From strong foundations in algorithms to advanced competencies in GenAI, MLOps, and full-stack development, the program prepares students for real-world challenges while instilling future-ready discipline and industry culture.

Q Your Bachelor of Data Science programme places heavy emphasis on industry-readiness — how do you decide which tech (libraries, languages, frameworks) and topics (ML, deep learning, MLOps, large language models, etc.) are mandatory in the curriculum versus elective? How often do you refresh that list, and what role do industry partners play in those decisions?

SP Jain Global's top-ranked Bachelor of Data Science program is aligned with industry requirements, and is probably one of the most difficult courses in the pure Computer Science / Data Science area, which is taught by IITians with Ivy League MS/PhD qualifications – our industry connect helps to redefine the course curriculum, and within the curriculum, there is continuous updating that happens every semester. The course is generally overhauled every 3–4 years to keep it super competitive internationally. The course design is fixed, and there is no option to take an easy course in between. The electives come in terms of workshops (such as Quantum Computing, Advanced Data Structures & Algorithms, etc.) and Capstone Projects. The benchmarking is typically with tech stacks in Big Tech companies, and throughout the course, the major emphasis is on inculcating coding skills.

Q SP Jain's BDS has reported strong placement outcomes in recent years. Can you walk us through the department's placement strategy — from preparing students (projects, mock interviews, case challenges) to employer engagement — and explain how you measure whether placements reflect genuine skill alignment rather than short-term demand?

Very early in the program, right from the 1st semester, students are encouraged to compete in hackathons and coding competitions. Apart from this, students are organized in groups and research projects are assigned. These research projects very often get culminated in paper publications in top journals such as IEEE, Springer, Elsevier, and Nature, etc.

After their first year, students are placed as interns in the US, the UK, the EU, India, and Australia, etc., at universities and in corporate organizations. Again, after the end of the 2nd year, students are assigned internships in companies, and most often these internships convert into return offers.

As on date, the skill requirements for Cloud Computing, Full Stack Development, Machine Learning, CI-CD-CT, DevOps/MLOps, apart from high-end skills in GenAI, Computer Vision, and AgenticAI, etc.: all of these skills are covered in the course; and students graduate with medium to high competencies in Python, building & managing data pipelines, PyTorch (ML libraries included), SAS, AWS/Azure, OpenCV, LangChain, Java Enterprise Edition, developing APIs in Flask, Spark, NoSQL, and Advanced SQL – students are typically mentored to focus on their top 3 skills while imbibing basic to average competencies in other relevant skills.

Q Many students entering data science come from varied backgrounds (commerce, arts, pure science) and often struggle with the math/statistics/programming ramp-up. What specific bridging strategies, remedial modules or pedagogic changes has your department introduced to level-up students quickly without diluting course rigor?

Education is all about students and never about universities or the faculties therein; as long as a student has enough motivation to succeed, they will do well. For students who come with an inadequate background in mathematics, a month-long bootcamp on mathematics and computer programming is undertaken before the start of the semester to ensure homogeneity in basic preparedness.



Q Applied projects and internships are touted as the programme's strengths. How do you ensure internships expose students to real, messy data problems (not curated toy datasets), and what safeguards do you have to prevent students being used for low-value work? Can you give an example of a recent capstone or industry project that had measurable impact?

Skills and competencies are matched with the internship project opportunities before assignments are made. Internships are not real jobs, but they provide a student with the opportunity to apply the skills learned in school to a real industry/research situation and solve problems. Most of the time, organizations align interns to pilot projects before committing major investments in those projects. In other cases, interns are tasked with really challenging work, such as developing a perception system for a UAV, building a RAG pipeline, developing a BI dashboard for executive consumption, or building a product for a cybersecurity company where ECG data is used for encryption – well, this project has now been granted a patent. Another interesting project, which is now being implemented, is in the area of carbon credit cards. There are many such examples where student projects have contributed major value to the organization.

Q With increasing attention on AI ethics, data privacy and regulatory compliance, how is the BDS integrating responsible AI and legal/ethical training into technical modules? Are assessments designed to test students' ability to reason about bias, fairness and data governance — and if so, how?

Students are trained on Ethical AI, AI governance, and privacy to an extent suitable for an undergrad CS/DS program, e.g., GDPR, PII, and the Indian IT Act, etc. These are not part of the course, but are conducted as workshops, and quizzes/ MCQ tests are organized to gauge learning outcomes.

ICFAI UNIVERSITY

The ICFAI University, Jaipur

ADMISSIONS OPEN - 2025

Upto 100% Scholarship for B.Tech Students

Domicile Concession & Early Bird Concession

MERIT SCHOLARSHIPS: Based on performance in Qualifying Examination & Semester-wise Performance in respective programs

PROGRAMS OFFERED

B.Tech CSE | CSE (AI & ML) | CSE (DS & AI) ME | ECE (VLSI Design)
B.Tech (LE)
Diploma | Diploma (LE) Mechanical Eng. | Mech. (Electric & Hybrid Vehicles)
M.Tech Computer Science & Engineering
BCA (Hons.)
BCA (Hons.) Data Science | Cyber Security | (AI & IoT) | Mobile Application & Web Tech | Full Stack Devp.
B.Sc. (Hons.)
B.Sc. (Hons.) Forensic Science
B.Pharm
B.Pharm (LE)
MCA
M.Sc. Forensic Science
BBA (Hons.)
BBA (Hons.) Fin Tech Business Analytics
BA (Hons.) Political Science Economics | Psychology
BPT Physiotherapy
B.Com (Hons.)
BBA-LL.B (Hons.)
BA-LL.B (Hons.)
LL.B
LL.M
Ph.D (Full-time / Part-time) Management | CSE | ECE Mathematics | Law Computer Applications

RANKINGS

AAA RATED Among Deemed, Central, State Pvt. Universities of Rajasthan for best Engineering Colleges Careers 360 2023
3 RANKED Among Top Engineering Colleges of Rajasthan CSR - GHRDC 2023
9 RANKED Among Outstanding B-Schools of Excellence CSR - GHRDC 2023
AA+ RATED Among Top Law Colleges of Rajasthan Careers 360 2023
AAA RATED Among Pvt.Universities in Rajasthan Careers 360 India's Best Engg.Colleges 2023

HIGHLIGHTS

- Fabulous Scholarships for the wards of Armed Forces
- On-campus, fully furnished, separate Hostels for Boys & Girls
- Excellent Career Oriented Academic Delivery and Placement Assistance
- Impressive infrastructure including smart classrooms, modern and state of art laboratories, sports facilities for Athletics, Football, Basketball and Cricket
- Realtime Industry interface, Mentorship and Live projects
- Lush green Campus spread over 40 Acres at Jamdoli, Jaipur
- Transport Facility

Campus: The ICFAI University, Jaipur, Agra Road, Jamdoli, Near Cambay Golf Resort, Jaipur, Ph: 8094688800

For details & eligibility, please visit: www.iujaipur.edu.in

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Q Student mental health, academic burnout and the competitive "placement race" are growing concerns in technical undergrad programmes. From orientation through final year, what counselling, workload-management or assessment policies has the department put in place to support students' wellbeing while maintaining high standards?

Tech is intellectually draining, and we actively discourage students who may not be able to keep up with the demands of the tech industry. For instance, in real life, teams could be distributed in different geographies (like San Francisco, London, Bangalore, Sydney, etc.), and therein, one is expected to show up and contribute to the standup calls. Someone who is not motivated enough to deal with 24x7 work in high-stress environments won't be suitable for a career in tech.

We counsel students and get them to face realities early in the course, so that the simulations in the classroom become close to the actual industry scenario. So far as mental health is concerned, we have psychological counselling, which is very similar to the ones in a corporate setup.

Q Employers increasingly ask for experience with productionizing models (MLOps, deployment, monitoring). How are you balancing teaching foundational theory with hands-on training in software-engineering practices necessary to take models to production — and how do you assess "deployability" in student projects?

The course is 30% theoretical and 70% practically oriented. Even courses like Algebra and Calculus are taught from a computer science point of view, and students get to do projects that solve a mathematical problem using computer code.

Industry, specifically big-tech, requires seven days to develop and deploy a solution into production. This is part of the culture building in the course.

Q Looking ahead 3–5 years, what changes do you foresee for undergraduate data science education (e.g., more specialization, micro-credentials, industry co-designed degrees)? What is SP Jain's strategy to keep the BDS future-proof — especially against rapid shifts like foundation models, automated ML and the globalisation of hiring — and what metrics will you use to judge success?

The primary qualification of any CS/DS graduate is the ability to code. The rest of the skillsets keep changing over time as newer dimensions and technologies are mainstreamed. The only way to future-proof any CS/DS program is to emphasise these core skills, and that's why we have a major thrust on building this skill. Very early, students are taught Object-Oriented Programming, Data Structures & Algorithms, Mathematics for Competitive Coding, etc., to seriously instill the culture of future readiness.

Interestingly, our students are actively discouraged from using AI tools in the program, since despite the perception going around in the market that AI is going to take away all software engineering jobs, that's not going to happen any time soon. Software is alive for a minimum of 10 years, often 30 years (for enterprise-class products), and development is only about 5–10% of this horizon where AI is going to disrupt or is disrupting. An AI engineer writes AI algorithms for business users – s/he does not use AI to build those. EP

ICFAI UNIVERSITY

The ICFAI University, Nagaland

ADMISSIONS OPEN 2025



Programs offered

BBA (Major / Minor) | B.Com (Major / Minor) | BA (Major / Minor) | BCA (Major / Minor)

MBA | M.Com | MCA | MA (Economics) | MA (English)

MA (Pol.Sc.) | MA (Education) | M.Lib.Sc (Integrated)

Ph.D. (Management | Pol.Sci. | English)

MERIT SCHOLARSHIPS based on performance in qualifying examination & Semester-wise performance in respective programs

HIGHLIGHTS

- To provide high quality, value-based, career-oriented education for students.
- To facilitate students in understanding, developing, integrating and applying both core and specialized concepts and practices.
- To provide students with stimulating and learning friendly atmosphere to utilize a higher level of their intellectual capacity, required to specialize in the respective areas of study.
- To produce energetic, effective, efficient and ethical professionals to meet the desired needs of the dynamic world and serve the society.

For details & eligibility, please visit: www.iunagaland.edu.in

For details, please contact

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Dr. Pardeep Kumar Chhuneja
Dean of Agriculture at Lovely Professional University

EDUCATION MUST MOVE BEYOND CLASSROOMS

TO CREATE INNOVATORS FOR MODERN INDIAN AGRICULTURE

Dr. Pardeep Kumar Chhuneja, Dean of Agriculture at Lovely Professional University, brings over three decades of expertise in apiculture, entomology, and agricultural education. In this insightful interaction with Education Post's **Prabhav Anand**, he shares how LPU's ICAR-aligned curriculum integrates scientific rigor with experiential learning, entrepreneurship, and emerging technologies such as precision farming and agri-biotech. Emphasizing student-managed farms, rural immersion, and innovation-driven training, Dr. Chhuneja underscores the importance of climate-smart practices and pollinator-centric development. His vision reflects a commitment to nurturing future-ready agri-leaders capable of strengthening India's rural economy and ensuring sustainable growth.

Q You have had a long and illustrious career in agricultural research and education, especially in apiculture and entomology. As the Dean of Agriculture at LPU, how are you integrating your research experience into shaping a curriculum that prepares students for modern agricultural challenges and opportunities?

With over three decades of experience in agricultural academics, including in research and education, particularly in apiculture and entomology, I firmly believe that an effective curriculum must extend far beyond textbooks. It should inspire critical thinking, nurture innovation, and equip students to address real-world challenges through hands-on learning, honing up in skills and scientific inquiry.

At Lovely Professional University (LPU), we have structured our agricultural curriculum for the Bachelor degree in alignment with the framework recommended by the Sixth Deans' Committee of the Indian Council of Agricultural Research (ICAR). This nationally recognized model provides a robust academic foundation, while we go a step further by placing a strong emphasis on practical exposure, field immersion, in exploration for start-up opportunities, including commensuration with enhancing revenue generation models and entrepreneurial development.

For our Master degrees, our curriculum is aligned to the recommendations of the Broad Subject Matter Area (BSMA) committees of the ICAR. Our interdisciplinary curriculum integrates core areas such as crop production (agronomy, soil science), horticulture (fruit science, vegetable science, floriculture & landscaping), crop protection (entomology, plant pathology), genetics & plant breeding, agricultural extension & economics, food science & technology, etc. More importantly, we embed experiential learning modules throughout the academic journey. Students engage directly with live projects managing real datasets, diagnosing insect-pest and disease outbreaks, implementing integrated pest management strategies, practicing apiculture, mushrooms cultivation, compost preparation, agro-waste management, micropropagation and participating in end-to-end agricultural operations, from cultivation to post-harvest handling, processing, packaging, and marketing.

Furthermore, we actively encourage entrepreneurial thinking and innovation. Through structured exposure to start-up ecosystems, incubation support, and agribusiness modules, students are empowered to explore viable business models and even initiate their own ventures. Our aim is to transform students into job creators rather than job seekers, equipping them with both the scientific insight and business acumen necessary for success in the evolving agri-sector. In research, the students are engaged on undertaking real time agricultural problems and towards evolving organic and natural farming practices. Ultimately, this blend of academic rigor, practical exposure, and entrepreneurial focus prepares our graduates to become dynamic contributors to sustainable agriculture and rural development.

Q Agriculture start-ups have emerged as a driving force for innovation in the Indian rural economy. From your perspective, what areas within agriculture, such as precision farming, agri-biotech, or apiculture, hold the greatest potential for young entrepreneurs, and how is LPU fostering an ecosystem to support these innovations?

Agriculture in India is at the cusp of a new revolution, one that is technology-driven, innovation-led, and entrepreneurship-powered. Start-ups today are redefining the agricultural landscape, transforming traditional practices into dynamic, data-driven, and sustainable enterprises. Among the many emerging frontiers, precision agriculture, agri-biotechnology, and pollination-based enterprises such as apiculture stand out as the most promising domains for young entrepreneurs.

Precision farming offers unparalleled opportunities by integrating IoT, drone surveillance, AI-driven analytics, remote sensing, and decision-support systems. These technologies empower farmers to optimize inputs, minimize environmental footprints, and enhance productivity even in fragmented landholding systems. Precision agriculture represents not just technological adoption, but a paradigm shift, from conventional farming to intelligent, predictive, and resource-efficient agriculture.

Agri-biotechnology is another transformative pillar. With innovations in genomics, seed biotechnology,



biofertilizers, biopesticides, and microbial consortia, this field is enabling the development of climate-resilient and nutritionally enhanced crop cultivars. These innovations are crucial for ensuring food and nutritional security in the face of climate variability and ecological constraints. Start-ups in this space have immense potential to bridge science and sustainability, translating research into impactful agri-solutions.

Equally promising is apiculture and pollination entrepreneurship, an often underutilized but high-value sector. Beyond honey production, managed pollination services can boost yields and quality in over 70 per cent of major crops, including fruits, vegetables, oilseeds, and spices. Given the warning ecosystems resulting towards the decline of natural pollinators, young entrepreneurs entering this field can create eco-restorative, economically rewarding, and globally relevant ventures, contributing to both biodiversity conservation and agricultural profitability.

At LPU, we are strategically nurturing this entrepreneurial renaissance. Our vision is to create a vibrant agri-innovation ecosystem that bridges knowledge, technology, and market linkages. **To this end, LPU provides:**

- Comprehensive incubation and acceleration support through its dedicated Startup School and Centre for Innovation & Entrepreneurship.
- Access to state-of-the-art research laboratories, experimental farms, and technology hubs equipped for precision agriculture, agri-biotech, and apiculture innovation.
- Interdisciplinary mentorship connecting students with academic experts, successful agri-entrepreneurs, and industry leaders.
- Collaborative partnerships with national and international institutions, agritech companies, and government innovation missions.
- Seed funding, prototype development grants, and investor connect programmes that enable students to translate ideas into viable enterprises.

At LPU, we embed entrepreneurship not as an extra-curricular pursuit, but as a core academic and cultural ethos. Students are encouraged to approach agriculture as a frontier of innovation, where science meets sustainability and business meets societal impact.

Our ultimate goal is to produce next-generation agri-leaders and innovators, the visionaries who can harness cutting-edge technologies and indigenous knowledge to redefine Indian agriculture, strengthen rural economies, and contribute to global food and environmental security.

Q Given your expertise in apiculture and pollinator ecology, what role do you see beekeeping and pollination-based ventures playing in strengthening both agricultural productivity and rural entrepreneurship in India?

Apiculture and pollination-based ventures represent one of the most powerful yet under-leveraged engines of agricultural transformation in India. With over 70 per cent of our major crops, ranging from oilseeds to fruits and vegetables, dependent on pollinators, managed pollination using bees can enhance crop yields by 20–30 per cent, while also improving quality and uniformity of produce. This makes apiculture not merely an allied activity but a core enabler of national food and nutritional security.

From an entrepreneurial stand-point, apiculture is a low-investment, high-return enterprise ideally suited to rural youth and small-holders, including marginal and small farmers. It demands minimal land and offers diversified income streams through honey, beeswax, royal jelly, propolis, pollen and pollination services. Moreover, organized pollination service models can evolve into micro-enterprises or cooperatives, turning farmers into value creators rather than input-dependent producers.

Equally significant is the ecological dividend, i.e. healthy pollinator populations sustain biodiversity, enhance ecosystem resilience, and support regenerative agriculture. Our vision is to institutionalize this synergy between economic gain and ecological stewardship through community-based beekeeping clusters, pollination entrepreneurship training modules, and integration of apiculture into agri-business curricula.

At an institution like LPU, we aim to foster pollinator-centric innovation through student-led apiary units, research on indigenous bee species, digital hive monitoring, and entrepreneurship incubation, preparing the students to lead in one of the most sustainability-aligned sectors of modern agriculture.

Q Agricultural education in India often faces criticism for being too theoretical. What initiatives or pedagogical reforms has LPU implemented to ensure that its students gain hands-on experience and develop entrepreneurial thinking in real-world agricultural settings?

At LPU, we believe that agriculture education must move beyond classrooms to the fields, laboratories, and markets. To bridge the gap between theory and practice, we have restructured our pedagogy around experiential learning, innovation, and entrepreneurship immersion.

Key initiatives include:

- Student-managed farms and precision demonstration plots, where students practice crop planning, input management, and digital monitoring in real-time conditions.
- Mandatory internships and industrial immersions with agribusinesses, agri-innovators, cooperatives, and FPOs to expose learners to the dynamics of value chains and market realities.
- Project-based courses and rural immersion programmes, where students identify real farmer problems and design implementable solutions, linking the academic concepts with societal impact.
- Entrepreneurship and design-thinking workshops embedded into the curriculum to stimulate ideation and innovation.
- Collaborative research projects co-supervised by industry and faculty mentors, encouraging students to apply science and technology to solve current challenges.

Our philosophy is clear: 'Learn by Doing and Innovate by Understanding.' The result is a new generation of agri-professionals who are not only technically competent but also industry-ready, entrepreneurial in mind-set, and empathetic to rural realities.

Q Many agri-startups struggle to scale due to challenges such as limited funding, policy hurdles, and market access. In your opinion, what structural or policy-level changes are needed to make the agricultural startup ecosystem more sustainable and investor-friendly?

For India's agri-startup ecosystem to thrive, it must rest on three pillars: capital accessibility, policy agility, and market connectivity.

1. **Financial Enablement:** Early-stage, low-interest capital remains a bottleneck. Dedicated rural innovation funds, seed grants, and blended finance models are crucial.
2. **Regulatory Reforms:** Startups working on bio-inputs, seeds, and agri-biotech often face protracted approval timelines. We need single-window clearance systems and innovation sandboxes that allow technology validation in real-farm conditions without heavy compliance burdens.
3. **Market Integration:** Strengthening FPOs, digital mandis, and cooperative e-market models will enable startups to reach scale faster, cutting dependence on traditional intermediaries.
4. **Institutional Support:** Universities like LPU should be empowered to incubate for-profit startups and hold equity stakes, aligning academic innovation with market viability.
5. **Cross-Ministerial Convergence:** Coordination between Agriculture, MSME, and Rural Development Ministries is vital to create a seamless support ecosystem for agri-enterprises.

By embedding entrepreneurship into rural economies and de-risking innovation, India can

catalyze a new wave of investor confidence, employment generation, and farmer-led prosperity.

Q Climate change continues to threaten crop yields, soil health, and biodiversity. How do you believe agricultural institutions like LPU can equip future professionals and entrepreneurs to build resilient, sustainable, and climate-smart farming models?

Agriculture's future depends on our capacity to train professionals who can adapt, innovate, and lead in the face of climate uncertainty. At LPU, our approach is to mainstream climate resilience and sustainability across every level of agricultural education and practice.

We focus on:

- Climate-smart agriculture modules covering precision irrigation, conservation tillage, carbon farming, and digital climate modeling.
- Hands-on exposure to renewable energy applications, organic inputs, and integrated farming systems that enhance soil health and biodiversity.
- Interdisciplinary learning, linking agriculture with data science, environmental engineering, and policy analysis, to develop holistic solutions.
- Collaborative projects with farmers, research institutions, and startups to demonstrate scalable adaptation strategies.

The goal is to produce professionals who are not only technically skilled but also system thinkers, capable of building resilient, low-emission, and livelihood-secure agricultural systems that align with India's climate commitments and rural development agenda.

Q From your extensive research background, what are some scientific or technological gaps in Indian agriculture that young innovators should focus on addressing through startups or applied research?

Despite remarkable progress, Indian agriculture still faces critical scientific and technological voids that demand innovative solutions.

Key priority areas include:

- **Digital and precision agriculture:** Affordable IoT-based sensors, AI-driven pest forecasting, and real-time crop monitoring tools tailored to smallholders.
- **Water-use efficiency:** Low-cost micro-irrigation and soil-moisture management technologies for arid and semi-arid regions.
- **Post-harvest and cold-chain solutions:** Modular, decentralized cold storage and smart logistics to minimize wastage.
- **Soil and ecosystem health:** Development of regenerative practices, microbial consortia, and biochar technologies for long-term sustainability.
- **Pollinator protection and biodiversity enhancement:** Integrating apiculture and landscape ecology into mainstream crop management.

Above all, the translational gap, from laboratory innovation to on-field adoption, remains the biggest hurdle. Startups must work on contextualizing science for smallholders, ensuring affordability, accessibility, and demonstrable the impact. That's where India's next agricultural revolution will emerge, from knowledge that delivers change on the ground.

Q Finally, what message would you like to convey to aspiring agriculture students and young entrepreneurs who wish to contribute to India's food security and rural development through innovation and startups?

As young minds aspiring to transform Indian agriculture, you stand at the frontier of history. The choices you make today will determine not only the nation's food security but also its ecological and economic destiny.

Remember that innovation is not just about technology; it is about purposeful thinking, empathy for farmers, and perseverance in solving real-world problems. Stay rooted in science, but let your ideas grow from the soil upward, anchored in the realities of rural India.

Agriculture today offers one of the most exciting platforms for entrepreneurship, with opportunities in biotechnology, digital farming, renewable energy, pollination services, and sustainable value chains. Approach it as a mission, not just a profession.

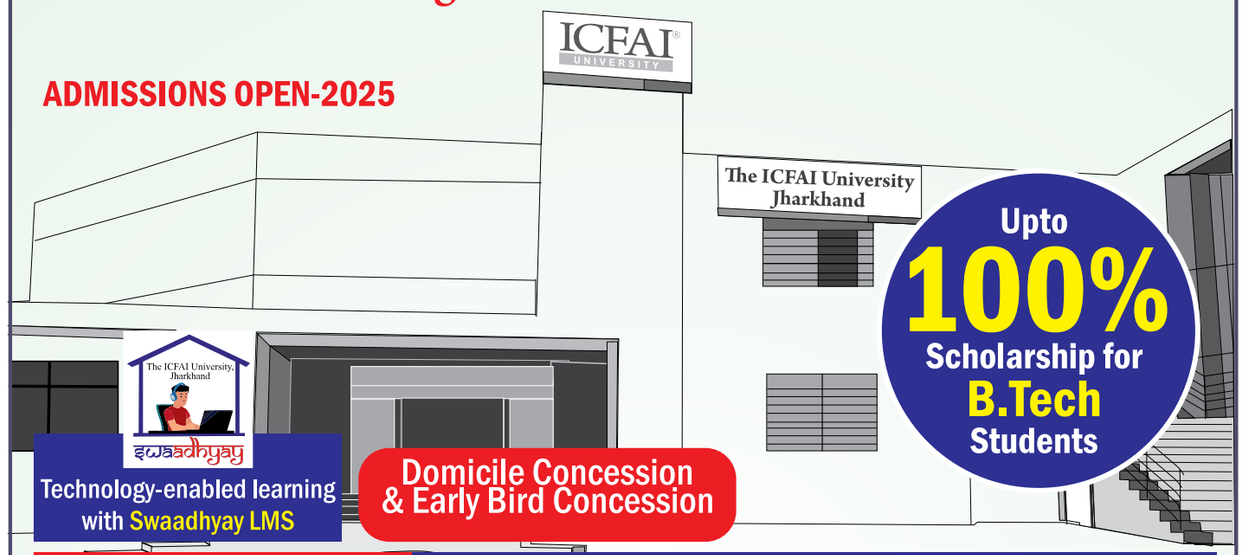
As future agri-leaders, you have the power to make agriculture profitable, inclusive, and planet-positive. Believe in your capacity to innovate for impact, and remember that in serving farmers and the land, you serve the nation itself. EP

ICFAI UNIVERSITY

The ICFAI University, Jharkhand

Grooming Professionals. With Values.

ADMISSIONS OPEN-2025



Upto 100% Scholarship for B.Tech Students

Technology-enabled learning with Swaadhyay LMS

Domicile Concession & Early Bird Concession

Placement Assistance

Faculty supervised academically integrated Internships

- MERIT SCHOLARSHIPS: Based on performance in Qualifying Examination & Semester-wise Performance in respective programs

ICFAI Tech School
B.Tech | B.Tech (Lateral Entry)
Dip.in Tech. (Polytechnic)
BCA | BCA (DS & AI)
BCA (Cyber Security) | MCA

ICFAI School of Management
BBA | BBA (Business Analytics)
B.Com (Hons.)
MBA | Executive MBA
Ph.D (Part-time) in Management

ICFAI Education School
BA (Hons.) English/ Economics

ICFAI Law School
Integrated BBA-LLB (Hons.)
Integrated BA-LLB (Hons.) | LLB
LL.M. (1 Year) | LL.M. (2 Years)

RANKINGS

1 RANKED Among Private Universities in Jharkhand Education World 2023

1 RANKED Among Private Universities in Jharkhand IIRF - 2023

2 RANKED Among Global top 100 innovative Universities WURI 2023

4 RANKED Among Indian Universities for Quality of Education Impact Ranking 2023

HIGHLIGHTS

Latest curriculum, including emerging technologies like Electrical Vehicles, AI/ML, Block Chain, Cloud Computing, IOT etc Courses on Digital Skills and Digital Transformation of Business Blended Learning, using Swaadhyay Digital Learning Management System Use of latest Educational Technologies in teaching-learning Courses on Soft Skills and Personality Development.

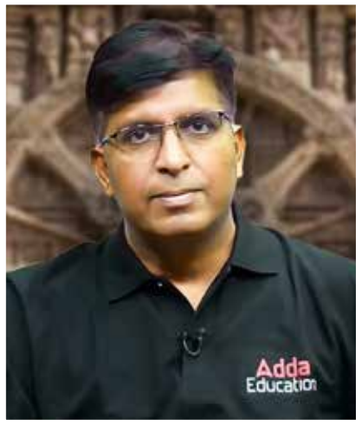
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Anil Nagar
Founder & CEO of Adda Education

PROFITABILITY MUST SERVE THE MISSION NEVER REPLACE IT

Anil Nagar, Founder & CEO of Adda Education, brings a deeply personal mission to India's edtech landscape—rooted in his journey from a small village in Uttar Pradesh to IIT-BHU and then to entrepreneurship. In this insightful conversation with Education Post's **Prabhav Anand,** he reflects on building an employability-first ecosystem that prioritizes access, affordability, and trust. From choosing mission over margins to expanding into skilling, multilingual learning, and AI-driven outcomes, Nagar shares how Adda Education is redefining success for Bharat's learners while preserving its core values of empathy, rigor, and responsibility.

Q You've often spoken about growing up in a small village with limited access to resources, and later moving into entrepreneurship. Can you share a formative moment or decision early in your life (before Adda247 was conceived) that fundamentally shaped your worldview about education equity — one that still guides your leadership decisions today?

I grew up in a small village in Uttar Pradesh, in a farmer's family, where education meant hope, not privilege. After clearing the IIT-JEE and graduating from IIT-BHU, Varanasi, I began my career in the corporate world but soon realised my true calling, bridging the gap I had experienced myself.

In 2010, from a small room in Noida, I started teaching math to a handful of students with one dream: to help them achieve their goals. What began as a small classroom under the name Career Power has today evolved into Adda Education, an employability-first ecosystem empowering millions of learners across Bharat.

Q Adda Education (via Adda247, Career247, etc.) is balancing a socially ambitious mission (serving Tier II/III learners, multilingual content) with the financial reality of profitability, burn, and investor expectations. How do you personally arbitrate trade-offs when internal metrics (e.g. unit economics) seem at odds with mission goals (e.g. access, affordability)? Can you cite a recent instance when you opted for mission over margin — and whether in hindsight you would do anything differently?

Running a mission-driven company often means walking a fine line between conscience and cash flow.

When we launched Career247, we were discussing going ahead with a premium pricing model to recover costs quickly. Strategically, it made sense. But I kept thinking about the kind of students I had started teaching over a decade ago capable, determined, but often priced out of opportunity. We ultimately chose to price the program at less than half the market average.

It wasn't the easiest financial decision, but it aligned with who we are. In the short term, it slowed our recovery cycle but in the long term, it expanded access and built lasting trust which, in education, is the strongest currency you can create.

For me, the principle remains constant: always put people first and lead with empathy, execute with efficiency. Profitability is essential for scale, but it should always serve the mission never replace it.

Q In 2025, Adda has made a notable push into skilling (e.g. BFSI, tech, Career247), seeking to move "beyond test prep." What have been the most surprising challenges or resistance points internally in making that pivot? And how are you measuring "success" in skilling — outcomes, retention, placements — in a way that gives you confidence in the bet?

Expanding into sectors such as BFSI, tech, and career readiness alongside our core strength in test prep has prompted us to fundamentally rethink what "success" means at Adda Education. The most surprising internal challenge was recalibrating our teams' mindset, long accustomed to measuring impact solely through test scores. Through sustained dialogue, targeted workshops, and onboarding new expertise, we introduced additional KPIs such as placement rates, course completion, and strong employer partnerships, reflecting a broader and more meaningful definition of learner success.

What truly inspires confidence is seeing alumni build sustainable careers, often achieving upward mobility, after participating in our skilling programs. Today, retention rates in skill-focused cohorts and authentic learner testimonials serve as our guiding metrics, offering a multidimensional view of learner impact beyond exam performance.

Q One of Adda Education's differentiators is multilingual content delivery (vernacular languages) beyond just English or Hindi. When you scale content creation in, say, 10+ regional languages, how do you prevent dilution of pedagogical rigor or quality? What are the internal guardrails, feedback

loops or innovation practices you use to ensure that a concept taught in one language is just as strong in another?

At Adda Education, vernacular isn't just a feature, it's our foundation. India's diversity demands more than translation; it requires a local connection. That's why we've built a network of regional YouTube and learning channels through Adda247 spanning Tamil, Telugu, Bengali, as well as Bihar, Punjab, and the North East where students learn from local faculty in their own language and cultural context.

Each channel is led by teachers who not only speak the language but also understand the mindset, aspirations, and challenges of learners from that region. When a student in Salem, Guwahati, or Patna hears a teacher explain a tough concept in their mother tongue, learning becomes personal not distant. Today, our vernacular ecosystem reaches millions of learners every month, empowering first-generation graduates and rural aspirants to prepare confidently for jobs and exams without language being a barrier.

At Adda Education, we don't just teach in multiple languages; we teach Bharat in its own voice.

Q You have publicly stated that you sometimes avoid hiring "toppers" if they lack curiosity. In a high-growth EdTech, how do you design hiring, onboarding, and retention practices that prioritize mindset over credentials? Also, can you share one case where you regretted hiring or rejecting someone because of misaligned mindset, and what you learned?

I have learned that degrees may open doors, but curiosity is what builds institutions. At Adda Education, we don't hire to fill positions we hire to protect our mission. The people who thrive here aren't necessarily "toppers" or "gold medalists." They're the ones who show grit, empathy, and a learner's mindset. Bharat doesn't need more credentialed professionals; it needs builders who can learn, unlearn, and stay restless in pursuit of impact.

Our hiring process reflects this philosophy. We don't obsess over resumes, we focus on decision-making under uncertainty, clarity of purpose, and the hunger to solve real Bharat problems. Candidates go through simulation rounds that test how they would handle ambiguous, ground-level challenges not theoretical puzzles. That's why we often say: hire for mindset, not medals. Skills can be taught, but alignment with the mission cannot. In a purpose-driven organization, every new hire is more than an employee; they are a guardian of that purpose.

For me, leadership isn't about finding the "best" people on paper; it's about creating a culture where ordinary people achieve extraordinary outcomes because they believe in what they're building. That belief, not brilliance, is what truly scales a mission.

Q The EdTech space—especially in test prep and skilling—is intensely competitive. Rivalries, talent poaching, and strategic positioning are inevitable. How do you draw ethical boundaries when scaling quickly? Has there been a moment when you had to make a tough call to refrain from an aggressive move—even though it might have yielded short-term gains?

From day one, we've prioritized building character. In the highly competitive edtech space, where talent wars, discount battles, and aggressive marketing are common, it's easy to lose sight of our true purpose.

I've always believed that trust compounds faster than aggression. It's tempting to chase quick wins: to copy features, undercut pricing, or lure talent with incentives. But these are short-term moves in a long-term mission. From the very beginning, we decided we would not build a company that wins the market at the expense of its moral compass.

At Adda Education, we aim not just to scale revenue, but to scale responsibility, setting a benchmark for how edtech can grow while staying true to its core principles.

Q You've indicated plans to eventually go public once revenue and scale benchmarks align. Given how the public markets scrutinize consistency, cash flows, and profitability, how are you preparing organizationally (in governance, data infrastructure, leadership bench) for that leap — and what are the biggest internal risks you're watching out for as the company "walks toward the IPO"?

In the last two years, we've evolved from a test-prep powerhouse to India's largest employability ecosystem, placing skills, industry collaborations, and AI-driven learning at the core of everything we do.

We've made significant investments in three key areas:

Skilling & Industry Integration: We've partnered with leading BFSI, IT, and services companies to co-design programs that map directly to real jobs, not just theoretical skills. The goal is simple: to make every learner job-ready, not just exam-ready.

AI & Data Infrastructure: AI isn't just a buzzword for us it forms the backbone of our approach. It personalizes learning journeys, predicts learner outcomes, and links skilling directly to hiring. Every learner interaction feeds into a comprehensive employability graph, allowing us to measure what truly matters: career outcomes.

Beyond technology and programs, the biggest risk we constantly monitor is cultural drift. As edtech companies grow, they often start speaking the language of valuation instead of value. At Adda Education, we consciously protect the DNA that brought us here frugality, agility, and a learner-first mindset.

The IPO, when it happens, will not be a finish line. It will be a milestone proof that an Indian edtech, born for Bharat, can balance mission, profitability, and purpose, while still leading with heart in a world increasingly driven by algorithms.

Q Five years from now, if all goes well, how do you envision Adda Education being perceived by learners, educators, and governments? What is the "impossible bet" (i.e. one that today might seem overly ambitious or risky) you're placing now — something that, even if it fails, will push the company's boundaries?

Five years from now, Adda Education won't just be known as a "test prep company." We're building something far more ambitious which is Bharat's first full-stack employability engine.

We envision a platform where any young person whether from Bundelkhand or Bhagalpur, aiming for Sarkari Naukri, banking, or the tech sector can start and complete their journey to employment under one trusted roof.

Our current big bet is the National Outcomes Network, a verified, interoperable system where every learner's skills, credentials, and employment outcomes are visible and trusted by employers and government agencies alike. Think of it as the UPI of employability: decentralized, real-time, and built for Bharat. It's uncharted territory, with enormous complexity but also immense potential for impact.

Why now? Because India doesn't have a learning gap; it has an outcomes gap. Degrees don't automatically lead to jobs. Skilling doesn't always guarantee placement. And most platforms stop at content not careers.

At Adda Education, we're solving for the full stack: from preparation to certification to placement all designed for the languages, aspirations, and realities of Tier 2–4 India. We believe the future of Indian edtech isn't just about test prep, it's about trust. And we're building the infrastructure to make it a reality. EP



Christopher Jolly
Founder of Jolly Phonics

ALL CHILDREN CAN SUCCEED IN READING

WHEN TEACHERS APPLY PHONICS WITH REAL DEDICATION

Christopher Jolly, Founder of Jolly Phonics, reflects on more than three decades of transforming early literacy through a rigorous, research-backed synthetic phonics approach. From addressing the reading crisis in the UK to enabling nationwide adoption in regions like Tamil Nadu and Nagaland, he emphasises that training, teacher awareness, and dedicated phonics practice remain central to real progress. In this conversation with Education Post's **Prabhav Anand**, he highlights India's unique readiness for early English literacy and stresses that true equity comes not from free materials alone, but from empowering teachers with strong methodology and sustained support.

Q You began your journey with classroom teaching in Malaysia before shifting to consumer marketing and then founding Jolly Phonics. Looking back, what gap in early literacy education did you identify that compelled you to build an entirely new pedagogy?

After my time as a teacher in Malaysia, I worked in consumer marketing for about 15 years. And when that came to an end, I was aware that the teaching of reading was in some kind of crisis in the UK.

During the 1980s, reading standards in schools had fallen. And I wanted to embark on a new area. I was able to start with one author, Betty Root, and create some reading games.

It was in that situation that I found myself in a small conference with Sue Lloyd, who later became the author. She was explaining how, in her case, they had got very good results in teaching reading, but that, because she wasn't the problem, nobody was interested. It wasn't because she was a good teacher; it was because of the way they did it.

So I said I was very interested. We put it into some research in a school, and I was able to see what it was that she had that made such a difference.

Together with another teacher, Sarah Wernham, we put the program together and then published it. It became an enormous success straight away. Just simply one book to begin with, which was a teacher's manual with Photocopy Masters.

Q Synthetic phonics has now become a globally accepted reading model, but it wasn't always mainstream. What were the biggest academic or policy-level resistances you faced in the early years, and how did you navigate them?

The biggest hurdle when we first started was just inertia within the education system. There was an expectation just to you would use the teaching of the alphabet, ABC, and memorization. Phonics was a good idea, but it was a bit vague.

Everything was geared to that; there was the curriculum, and there would be national curricula published. There was a teacher training that endorsed it and just experience.

What was triggered and what were the mechanisms by which to bring about change for us were actually achieved by having pilot studies in research. The most influential of them was a study done in Clackmannanshire in Scotland, which showed that with Jolly Phonics, the children could learn twice as fast. And at the end of one year, they had a reading age 12 months ahead.

But there were other studies in various places, academics, and they all came up with these kinds of results, children being substantially ahead. Then there were various mechanisms; there was a lot of lobbying by key people of government.

There were a lot of comments in the press. But it was when the opposition political party adopted this kind of teaching and said they would make it, put it in their manifesto at the next election, and then the whole thing changed. And the government in the UK then had an inquiry, which led to endorsing Synthetic Phonics, and that endorsement has been there ever since.

Q Countries like Singapore and Ireland have adopted Jolly Phonics nationwide. What do you believe India still needs—policy-wise or training-wise—to achieve similar large-scale adoption across its diverse school systems?

What India needs is a serious adoption of synthetic phonics for government schools. But I'm not in favour of this being done through legislation. I think that is a very over-heavy way of doing it.

Training is the most effective way, training and experience. And we've had the good fortune to have the programme accepted for all government schools in Tamil Nadu, also in Nagaland and in Ladakh, and our wish is to continue right the way through every state in India. But it will be best achieved in our view by persuasion, by example.

But there can be times when soft power from central-federal or central- state power can make a big difference. In the case of private schools and learning centres, then again, the answer is advocacy, such as in the press here, and through training and through the examples of others. So we find that conferences, training events, and all sorts of publicity are helpful.

India has several great advantages. One is that it is open as a society to the wide use of English. And the second is that the government, although it's guided with the national plan, nonetheless, there is flexibility within that for a programme of synthetic phonics to become more and more established.

I believe that will be happening and will be the direction of travel. The end result and the aim are for all children in India, whatever school they go to, to be able to read and write early in primary school.

Q India's education sector is rapidly expanding, yet foundational literacy remains an urgent challenge. During your visit to India, what gaps or opportunities stood out to you in terms of teacher preparedness and early literacy pedagogy?

I think the gaps that exist in India are really simply ones of awareness, of knowledge, of teachers being knowledgeable about the features of what makes for the successful use of synthetic phonics. My own experience from the various training events I've attended here and talking with teachers more is that I'm very impressed

with the understanding of teachers and their engagement with the process.

They know how to teach letter sounds, not letter names, to teach them at a fast pace and to work with the children who struggle by making sure that each stage in the process of learning sounds and blending, and segmenting is one that they master. So that they can, these teachers talk of children at the end of during their first year of learning to read being able to write their own news and read simple storybooks. So that the ability there is very impressive.

And so the aim then is to enable teachers as a whole across India to have that background knowledge and to be able to implement it through schemes such as Jolly Phonics.

Q Many educators argue that phonics alone cannot address deep-rooted literacy barriers, especially in multilingual countries like India. How does Jolly Phonics adapt to linguistic diversity and scripts beyond English?

Straightforwardly it is perfectly true, it is entirely true that phonics alone is not sufficient, but it is essential nonetheless. Not only that, but in the very beginning, phonics needs to be used with enormous dedication. It should not be diluted with too much of a mix of methods.

The more that teachers try to get children to memorise ordinary, normal words, such as and, had, but, not, this is not the way forward. Those words are straightforward and can be read each time by sounding out and blending. What it is important is that children should also, besides phonics, develop an understanding of what the words and their meaning are within the context.

Which is where I obviously picture storybooks are so valuable, where having a child being read to is very valuable, and children having experience of reading books for themselves, with words that they won't have read before. Although they may know them as words because they've heard them, but now they can actually read them. And with all of this, their vocabulary will increase, and young children are learning new words at a remarkable rate.

But the core foundation needs to be a very dedicated use of synthetic phonics at the beginning of learning to read.

Q Your program claims that 'no child is left behind'. Critics sometimes say such statements oversimplify complex learning needs. How do you ensure that struggling learners, children with disabilities, or those with limited English exposure actually benefit from this method?

About struggling readers, one of the features that have come out in research on Jolly Phonics is how it enables all children to learn to read. Studies have shown that children who have English as an additional language can keep up just fine, children who come from poorer homes and homes with no books can keep up just fine, and the boys can do as well as the girls.

Now, there will be some children who struggle, and the best response for them is for the teacher to show dedication with them at each stage to ensure that they master it, that they really do understand and can say each letter sound when they see it on a flash card, for instance, that they really can achieve blending to read words. It's a matter of practice. I'm not someone who favours letting children fail and then giving them a remedial programme later.

The stories of remedial programmes are not ones of success. They take a long time, they do not work for all children, they can still be left behind, and children in a remedial programme know that they've been a failure, and they don't find reading enjoyable, so they don't find it easy to commit. By contrast, if they're worked at in the very early stage with teacher's patience, these children get there and get enormous satisfaction from it.

I should say that in India, where the children don't have English as their first language, their ability to learn English and to use it is just as good as children for whom English is their first language. It's the methodology which is the most important feature of ensuring success.

Q Digital learning is booming, yet early literacy is fundamentally tactile and interactive. How is Jolly Learning balancing the rise of EdTech with the need to maintain multi-sensory, classroom-based learning?

About EdTech, you are right that young children especially, but in learning to read, they are, children are tactile, they like to be active, they like to be able to form the letters in writing and they need the feel of a book and being able to turn the page as they've read a page and then to finish the book and to reach for another one.

The role of EdTech is to enhance and hasten the process of learning and to make it secure for children of all abilities and EdTech, on the one hand, can be very diverse, but on the other hand, it's principally visual and audio rather than doing. It is extremely helpful in showing children and teaching to children from a whiteboard with all the diversity that you can put in a programme, and our programme is called Jolly Classroom and is outstanding.

But also, EdTech can work in a variety of other ways, for instance, we have an online training course that requires teachers to be involved for at least 20 hours. We have a JollyPhonics lessons app which is, can be carried on a mobile device, a phone, and can teach all the sounds with examples. Typically that is for a teacher to enhance their understanding and to be a practical tool for them, but also it's one which could be used with a child.

So there are a variety of ways of using EdTech, and this will grow enormously in the coming years.

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Q With over 30 years of global impact and visits to more than 100 countries, have you observed any cultural or pedagogical misunderstandings about phonics that you feel urgently need correction, especially in developing nations?

Drawing from my experience over all the time, originally the issue was the use of synthetic phonics and that is still very largely true but I think that the debate is moving on now and I see the most urgent issue nowadays is not so much the use of synthetic phonics but how do you use it very effectively to ensure not simply that children make the huge gains that they can and will make but also so that you can bring all children with you and to avoid the need for a remedial programme later on.

And there are various features that are needed, which are about the dedication to synthetic phonics, about going at a pace, and about ensuring that children have mastery of each stage, so that they are able to use it. These are the issues now about the effectiveness in which it is used, and some of this is also about programme design, whereby children are taught features and then are able to practise them with decodable readers.

Our understanding of decodable readers is very much better than it was, but it is still not as advanced as it should be. People are inclined to think of decodable readers as all being of a type, and this is not true. Decodable readers need to go in stages so the very simple ones just draw on the early understandings that children have, and as children learn more spelling patterns and understand in greater depth the way in which letter sounds are written in English. So it is that children can then have more advanced books, but they are still decodable, and being decodable does not mean that they can't be interesting; they can be very interesting, fiction, non-fiction, even in verse and poetry. But they must use the skills that the children have been taught, including some of the words which are called tricky words, which have got irregular spellings, words like once or said, or one, and these words they need to learn, which is the tricky part, and be able to recognise the word.

But with a greater systematic use of phonics, teachers and children will achieve much more, and that is a feature which needs to be constantly worked at.

Q You were recently awarded the OBE and hold two honorary doctorates. How do these recognitions influence your long-term vision? Do they add pressure to innovate beyond Jolly Phonics or reinforce the need to protect its core philosophy?

The OBE that I have received, and the honorary doctorates have been remarkably, I mean, it's been an enormous honor to receive them of course and I've been absolutely delighted and very humbled and these awards have been particularly helpful in helping people feel that the message we have is one that is true and it is one that they can take forward with confidence. And it has been one that has support, people have felt supported by at all levels within the education community.

So the many trainers of Jolly Phonics that we have felt very supported by the honors that I've had the good fortune to receive. Teachers who've been interested in the program see this as recognition that there is something of value here and so on. So yes, it's been very privileged to have these honors, and I feel it has been very supportive.

Q Some educators argue that literacy programs have become commercialised, making access difficult for low-income schools. How do you respond to the criticism that global literacy solutions should be more open-source, and what steps has Jolly Learning taken to remain accessible and equitable?

About being overly commercial and whether some items should be open source. I don't feel that there's any need to be apologetic about being commercial; it is how the world works. In my experience, private companies and publishers come with a sense of mission that is rooted in a deep understanding of their own subject.

That is true in literacy, publishing as elsewhere. But I fully support the need to reach right across the community. And in our case, we've done a considerable amount in providing free pilots and indeed on occasions support at cost to ourselves in ensuring and enabling adoption right across the community, and particularly in government schools.

This has been true around the world, and we have done a considerable amount of this in Africa and also within South Asia. But bear in mind that the prime need is not actually about providing for free. The prime need is about establishing the understanding and enabling teachers to use that understanding, and to do so with good experience.

Hence, we provide training and we provide support, a lot of support online. I have to say that there is a lot of material out there for free already that teacher can access. The principal need is not so much to provide for free, it is to ensure that there is an understanding on which teachers can then build.

With any programme like Jolly Phonics, teachers could spend a large amount of money and get very good results, but they could also spend much more modest sums and still get good results. And our job is to, and our mission is to reach all teachers and enabling that to happen. EP

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SUSTAINABILITY IS NOT A SUBJECT

IT IS A LIFELONG DESIGN COMMITMENT AND MINDSET



Prof. Risha Roy
Associate Professor and Lead of the Sustainable Fashion and Textile Design programme at Anant National University

Prof. Risha Roy, Associate Professor and Lead of the Sustainable Fashion and Textile Design programme at Anant National University, speaks with refreshing clarity about redefining fashion education in India. From integrating sustainability into every module to fostering deep, respectful engagement with artisan communities, she emphasises conscious material choices, ethical field practices, and research-driven design thinking. In this conversation—taken by Education Post's **Prabhav Anand**—Prof. Roy reflects on empowering students to navigate industry paradoxes, challenge fast-fashion norms, and build meaningful, responsible careers in a rapidly changing world.

Q You conceptualised and now lead India's first undergraduate programme in Sustainable Fashion and Textile Design. What gaps in existing fashion education made this programme necessary, and how do you ensure that sustainability is not treated as a theoretical add-on but embedded into each stage, from material literacy and dyeing practices to supply-chain thinking and consumption behaviour?

The programme emerged from a gap in mainstream fashion education that overlooks designers' responsibilities and the impact of design. Some existing programmes treat sustainability as an optional or theoretical subject rather than recognising it as a core course that must shape design decisions in today's constantly evolving world. The disconnect between how and what students learn and the changing world, depleting resources, and social divide make it necessary to create a dedicated undergraduate programme that redefines how we approach fashion education in India.

At Anant's Sustainable Fashion and Textile Design (SFTD), sustainability is not an add-on; it is an integrated part of every module with a dual focus on sustainability and design-responsible practice. Whether students are learning about materials, dyeing processes, textile structures, zero-waste pattern making, supply-chain systems or consumption behaviour, sustainability forms the lens through which each topic is decoded and taught. Although the concepts are theoretically grounded, they are taught through a practice-based approach, featuring hands-on studios, real-world projects, field research and industry collaborations.

We are creating conscious designers who are aware of conscious material choices, designing for the end of life of a product, and thinking of circular systems. This is an internalised attribute of sustainability as a habit of mind and a lifelong professional commitment, rather than a standalone subject.

Q Many students enter design programmes with strong creative instincts but limited understanding of sustainability, craftsmanship ethics, or material science. What are the most common academic or skill-based challenges you see among first- and second-year students? How has your "experimental pedagogy" addressed these gaps, especially for students who struggle with technical modules like textile structures, natural dye chemistry, or lifecycle analysis?

Students enter the Sustainable Fashion and Textile Design programme with strong creative potential, but their understanding of sustainability and the other subjects mentioned is not so refined. To address such challenges, the programme offers opportunities to learn through our experimental pedagogy, ensuring robust learning and skill competency development.

Carefully curated workshops and hands-on studios facilitate an exploratory environment, where students experiment, understand processes and iterate on conscious design. For instance, to understand material structures, students scavenge, scout and extract pliable materials and learn blending techniques.

We invite industry stakeholders and technical experts to provide regular input, demonstrations and critiques in the form of a semester-end jury. Their participation helps students connect classroom learning with real-world applications, making complex subjects more accessible and relatable.

We introduce strong foundational concepts slowly and methodically, building a strong base from which students can 'lift off' into advanced and complex areas.

Q Your years as an empanelled designer with the Development Commissioner (Handicrafts) have given you deep exposure to artisan communities across Gujarat. How does this grassroots experience shape the curriculum? More importantly, how do you prevent "craft field visits" from becoming superficial experiences, and instead ensure students develop long-term, respectful, mutually beneficial relationships with artisans?

My experience as an empanelled designer with the Development Commissioner (Handicrafts) has shaped how the programme curriculum positions craft and its community. This grassroots experience has helped reiterate the need to move beyond superficial craft exposure and create humble bonds with the artisans, keeping their challenges in mind.

AT SFTD, we have a dedicated module on the Ethics of Fashion and Fair Trade Practices. This module contextualises cultural appropriation for students and provides a framework of respectful engagement, fair compensation, authorship and shared decision-making. The dialogue on understanding their role as external stakeholders involves engaging with a community not as extractive observers, but as co-collaborators, who honour indigenous knowledge systems.

Field visits are structured at various stages, involving pre-visit sensitisation, guided interaction, reflective documentation with artisans and co-creating iterations with the artisans.

Q "Samman" has been recognised for restoring dignity and transparency in the distribution of pre-loved goods. As the project's mentor, how did you guide students through the field research and community engagement process, and what were the biggest challenges they faced while designing an equitable, user-friendly system?

As a mentor, my role was to guide students through a difficult and sensitive research process while preparing



them for meaningful community engagement. We started with aspiration mapping to understand the lived experiences, needs and ambitions of migratory marginalised communities. Students got trained in appropriate research methodologies, including how to design interviews, conduct observations and gather data ethically and inclusively. Seven sites were identified based on different demographics and interconnectedness to them via migration patterns.

The students were sensitised to the nuances of working with both genders. We discussed interaction protocols, cultural cues, and the importance of humility on the field. Students explored suitable data collection and analysis approaches, ranging from mapping supply chains to documenting donation flows.

The biggest challenge we faced was the initial barrier of building trust and starting a conversation. Due to social media, the community was very aware of what data gathering meant. Breaking the ice required patience, consistency and an understanding of the community's sensibilities. As the data spanned seven different regions, students had to adapt methods for each situation. Implementing and testing action plans in real-world scenarios further deepened their understanding, helping them develop a transparent and user-friendly system grounded in dignity and mutual respect.

Q Initiatives like "Samman" often struggle with long-term sustainability once the pilot phase ends. What risks do you foresee as the project scales, and how is the department supporting the students to ensure community trust, transparent processes, and measurable social impact beyond the award?

Projects like Samman are usually done in phases. Within the project Samman, we have created enough documented evidence for the interested stakeholders to continue working on in the next phase.

This project was designed as a module that can be replicated at a larger scale in various Tier II cities to achieve an efficient circular economy. Students create transparent ecosystems with the key stakeholders and community, enabling a trustworthy environment.

It is important to build trust with the community. We ensure that these stakeholders are provided with the best possible support to ensure they trust the system. The actionable plans for Samman have measurable and quantifiable outcomes that can be implemented in phases.

Q Sustainable fashion today must negotiate a paradox: students want innovation, but the industry continues to function on fast fashion timelines and consumerism. What conversations do you have with students who feel disillusioned or conflicted, those who want impactful careers but worry about employability, pay scales, or greenwashing in mainstream fashion jobs? How does your department prepare them to navigate these ethical tensions?

Sustainability is a lifestyle decision that one must continually opt for as they navigate milestones. The students often feel disconnected and disillusioned as the industry still has a consumerist outlook. We encourage them to work towards incorporating either of the sustainability pillars, including environmental, social, cultural, and economic factors, in ways that could have a larger impact in the long run.

We also encourage them to advocate and inform key stakeholders to make pro-sustainable choices right from day 1. By the time they start their Capstone project, which is the first time they engage with the industry, they already have a voice, which pushes them to seek out industry partners where sustainability is a real value.

Q You've worked at multiple institutions UID, Nirma University, Somaiya Kala Vidya each with different student demographics and design cultures. From your experience, what systemic issues do you see in Indian design education today (for example: lack of lab access, inadequate critique culture, weak writing/research skills, or overemphasis on aesthetics)? Which of these challenges are you actively addressing within Anant's Sustainable Fashion and Textile Design programme?

One of the biggest challenges that design education faces in India is balancing technical skill development and critical thinking. Artisan-centred design schools demonstrate a more robust balance. The curriculum is integrated in the form of practical craft skills and community-based knowledge, allowing young artisans to continue experimenting and strengthen traditional practices while shaping their own creative pathways. It is vital to achieve the right balance between skills and critical thinking among new-age designers.

At Anant, we emphasise developing a strong foundation. Sustainable Fashion and Textile Design re-examines fashion education with a fresh perspective, as the world is constantly changing and we are heading into a space of conflicts where resource depletion, climate change, unfair and unethical practices, gender divide, etc., will become serious challenges. We nurture designers equipped to deal with new-age challenges. The students constantly engage in dialogues to become more aware and sensitive towards these challenges.

Q Research is central to your work, especially on altering consumption patterns through traditional sustainable practices. How do you incorporate this research into student projects so they move beyond "eco-friendly prototypes" and towards deeper behavioural change models? Can you share a recent student project where research and real-world impact converged, whether in waste reduction, upcycling, natural dye revival, or market interventions?

I recently conducted a workshop, where we adopted a research-driven learning approach. It aimed to sensitise students towards being more inclusive by engaging them with both visible and invisible forms of disability. Students conducted primary and secondary research, interacted with individuals with limited abilities, and iterated solutions that focused on adaptation rather than new production.

Many interesting outcomes emerged. One of the initiatives addressed the needs of individuals with limited visual abilities. The student developed a system that helps individuals identify colours within their existing wardrobe. Instead of creating new products, the students intervened directly in existing wardrobes, demonstrating how design intervention through research insights can lead to low-impact, highly contextual solutions.

The workshop also covered topics related to inclusiveness across sexuality, ageism, gender and body size. Students also worked on making fashion more equitable and how design can bring about a behavioural shift.

This research-based, empathetic approach helped sensitise students and understand sustainability beyond environmental concern and look at it as a social and cultural practice that can bring dignity and long-term change.

STARTUP IDEAS IN AGRICULTURE, MARKET STUDY, RESEARCH & INNOVATION

Siddharth Verma

The agriculture technology sector is experiencing unprecedented growth, with the global agritech market projected to expand significantly over the next decade. Beyond mainstream farming solutions, numerous innovative and lesser-known startup concepts are emerging to address specific challenges in agricultural production, sustainability, and resource management.

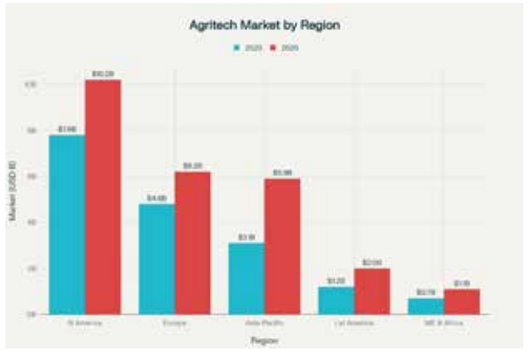
Market Overview and Growth Statistics

The global agritech market demonstrates robust expansion across multiple segments. The overall market is valued at approximately USD 8.15-30.63 billion in 2024 and is projected to reach USD 34.8 billion by 2034, representing a compound annual growth rate (CAGR) of 15.3%. Within this broader market, the precision agriculture segment shows particularly strong growth, expanding from USD 9.32 billion in 2024 to an estimated USD 21.47 billion by 2033, with a CAGR of 9.66%.



Global Agritech and Precision Agriculture Market Growth Projections (2024-2034)

The Asia-Pacific region exhibits the fastest growth trajectory with a projected 21.1% CAGR between 2023 and 2025, expanding from USD 3.1 billion to USD 5.9 billion. This rapid growth reflects massive adoption in large agrarian economies like India and China, driven by the need for accessible IoT platforms, drone-based precision farming, and remote monitoring solutions tailored to smallholder farmers. India's agritech market specifically reached USD 878.1 million in 2024 and is projected to grow at a 10.93% CAGR to reach USD 6.15 billion by 2033.



Global Agritech Market by Region: 2023 vs 2025 Projections with CAGR Growth Rates

Innovation in Agricultural Research and Development

Investment in agricultural research has become increasingly concentrated in Asia, with significant implications for global innovation. China has emerged as the largest funder of agricultural research and development, with public expenditures reaching over USD 10 billion annually by 2015, roughly twice the U.S. level and nearly five times China's own spending from 2000. Between 2019 and 2021, China's annual average public-sector expenditures on agricultural R&D exceeded the combined spending of the United States, India, and Brazil. Global South governments account for approximately 60-70% of agricultural innovation funding totaling around USD 60 billion annually, with China, India, and Brazil representing nearly 40% of this total.

Lesser-Known Startup Ideas in Agriculture

Beyond conventional farming models, several niche agricultural startup concepts demonstrate significant potential for disruption and market growth:

1. Vertical and Aquaponics Farming Systems

Vertical farming represents a paradigm shift in urban agriculture, utilizing controlled environments and hydroponic systems. Planty Cube, developed by n.thing, employs shipping containers stacked vertically with computerized climate controls and hydroponic systems for crop cultivation. These systems achieve remarkable efficiency gains, CubicFarms' HydroGreen Grow System can produce up to 25 million pounds of fresh livestock feed annually using just one-tenth of the water required in traditional irrigated systems.

Aquaponics integrates aquaculture with hydroponics in symbiotic systems where fish waste provides plant nutrients and plants purify water for fish. These integrated systems can achieve up to 90% water savings compared to traditional soil-based farming while enabling year-round production of multiple crops and protein sources simultaneously. Commercial implementations like Ouroboros Farms in California demonstrate the scalability of this approach within urban settings.

2. Insect Protein Production

Insect farming emerged as a viable alternative protein source, addressing sustainability challenges inherent in traditional livestock production. SENS Foods produces cricket flour containing 70% protein with equivalent quality to high-end beef, using 2,000 times less water, 15 times less land, and generating 100 times fewer greenhouse gas emissions than livestock-based proteins. Inseco converts food waste and organic by-products into proteins, oils, and fertilizer using black soldier flies, with their EntoPod system enabling on-site waste management and upcycling.

Full Circle Biotechnology, based in Singapore with operations in Thailand, combines black soldier fly larvae with microbial protein produced via solid-state fermentation. Their facility produces 7,000 tons annually with production commencing in November 2025, and their feed can replace up to 75% of fishmeal in aquaculture—the highest commercial substitution rate documented. Divaks focuses on yellow mealworms with vertically integrated production in collaboration with Buhler Group, enabling industrial-scale operations.

3. Soil Health and Regenerative Agriculture Technologies

Regenerative agriculture startups address soil degradation and carbon sequestration challenges. Biome Makers utilizes BeCrop® technology analyzing soil microbiomes through a database of 24 million microorganisms, providing actionable insights for enhancing crop resilience and productivity. InPlanet focuses on Enhanced Rock Weathering using natural rock powders from tropical soils to simultaneously remove carbon dioxide while rejuvenating soil health, allowing farmers to replace chemical fertilizers with sustainable alternatives.

Propagate, a venture-backed startup, provides comprehensive platforms integrating agronomic insights, technical assistance, and financing to transition farms to regenerative practices through agroforestry integration. Living Roots creates AI-designed regenerative fertilizers from local waste, combining biology and data to help farmers increase yields by 30%, eliminate chemical inputs entirely, and improve long-term soil health.

4. Climate-Resilient Crop Development

The climate-resilient crops market represents a major growth opportunity, expanding from an estimated USD 365.9 million in 2024 to USD 850.5 million by 2034, growing at 8.8% CAGR. Drought-resistant varieties command the largest market share at 45%, followed by flood-tolerant crops at 30%, and salinity-resistant varieties at 25%. Applications include CRISPR gene editing for precise genome modifications without foreign DNA insertion, enabling faster regulatory approval and higher public acceptance. Leading companies like Bayer AG and Corteva Agriscience are developing seed lines designed to withstand extreme weather conditions, leveraging cutting-edge genetic technologies.

5. Microbial Biotechnology and Biofertilizers

Microbial biotechnology represents a fundamental shift from chemical dependency toward biological solutions. Beneficial bacteria and fungi such as rhizobia, azotobacter, and mycorrhizae serve as biofertilizers, reducing synthetic fertilizer dependence while enhancing nutrient uptake efficiency. Companies like Pivot Bio and Locus Agricultural Solutions offer regenerative inputs including microbial seed coatings and biofertilizers that naturally enhance soil nutrient cycling. Lavie Bio and PlantArcBio develop microbiome-based inputs enhancing soil biodiversity and optimizing plant nutrition for resilience under extreme conditions.

6. Alternative Protein Production Through Fermentation

Advanced fermentation technologies are enabling protein production independent of traditional agriculture. Nature's Fynd uses biomass fermentation with fungi discovered in Yellowstone hot springs, producing Fy protein requiring minimal land and water for dairy and meat substitutes. Perfect Day pioneered animal-free dairy using precision fermentation to produce whey and casein proteins. Solar Foods develops "Solein" through gas fermentation, converting CO_2, water, and electricity into edible protein through microbial conversion, completely decoupling protein production from agriculture.

Microbe-derived proteins demonstrate exceptional environmental advantages, with studies showing up to 62 times lower greenhouse gas emissions and almost 2,000 times less land use compared to animal-based proteins. Large-scale global shift to alternative proteins could reduce land use for food production by up to 75%, freeing substantial acreage for conservation or regenerative farming.

7. Precision Agriculture and AI-Powered Farm Management

AI-driven platforms are transforming farm decision-making through data analytics. Fasal employs data science and artificial intelligence to provide farming predictions, having helped farmers save over 3 billion liters of water since inception through hyperlocal weather forecasts, pest and disease predictions, and irrigation management optimized for sustainability. Cropin integrates farming with enterprise resource planning using big data analytics, AI, geo-tagging, and satellite imagery for comprehensive farm monitoring and optimization.

Green Collar Agritech Solutions, an Indian startup founded in 2022, creates crop growth analytics using machine learning and AI to increase agricultural production by providing real-time insights on crop health and growth patterns. Their TARAM device enables portable, AI-powered on-site quality analysis of spices and high-value crops, with the TARAM-IQ platform aggregating data on quality, quantity, and location for informed decision-making.

8. Drone and Robotics Automation

Labor shortages and resource optimization drive robotics innovation. Agrobot develops robotic harvesting solutions specifically for high-value crops, with their Sprout asparagus robot enabling precision picking while reducing labor costs. Their Squirrel autonomous transport system carries harvested crops and empty trays, easing physical burden on workers. Iron Ox and similar companies develop autonomous field robots for weeding and monitoring with minimal human intervention.

ecoRobotix enables smart crop management through high-definition field image analysis, with their ARA sprayer recognized as the market's most precise, reducing crop protection product usage while increasing efficiency. Abit and Yevul Info develop functional biodiversity management software and AI-enhanced plant health detection systems respectively, supporting targeted interventions.

Emerging Research Trends in Agriculture

Current agricultural research emphasizes several critical themes aligned with global sustainability and food security goals:

Climate Adaptation Through Biotechnology: Advanced breeding techniques including CRISPR gene editing, marker-assisted selection, and genomic breeding accelerate development of climate-resilient varieties. Integration of molecular markers with genomic data enables rapid stacking of desired traits for drought, heat, and salinity resistance. Research institutions like ICAR (Indian Council of Agricultural Research) actively promote climate-resilient varieties to ensure stable production amid increasing climate variability.

Microbiome Science and Plant-Microbe Interactions: Fundamental research explores mechanisms behind beneficial microbial activities that enhance nutrient use efficiency. Delivery systems for large-scale field application represent the primary bottleneck, though advances in mass production and formulation techniques continue progressing.

Carbon Agriculture and Environmental Impact Reduction: Carbon utilization is evolving from niche concept to cornerstone of sustainable agriculture. AI-driven measurement, reporting, and verification (MRV) technologies combined with carbon farming initiatives enable agriculture to actively contribute to climate solutions. Companies like Agreena, Boomitra, and Nori have built platforms measuring soil carbon and connecting farmers to carbon credit buyers.

Water Security and Resource Optimization: Technologies addressing water scarcity through precision irrigation, closed-loop systems like aquaponics, and AI-powered water management represent critical research areas. Satellite monitoring and remote sensing enable real-time resource monitoring across regions.

Food Security Through Diversified Protein Sources: Research explores integration of alternative proteins within agroecological frameworks, comparing legumes, plant-based products, edible insects, macroalgae, fungal biomass, and cultivated meat for sustainable nutrition provision, particularly in low and middle-income countries.

Market Component and Technology Distribution

Within the broader agritech market, the hardware segment held the largest share in 2024, driven by rising demand for precision farming equipment, IoT-enabled devices, and automation solutions. However, the service segment is experiencing the highest growth rate during the forecast period, reflecting increasing demand for data analytics, AI-driven farm management solutions, and maintenance/consulting services. Automation and robotics technologies currently lead the market by technology type, with applications spanning harvesting, weeding, planting, and spraying operations.

Investment and Funding Landscape

Private equity and venture capital funding for agriculture startups represents 2-3% of total agricultural innovation funding in the Global South, though this proportion is accelerating. Multiple Indian agritech startups demonstrate successful funding trajectories: Fasal has raised USD 1.8 million across multiple funding rounds from investors including Omnivore, Wavemaker Partners, and others. Aibono, another precision farming platform, improved yields by up to 50% with day-to-day interventions and has established significant investor backing.

The agriculture sector is experiencing transformative innovation across multiple fronts, from vertical farming systems achieving 90% water savings to alternative proteins generating 62 times lower emissions than conventional livestock. Lesser-known startup ideas addressing soil health, insect protein production, climate-resilient crop development, and AI-powered farm management represent significant market opportunities within a sector projected to reach USD 34.8 billion by 2034. Continuous advancement in microbial biotechnology, precision fermentation, and genomic breeding—coupled with increasing global R&D investment particularly from Asia-Pacific regions—positions agriculture as a sector poised for substantial technological and market transformation over the coming decade.





J&K KUPWARA TEEN TURNS CLASSROOM IDEA INTO A RISING STARTUP, POWERED BY HIS MOTHER'S SUPPORT

Amin Masoodi

In a modest home in Allachizab, a remote corner of Jammu and Kashmir's frontier Kupwara district, a young dream quietly took shape — and against all odds, it is now shining bright.

Barely out of school, Class 12 student Maajid Ahmad Bhat has built a growing business from scratch — a soap and chappal manufacturing unit that is fast becoming a household name across Kupwara.

Powered by determination, and unwavering support from his mother, Maajid has turned his idea into a model of youth entrepreneurship in one of the region's most backward areas.

"I always believed I could create something of my own," says Maajid, standing amid rows of soap bars stacked for dispatch under the label Bhat Chemicals.

"I didn't want to wait for a job but do something exceptional to be my own boss and a job giver. I always wanted to create jobs for others. Mission Yuva gave me that start, but my mother gave me the courage." he added.

Under the Mission Yuva initiative — the Jammu and Kashmir government's flagship scheme to empower educated unemployed youth — Maajid received financial support to set up his unit in his native Allachizab village, about 15 miles from Kupwara town.

Within months, his brand began to take root. His products including Extra Wash detergent cakes to toilet cleaners and colorful chappals — are now in steady demand across local markets.

"Over the past few weeks, we've seen a steady rise in orders from Kupwara town, and now shopkeepers in neighboring areas such as Kralpora, Trehgam and Sogam have begun reaching out as well," Maajid told Education Post.

"They're drawn to our products because they're affordable, reliable and already showing strong results on the ground. This growing interest gives us the confidence to expand our reach further in the coming months, strengthen our supply chain, and introduce new product lines tailored to local demand." he added.

For Maajid's mother, the journey is deeply emotional. "We had very little, but he had big dreams," she recalls, her voice trembling with pride. "Every evening, he would talk about starting something that would make our village proud. I told him — don't fear failure, just begin. I'll stand with you."



"It fills me with immense relief and pride to watch my son take charge of this venture at such a young age," she said. "I'm certain he will carry this project far beyond where it stands today — this is only the beginning." she added.

His father Ab Hamid Bhat, too, beams with quiet satisfaction.

"It wasn't easy. We come from a small village where opportunities are scarce and dreams often take a backseat to survival. But Maajid's determination has changed how people here view what's possible," he says.

"Today, he is not only running his own unit but also providing employment to a few others. And I'm confident that in the coming years, many more jobless youths will find a livelihood here as our business expands."

"That, to me, is a victory — not just for our family, but for the entire area."

From a single room business unit initially to a growing rural enterprise, Bhat Chemicals has become a symbol of what faith, grit, and opportunity can achieve. Maajid now plans to expand production and train other young people from Kupwara to start small ventures of their own.

"Entrepreneurship is not just about profit," he says. "It's about proving that no place is too remote and no dream too small. If you have the will — and your mother's prayers — you can build anything."

Bhat Chemicals is a standout success story for us, a senior bank official said.

"Mission Yuva has opened a pathway that many young people in remote districts never imagined possible. With accessible loan facilities and hand-holding support, jobless youth can now think beyond traditional constraints and build sustainable business units of their own," he said.

"What we are witnessing here is not just one entrepreneur's rise, but the beginning of a broader economic shift — and we expect many more young men and women to step forward and transform their futures through this scheme." he added.

Mission Yuva steps up as J&K's big youth empowerment mission

With nearly 65% of Jammu & Kashmir's population below the age of 35, the Union Territory stands at a pivotal juncture where its demographic strength can be transformed into economic power. Mission YUVA has quickly emerged as the government's flagship program to channel this potential into entrepreneurship, employment, and social leadership.

Conceived as a transformative movement more than a policy intervention, Mission YUVA positions young citizens not as beneficiaries but as partners in progress. The program aims to nurture a generation that is educated, employable, entrepreneurial, ethically aware — and equipped to push J&K into a new era of innovation and inclusive growth, said a government official.

At its core, Mission YUVA blends ambition with character-building. It recognises that empowerment goes beyond degrees and job placements; it lies in developing critical thinkers who can act responsibly, innovate fearlessly, and contribute meaningfully to society.

To this end, the government of J&K has set an ambitious goal: creating 1.37 lakh new enterprises and 4.25 lakh employment opportunities over the next five years.

SCHEMES TO TURN IDEAS INTO ENTERPRISES

Under Mission YUVA, the government has rolled out targeted financial schemes to support aspiring and existing entrepreneurs:

I. Nano Entrepreneurs & Collectives (J&K Bank Nano Udaan)

- For small-scale ventures up to ₹10 lakh.
- Ideal for first-time entrepreneurs with no formal credit history.
- Covers businesses like tailoring, vending, groceries, and small manufacturing.

II. New MSMEs in Focus & Sunrise Sectors (J&K Bank MSME Aghaaz)

- For high-growth sectors such as renewable energy, IT, pharma, and advanced manufacturing (₹10 lakh to ₹125 crore).
- Offers 6% interest subvention for five years, capped at ₹5 lakh/₹30 lakh/₹75 lakh for micro, small, and medium units.
- Mandatory MSME registration.

III. Business Acceleration for Existing Enterprises (J&K Bank Yuva Parwaaz)

- For expansion of established micro-enterprises (₹10 lakh to ₹25 crore).
- Offers 6% interest subvention for five years, capped at ₹10 lakh.
- Restricted to registered, operational units.

IMPACT ON THE GROUND: THOUSANDS STEPPING INTO ENTREPRENEURSHIP

Mission YUVA's outcomes are already visible across rural and semi-urban belts. Training modules and awareness drives have been taken deep into villages, ensuring equitable access for youth across gender, geography, and economic backgrounds.

From eco-friendly rural ventures to student-led digital literacy campaigns, young participants are beginning to reshape local economies and social ecosystems.

JK Bank — the implementing financial partner — has received over 31,000 applications since June this year, according to officials. Of these, 8,700 have been sanctioned and nearly 6,600 disbursed, amounting to more than □356 crore. Each new unit adds not only to the UT's enterprise count but also to its pool of skilled jobs.

A MOVEMENT SHAPING LEADERS, NOT JUST LIVELIHOODS

Beyond financial assistance and training, Mission YUVA's most powerful contribution lies in leadership development. Through camps, mentorship sessions, and entrepreneurial bootcamps, the mission equips young people with confidence, teamwork, ethical reasoning, and a sense of purpose — qualities vital for building a modern, resilient J&K.

As India's economy expands, the stakes for youth empowerment grow even higher. Mission YUVA aims to widen its digital footprint, deepen institutional partnerships, and cement its role as a permanent ecosystem for innovation and self-reliance.

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Dr. Prashant R. Nair

INTEGRATING STARTUP AND ENGINEERING EDUCATION ECOSYSTEMS IN INDIA

India boasts of the 3rd biggest higher education system world-wide after USA and China with 1100+ universities & 56000+ colleges with 40 million enrolments and 1.5 million teachers in higher education. Gross Enrolment Ratio (GER), is inching towards 30% with 40 million students pursuing higher education according to the FICCI EY Parthenon Knowledge Report 2023 of higher education in India. India has taken great strides in higher education considering the fact that the GER is marching ahead at a pace comparable to developed economies. The National Education Policy (NEP) 2020 of the Government of India aims for the Indian higher educational system to attain 50% GER by 2035. The objective is to have additional 26 million higher educational enrolments by 2035 with engineering admissions taking the lion share. Hitherto, there are 6000+ higher educational institutions in engineering education with over 3 million enrollments as per the statutory body regulating engineering education in India, All India Council for Technical Education (AICTE) in its 2023 annual report.

This remarkable growth in engineering education and mushrooming of higher educational institutions has brought about its share of concerns and challenges. These include diverse challenges related to access, accreditation, employability, equity, faculty, funding, research, quality, and ranking. As per the World Economic Forum (WEF) Future of Jobs Report, the unemployment rate in India in 2023 while remaining fairly stable overall at 3.2%, has seen increase up to 9% amongst workers with higher educational qualifications such as engineering. One of the key reasons for this conundrum is the employability skills gap pointing towards the quality of engineering education in India.

This is very relevant in the context of the digital transformation and disruptions happening world-side in all sectors and verticals. Job roles are likely to see dramatic changes such that 50% of the present job roles are likely to be irrelevant in the next 5 years. This is no doubt a challenge but also a great opportunity, India's demographic dividend can be put to good use globally especially with the talent and numbers of Indian engineers. India can prepare itself to meet the need for engineering talent on a global scale, with the potential for talent mobility across borders to contribute US $ 500 billion to the global economy provided steps are taken to increase the employability.

The India Skills Report 2025 is a report brought out with industry-academia-government collaboration providing insights on the status quo with respect to employability of India's youth, emphasizing industry readiness for an AI-powered future. Confederation of Indian Industry (CII), Association of Indian Universities (AIU), AICTE, Google and Wheebox are amongst the partners for this report. As per the India skills report headlined by Wheebox, employability rate is around 55% for Indian graduates in higher education. This is an increase from 33% over a decade ago. With respect to engineering education, it is 70%. However, there is sufficient cause for worry considering the fact that 30% of engineering graduates do not make the cut in terms of employability. These numbers are also alarming considering the overall numbers, which are close to half a million engineering graduates in India.

A wide variety of 21st century skills are needed for preparing the future-ready engineering workforce. These include and are not limited to Data Science and Analytics, AI & Machine Learning (ML), IoT & sensors, cloud & virtualization, Cybersecurity as well as life skills and human-centric abilities like leadership, collaboration, empathy, communication, ethics, and cognitive skills.

SO HOW DO WE DO RAMP UP THE EMPLOYABILITY NUMBERS AND BUCK THE TREND?

There is light at the end of the tunnel.

India's vibrant startup ecosystem is a shining example of the India rising story. India is the 3rd largest startup ecosystem with more than 1.6 lakh registered startup providing employment to 1.6 million people, with most of them being engineers. These are the registered startups with DPIIT. Unregistered startups may be three times this number including student startups in universities and colleges. India is also home to 100+ unicorns which is perhaps the largest number of unicorns in any country worldwide. And most of these startup founders are mostly graduates from regular engineering colleges such as NITs and private universities and colleges in India. These young entrepreneurs have mostly worked on their own steam with limited support, which has primarily come from the incubation centres in their colleges and campuses. There has been no dearth of talent and aspirations in India, and these startups have multiplied and thrived despite not having a fully developed startup ecosystem like the USA replete with venture capitalists, angel investors etc. The Indian startup ecosystem is now fast developing with the partnership of all stakeholders including government agencies, universities, colleges, venture capitalists, angel investors, incubators and accelerators. As on date, there are 1000+ incubation centers in India with the majority of them in engineering institutions. The connection between startup and engineering education ecosystem primarily through these incubators and these have reaped dividends. The startup numbers in India are proof of this. However, we have only scratched the surface.

Further integration between the startup and engineering education systems is the need of hour. Fortunately, there are several initiatives linked to statutory and regulatory compliances, accreditation, and rankings for engineering institutions linked to development and promotion of innovation and entrepreneurship. These include Institution's Innovation Council (IIC) and National Innovation and Startup Policy (NISP) for higher educational institutions by AICTE and Ministry of Education's Innovation Cell (MIC). IIC and NISP are complementary to each other. These initiatives promote, facilitate and enable startups and entrepreneurship as also also incentivize these engineering colleges who

realize these innovation and entrepreneurship outcomes including startups, patents, prototypes, projects and the like. There is a five-star rating for the IIC performance, and a good number of engineering institutions are working towards securing the best star rating. AICTE approval and extension of approval has now been linked to a functional IIC and these activities and IIC performance star rating also fetch points in various accreditations of NAAC and NBA and NIRF rankings of the Government of India However, it is vital that all engineering institutions take these initiatives proactively and seriously as also strategize towards attainment of various outcomes.

The numbers of engineering colleges working towards improved IIC performance have seen a steady growth, but the numbers need to be significantly ramped up. Full coverage will definitely have a force-multiplier effect on startup numbers in the colleges, thereby increasing employability and employment. This has the potential to dramatically increase startup numbers so that India can emerge as the top startup nation in the world within the next 5 years. Details of these initiatives which can play a cardinal role in integrating the startup and engineering educational ecosystems are as follows:

Institution's Innovation Council (IIC): This council aims to create a vibrant local innovation ecosystem by encouraging students and faculty to work on new ideas and convert them into viable startups. Each IIC functions as a platform within an institute to plan, implement, and monitor innovation-related activities such as idea competitions, hackathons, workshops, and start-up mentoring sessions. It connects academic institutions with regional and national innovation networks, enabling collaboration and knowledge sharing. By fostering creativity, design thinking, and entrepreneurial skills, the IIC framework helps nurture future innovators and contributes to India's vision of becoming a global innovation hub. IIC Activities include but are not limited to.

- Orientation and awareness sessions on innovation and entrepreneurship
- Idea generation and submission drives
- Workshops on Intellectual Property Rights (IPR), design thinking, and prototyping
- Entrepreneurship development programs
- Innovation Day celebrations and success story sessions
- Smart India Hackathon (SIH)
- Toycathon, National Innovation Contest (NIC), and Impact Lecture Series
- Bootcamps, innovation challenges, and leadership talks
- National-level exposure visits and mentorship programs
- Internal hackathons or idea competitions
- Industry–Institute interaction sessions
- Startup or product exhibitions
- Expert talks and innovation awareness programs
- Prototype development and incubation support activities.
- Celebration of Innovation Day, Startup Day, World Entrepreneurs' Day, etc.
- Showcasing local innovations and success stories
- Felicitation of student innovators and mentors

National Innovation and Startup Policy (NISP): The National Innovation and Startup Policy (NISP), launched by the Ministry of Education's Innovation Cell (MIC) and the AICTE, provides a comprehensive framework to promote innovation and entrepreneurship in higher education institutions. It aims to create a robust campus ecosystem that encourages students and faculty to develop ideas into viable startups. The policy outlines guidelines for setting up incubation centres, managing intellectual property (IPR), and integrating entrepreneurship into academics. By fostering collaboration between institutions, industry, and investors, NISP helps build a culture of creativity, problem-solving, and self-reliance among young innovators. Key features of the policy include the establishment of pre-incubation and incubation centres, provision of mentoring and funding support, and the creation of institution-level innovation councils to monitor and promote entrepreneurial activities. It also provides detailed guidelines for intellectual property rights (IPR) ownership and revenue sharing between the institution, faculty, and students to ensure fair recognition and benefit distribution.

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Harish Arnezath

BEYOND CLASSROOMS
HOW ENTREPRENEURS ARE REWRITING THE LEARNING PLAYBOOK

For many South Asian entrepreneurs, these are testing yet defining times. Markets are shifting faster than forecasts, new technologies are rewriting industries, and global headwinds are pushing business owners to stay alert and adaptable. Across sectors, leaders are recalibrating strategies, diversifying portfolios, seeking new pathways for growth, and keeping a steady hand on the wheel. Amid all this motion, one question surfaces quietly but persistently: Can learning still find its place when every moment demands action?

For entrepreneurs, learning isn't an academic exercise, it's a survival instinct. They learn to grow, to scale, to lead better, and to resource their companies faster. Their learning is purpose-driven and deeply practical. The sources they trust most are those anchored in reality: mentors who've weathered crises or built companies, peers who speak their language of possibility and constraint, and experts who combine insight with action.

Over the years, programs like the Stanford Seed Transformation Program (STP) have shown how learning can be both rigorous and real-world. By bridging academic depth with practical application, STP helps entrepreneurs not only understand frameworks but use them to turn insight into strategy and strategy into measurable results.

For most SMEs, time is the rarest resource. That's why learning must be accessible and immediately useful. STP's hybrid model blends immersive, in-person experiences with digital learning, allowing leaders to absorb, apply, and return to their businesses stronger. The Seed Transformation Network (STN), an alumni community, further extends this impact, connecting founders who continue to share challenges, ideas, and honest feedback long after the classroom sessions end.

At its heart, growth is a human transformation before it's a business transformation. The most successful entrepreneurs often realize that scaling a company begins with scaling themselves. Reflective learning spaces, like leadership labs, coaching, and advisory partnerships, help founders examine their blind spots, leadership styles, and decision patterns. With the right guidance, insight turns into action, and action into lasting change.

The next frontier of learning is already unfolding. Artificial intelligence is reshaping how we acquire and apply knowledge. Tools that combine data, context, and experience are helping entrepreneurs learn faster, adapt smarter, and scale with confidence.

South Asia's entrepreneurs are writing their own playbook, one that blends purpose with pragmatism. They remind us that learning is not what happens after the work; it is the work. And as they continue to rewrite the rules of growth, one lesson at a time, they invite others to join them in building a future where those who learn, adapt, and innovate continuously will lead the way. The real classroom of tomorrow may not have walls at all, but will live in conversations, collaborations, and the late-night founder calls that spark the next big idea.

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THE CASE FOR FINANCIAL AND CRYPTO LITERACY IN INDIA'S CLASSROOMS

Edul Patel
CEO of Mudrex

As India moves toward a digital, decentralized future, financial awareness and Web3 readiness are becoming essential for students, writes Edul Patel, CEO of Mudrex.

Every year, National Education Day is celebrated to honour India's dedication to learning and innovation. Over time, values of curiosity and knowledge have been passed down, shaping generations of students and dreamers. In the past 13 years, the country's literacy rate has risen to 80.9%, showing the progress that has been made. Yet, as the world moves toward a Web3-driven future, we need some important changes in the current curriculum to help students prepare for new opportunities.

To truly prepare our students for the opportunities and challenges ahead, we need to go beyond traditional subjects and equip them with the knowledge that defines success in the modern world, which is led by financial and crypto literacy.

Why Today's Students Need Financial Awareness

Money plays a role in almost every decision we make as adults, from managing expenses to planning careers and investments. Yet, most students graduate without ever learning how to manage their finances. Concepts like budgeting, saving, investing, and understanding interest are rarely taught in classrooms, even though they directly impact one's future stability and independence. In today's fast-evolving economy, it is not about how much you earn; it is about how you manage it. And to achieve this level of literacy, parents and teachers play a big role throughout the journey.

Encouraging open conversations about money early on helps students see finance as a life skill, not a complex adult responsibility. Given that there are very few academic lessons on managing money, it is up to us as mentors to teach today's generation about the importance of investing, the impact of inflation, and even filing taxes. These are essential skills that make life easier just by understanding the basics.

Entering the New Age of Web3 Literacy

One important aspect that today's students are missing to see is that the way the world looks at money is changing. While financial education builds a strong foundation, the future of money is being rewritten by crypto, blockchain, and Web3 technologies. Across the world, digital currencies are changing how we save, trade, and even think about ownership. India is one of the fastest-growing crypto markets, with millions of young investors participating, but many do so without fully understanding the technology behind it.

This is an opportunity for students to explore the digital world early and prepare for the future. Lessons about blockchain and crypto are not meant only for those studying tech or finance. They can be learned by anyone who wishes to be part of the growing digital economy. Through Bitcoin, the idea of decentralization can be understood. NFTs can help students see how creators are paid directly for their work.

Today's students are already familiar with the internet. Time is spent creating content, solving problems, and connecting with people around the world. With Web3, digital ownership is given to creators, allowing them to control and benefit from what they build. By understanding how Web3 functions, students can be guided to become innovators instead of just users of technology.

Building a Future-Ready Curriculum

To make financial and crypto literacy mainstream, our education system needs to adapt. While we have seen some of the top institutions like IITs and others, including courses at a graduation level, that's not enough when the world is evolving much faster. Back when the internet was still new, it was largely one-directional. The applications were limited when compared to today's world, and yet, schools have been teaching computers and the internet much earlier in education.

The same kind of importance needs to be given to Web3 as well, considering the impact it is having on the world. Be it from the smallest use cases like record-keeping to transforming money movement, Web3 is on its way to change everything, and we need to prepare our students accordingly.

The focus should be kept on hands-on learning. Students should be encouraged to learn through workshops, financial games, and real-world simulations. Through such practice, awareness and confidence can be built together.

Empowering the Next Generation

India's youth are known for being ambitious and tech-savvy. Startups are being built, assets are being traded online, and global opportunities are being explored right from classrooms. But to lead in this changing world, the right tools are needed, and education must serve as that foundation.

Financial and crypto literacy are not just about learning money concepts. Responsibility, discipline, and digital awareness are taught through them, helping students get ready for the new economy. The aim is not for every student to become an investor, but for each to adapt to a world moving toward decentralization.

Looking Ahead

As we celebrate National Education Day, it's time to prepare our students for the next generation of digital evolution. The classroom of tomorrow must introduce students to the world outside, a world that is digital, decentralized, and data-driven. A generation that understands finance and technology will be a generation that drives India's growth story forward, making a society that is smarter, more confident, and more inclusive than ever before.





THE QUIET REVOLUTION

HOW A BIHAR-BASED DAIRY STARTUP IS REDEFINING TRADITION AND ENTREPRENEURSHIP

Prabhav Anand

In the heart of India's eastern plains lies a story not often told—of ingenuity, tradition and resilience converging to spark a new kind of enterprise. This is not Mumbai's glamorised tech hub, nor Bengaluru's unicorn-race. It's a narrative emanating from Patna, the 38-district state of Bihar, where a different startup blueprint is taking shape—anchored in local roots, cultural rhythms and the promise of inclusive growth. At its centre is Milkvilla Private Limited, a startup that has turned the everyday act of milk delivery into an exercise in innovation, sustainability and youth-driven entrepreneurship.

Why Bihar? A region historically associated with agriculture, social churn and migration is now quietly re-imagining its place in India's entrepreneurial landscape. The state government's "Startup Bihar" policy underscores this change: more than 1,500 companies have registered under its umbrella, and efforts are underway to support 10,000 new ventures across all districts. Amid this ecosystem shift, Milkvilla emerges as a telling case study—of how local capital, local culture and fresh thinking can co-exist and flourish.

From Farm to Smartphone: Milkvilla's Journey

Founded by two brothers—one an alumnus of IIT Patna—the story begins not in a metropolitan incubator but in overlooked hinterlands. According to reports, Milkvilla's "app-controlled, Bluetooth-enabled milk dispensing system" mounted on autorickshaws delivers chilled, desi-cow milk directly into consumers' containers—without a plastic packet in sight.

Behind the innovation lies a simple but powerful insight: India's dairy supply chain is vast but uneven. In Bihar's villages and small towns, where dairy farming has long roots, logistic bottlenecks, adulteration and packaging waste remain persistent challenges. Milkvilla's model addresses this by integrating technology (IoT, app-control, real-time tracking), sustainability (eliminating plastic, using chilled containers) and local sourcing (direct from farmers) in one loop.

For example:

- Their fleet of three-wheelers visits farms, tests milk quality on the spot, weighs it digitally and transports it to chilled dispensers within 30 minutes.
- The dispenser maintains milk at 0-4 °C for up to 10 hours and delivers measured quantities to customers' containers, all managed via an app.
- Early traction: over 6,000 households served in Patna, Muzaffarpur and Bengaluru.

This is not simply logistics for logistics' sake—but a re-imagining of a commodity many Indians consume daily. It speaks to freshness, traceability, environmental concern and tech-enabled convenience.



Entrepreneurship Rooted in Culture & Place

What makes Milkvilla's rise noteworthy is not only the technology, but the context. Bihar is often seen through the prism of migration, low industrialisation and resource constraints. Yet the startup ecosystem here is shifting. The government's startup policy offers interest-free loans up to □10 lakh and supports incubators and 46 startup cells across the state.

Milkvilla taps into this changed atmosphere. The very notion of a Patna-based startup building a model worthy of expansion to Bengaluru flips the usual narrative of "brain drain" from Bihar to elsewhere. Instead, it says: "We can build it here."

Beyond economics, there is cultural resonance. Milk is deeply embedded in Indian rural life—milch animals, morning milking, village interactions, celebration and sustenance. Milkvilla honours that tradition by using desi-cow A2 milk, free-grazing herds and minimal processing. It appeals not just to urban consumers craving purity, but to rural farmers seeking fairer value, recognition and a tech interface that connects them to urban markets. Its zero-plastic packaging ethos also aligns with global sustainability sensibilities, adding a newer layer to the cultural narrative of responsibility.

In doing so, Milkvilla becomes more than a startup—it becomes a bridge between rural Bihar and urban India, between tradition and technology, between local value and national ambition.

Challenges, Growth & What's Next

Of course, the path hasn't been without friction. Scaling a supply chain across Bihar's villages and towns, overcoming investor scepticism, battling infrastructural lacunae (cold-chain, last-mile delivery, farmer aggregation) and changing consumer habits—all present real hurdles. Many startups falter precisely because they ignore the ground realities.

Milkvilla's advantage lies in embracing those realities, rather than bypassing them. Testing milk at farms, integrating technology with respect for natural rhythms (e.g., free-grazing cows), and delivering freshness within hours—not days—is a distinct strategy. Their own communications claim that more than 2 lakh trees have been saved by eliminating plastic packaging.

Growth-wise: With thousands of customers already and operations beyond Bihar (e.g., Bengaluru), the challenge now is: Can this model scale further? How will they maintain quality while expanding? How will they deepen farmer-linkages and preserve cultural authenticity amidst growth? These are not trivial.

But the stakes are high. Not only does Milkvilla stand to capture a meaningful share of India's dairy market (which is enormous and growing) but it also showcases how a startup from a non-metro, traditionally non-startup region can succeed. For Bihar's youth, this offers a powerful story: entrepreneurship need not always mean moving to Silicon Valley or Bengaluru—it can begin at home, with local assets, local ambition and global thinking.

The Bigger Picture: Bihar's Startup Shift & Why It Matters

Milkvilla is just one example within a broader transition under way in Bihar's ecosystem.

- The "Startup Bihar" initiative aims to build a pipeline of entrepreneurship across all 38 districts.
- Government policy is aligning with private and academic institutions—incubators, innovation hubs, and outreach campaigns in rural areas.
- The cultural shift is equally significant: young entrepreneurs are returning, leveraging local talent, building place-based ventures instead of always migrating out.

Why does this matter for education, for youth, for the future of India? A few points:

1. **Inclusivity of entrepreneurship –** By focusing on tier-2 and tier-3 cities, on artisans, women entrepreneurs and first-generation founders, the Bihar story challenges the metro-centric bias of India's startup narrative.
2. **Re-use of local assets –** Bihar has strength in agriculture, dairy, artisanship, social networks and a rising college-going youth base. Startups such as Milkvilla reflect the imaginative reuse of these assets, rather than ignoring them.
3. **Cultural resilience –** Startups often import 'model cities' approaches. But the Bihar model shows how embedding in local culture—milk delivered as in the morning at home, rural-urban dairy interface—can anchor innovation in authenticity.
4. **Employment & skills –** Beyond tech desks, the

proliferation of startups in places like Bihar speaks to new employment ecosystems—logistics, dairy supply chain, agri-inputs, digital platforms, local services.

5. **Narrative shift** – Education programmes, management institutes, mentors and policymakers are now increasingly pointing to Bihar not as a "lagging state", but as a frontier of untapped potential. For youth in Bihar, the message is transforming: you don't need to leave to launch.



Lessons for Students, Educators and Aspiring Founders

What can the student reading this learn? What should educators emphasise? What do aspiring founders in Bihar—and elsewhere—take away?

- **Look around, not away:** Innovation isn't only in high-tech chips; often it is in everyday systems—milk, dairy, supply chain, local trade. Milkvilla's model shows that reading local, executing with global tools matters.
- **Respect tradition while challenging it:** The fact that the core product is desi-cow milk, free-grazing, unprocessed, speaks to tradition. But the delivery, app control, IoT, plastic-free packaging speak to disruption. The blend is powerful.
- **Use place advantage:** While many startups flock to metro areas, there is value in being grounded in a region like Bihar: lower costs, less competition, possibility of building something distinct, tapping local talent.
- **Ecosystem matters:** The government, incubators, policy skins in the game. The "Startup Bihar" drive, free office spaces, dedicated funding schemes all help. For a founder, understanding and utilising this matters.
- **Sustainability is now a business lever:** Milkvilla's zero-plastic packaging is not window-dressing—it's part of the value proposition. Students and founders should note: responsible business isn't optional—it's integral.
- **Scale thoughtfully:** Technology, operations, supply chain are interlinked. Milkvilla shows how an integrated approach—farmers, testing, logistics, app, delivery—makes for stronger business.
- **Narrative counts:** For younger founders in Bihar, their story matters. Their origin, culture, context is a differentiator. Milkvilla's story from Patna to Bengaluru becomes a narrative asset.

A Look Ahead: What's Next for Bihar's Startup Journey

As Milkvilla and others push boundaries, several questions and opportunities open up for Bihar's ecosystem:

- Can this momentum substitute for the metro-startup centre dominance? Not immediately—but it need not. The new paradigm may be multiple regional hubs, each rooted in local strengths (dairy in Bihar, textiles in Tamil Nadu, agro in Madhya Pradesh).
- How will talent evolve? As college graduates in Bihar become more startup-aware, education institutes (engineering, management) must align curricula with local entrepreneurship, supply-chain innovation, rural tech.
- Funding remains a constraint. While policy support exists, private capital in Bihar is still relatively sparse compared to metros. Building investor confidence is key.
- Maintaining authenticity while scaling is tricky. For Milkvilla, as they expand beyond Bihar, the challenge will be to keep the "from-farm to-consumer" ethos, the local sourcing and tech-integration intact.
- Culture-shift needs nurturing. The myth that one must leave Bihar for success is slowly dissolving—but trust, risk-appetite, exposure still differ. Role-models like Milkvilla help close that gap.

Closing Thoughts

In the churn of India's startup narrative—often fixated on unicorns, metro glitz and venture capital rounds—the story of Milkvilla from Bihar brings us back to fundamentals: purpose, place, people. It reminds us that innovation is not solely about silicon chips or global apps—it can be about milk, farmers, rickshaws, local towns, tradition and technology converging.

For the youth of Bihar, for students in management institutes, for educators seeking examples of "entrepreneurship with roots", this story resonates deeply. What begins as delivering pure milk to a doorstep becomes a metaphor: for reclaiming regional pride, for building local ecosystems, for demonstrating that the next startup wave may well originate from Bihar's plains.

In the coming months and years, as Bihar's startup policy matures, incubators deepen and more founders emerge, Milkvilla will stand as a pioneer—a living example of what is possible when ambition meets authenticity. And for the Education Post readership—those students, mentors and changemakers—it offers a lodestar: that the next big story in Indian entrepreneurship might just begin in Patna, not Palo Alto.

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GEN Z AND THE STARTUP MINDSET

WHY STUDENTS NEED EXPOSURE TO REAL-WORLD PROBLEM SOLVING

Sujatha Kshirsagar

Gen Z is growing up in a world that is fast-changing, unpredictable, and powered by innovation. They don't follow the cliches of traditional jobs and education, nor focus on rote learning and standardized outcomes. At present, traditional learning is struggling to keep up with the pace of the evolving generation. What young people need today is not just academic knowledge but the mindset and skill set to solve real-world problems.

Students must develop a startup mindset through curiosity, creativity, adaptability, and resilience, which will help them achieve better learning results and leadership abilities. When students are encouraged to think like entrepreneurs early in life, they learn to see challenges as opportunities and uncertainty as a chance to innovate

The Startup Mindset: Thinking Beyond the Textbook

The startup mindset requires students to think differently than they would in regular business operations. The entrepreneurs are trained to ask "why not" instead of "why" while they test their ideas through fast failure to achieve rapid learning. Students who adopt this educational method understand why learning functions as an active discovery process, exploring a wide variety of opportunities. Students who experience entrepreneurial thinking develop their ability to solve problems and think critically while gaining decision-making, self-assurance, and also learn to handle setbacks in the course of life.

The entrepreneurial mindset aligns perfectly with Gen Z students because they were born into a digital world, and they understand social issues. The digital generation of Gen Z students naturally questions established norms while they seek meaningful work experiences that involve direct involvement instead of traditional classroom learning. According to a 2020 WP Engine survey, 62% of Gen Zers have ambitions to perhaps start their own business, making them one of the most entrepreneurial generations to date. With a growing desire among Gen Z to become entrepreneurs, the educational institutions face the task of developing these natural abilities through structured programs, which should have started at an early age.

Learning by Doing: Real-World Exposure as the New Classroom

In reality, the most informative lessons usually come from outside a classroom after experiences solving real issues, in places like internships, labs focused on innovation, hackathons, and projects within a community, allowing students to see how their studies relate to the real world. By working on current issues, such as working towards sustainability and engaging in local business projects, they understand the results of applying what they know.

For example, a student involved in a local waste project applies science and economics, learns to lead and work as a team, and makes sure to care about others. These lessons are impossible to learn from a book.

Schools that use practical learning are already seeing the advantages. Students in such various programs have better skills in analysis, can communicate more effectively, and have a stronger sense of themselves. They learn to manage their time, work when stressed, and think fast. These skills are key for business owners and professionals ready for what comes next.



Bridging the Gap Between Education and the Real World

There is a huge gap between what students learn and what the world demands, and there is an urgent need for it. The startup ecosystem is the ideal platform to make this connection. Educational institutions collaborating with startups and incubators expose students to the authentic world of innovation and enterprise.

Professors and mentors are instrumental in this transition. A caring mentor will guide students to make an impact on the real world using the concepts learned in the classroom. As a matter of fact, mentorship programs and student innovation contests are aimed at opening the young minds to recognize the most urgent issues and come up with scalable, sustainable solutions. Such experiences not only deepen knowledge but also nurture identity and purpose.

In addition to that, these partnerships give educators insights into industry changes, thus enabling them to make their teaching more engaging, relevant, and application-oriented.

Fail Fast, Learn Faster: The Value of Resilience

In the world of startups, failing is not viewed as taking a step backward; rather, it is deemed as part of the bigger journey. Students are encouraged to take smart risks, try new things, and learn from their failures; this builds their resilience and determination. These qualities are extremely important, not just for entrepreneurs, but for everyone trying to carve a way through a rather complex and competitive environment.

Schools and learning spaces that treat failure as a normal part of learning help students become more confident and flexible. Whether they're pitching an idea that doesn't get traction or dealing with a project that hits roadblocks, students learn how to keep going, think about what went wrong, and adapt. This way of thinking helps them do well even when things are uncertain, a skill every future leader is going to need.

Preparing Future-Ready Professionals

Degrees are not enough for employers in today's world. They look for creative thinkers, quick adaptors, and constant innovators; they now focus on people's future skills as identified by the World Economic Forum: problem-solving, creativity, and emotional intelligence.

Education in a startup mode prepares the students for this very reality, where they do not have to discover one way of learning entrepreneurship.

Consumer awareness at an early age is supposed to get a person ready for unknown conditions, on how to work with other people with different professional specializations, and build value in an environment where it means something. It lays down the internal compass by which they choose their own paths through the unpredictable places and enables them to lead with conviction and purpose.

Our startup ecosystem in India is getting stronger with government initiatives like Startup India, the establishment of incubation centers, and the creation of student-run enterprises all over the campuses, to develop a nation with entrepreneurial mindsets towards long-term innovation and economic growth.

Conclusion: Shaping the Innovators of Tomorrow

At the forefront of redefining the education-employment pathway remains a generation that refuses to be shackled by the challenges in the real world. Problem-solving isn't optional anymore in education; it has become the basis of it.

As educators, parents, and leaders, we should provide young people with space, mentorship, and opportunities for exploration, inquiry, and creation. When students develop innovative thinking and behavior as problem solvers, they accomplish self-preparation for their future and begin to shape it. The startup mentality is more than an ability; it is a philosophy of lifelong learning. The sooner institutions infuse this into their teaching methods, the better conditioned will be the next generation of students who are empowered to lead, create, and shape the future with confidence.

This article has been authored by Sujatha Kshirsagar, President, Career Launcher. The views and opinions expressed are solely those of the writer and do not represent the editorial stance of Education Post Magazine.

SMARTER SCHOOLS, STRONGER FUTURES

HOW TECH IS REWRITING THE RULES OF RURAL EDUCATION



Yuvraj Shidhaye

Classrooms in rural India are often defined by constraints—of distance, infrastructure, access, and sometimes even belief. Yet, despite the challenges, what remains constant is the desire to learn. Communities are invested, parents make sacrifices, and students continue to show up. What they need isn't more effort. They require better systems. Technology will not substitute for commitment, but it will enhance its effect. Hearteningly, change is in progress—as per the 2024–2025 economic survey reveals that in the period between 2019–20 and 2023–2024, the proportion of schools with computers increased from 38.5% to 57.2%, and with the internet from 22.3% to 53.9%. These shifts signal growing readiness to adopt tech-driven solutions. By bringing clarity to where students live, how resources are distributed, and why children drop out, digital tools can help move rural education from survival to strategy. And at the centre of this shift is how data is gathered, interpreted, and used to act.

Mapping Needs, Not Just Numbers

In many rural blocks, schools were built based on land availability or administrative convenience, not necessarily on where children live or how far they must travel. The result: uneven school density, overcrowded classrooms in one hamlet and near-empty schools in another. Here, technology steps in—not just to digitise, but to clarify. By mapping student and teacher density across micro-regions and overlaying that with population age distribution, planners can see the actual demand for education, not just the theoretical one.

This kind of layered analysis, such as identifying regions with a high share of 6–10-year-olds versus 11–14-year-olds, can help direct resources more precisely. For instance, areas with a concentration of younger students but limited classroom infrastructure can be prioritised for early-grade teachers, additional learning spaces, or mobile classrooms.

This level of insight can guide smarter decisions. Should two underutilised schools be merged to create a stronger, better-equipped one? Where should a new learning center come up to serve a cluster of villages more efficiently? These are not questions of guesswork. They are questions of visibility. With the right data, education departments can optimise not just where resources are sent, but how they're used.

The Role of ERP: Bringing Structure to the System

Many rural schools are still run on paper—attendance registers, exam logs, and teacher schedules. And although this might work at the level of a single school, it fails under the strain of hundreds within a district. An ERP (Enterprise Resource Planning) system brings order to the chaos. It's monitoring attendance in real time, analyzing usage of resources, and assisting in identifying issues early on—whether it's an increase in absences, teacher shortages, or textbook availability gaps.

But the true value of ERP is not in gathering the data. It lies in what that data helps reveal. Why are dropout rates higher in certain pockets? Is it because students have to work during harvest season? Because the nearest school lacks a science teacher? Or because they simply can't get there? Once these insights are available, administrators and policymakers can act—whether through seasonal academic scheduling, local hiring, or transport support. Data is only useful when it leads to decisions.

Making Learning Mobile and Local

It's tempting to imagine school optimisation as a matter of computers and dashboards. But many rural homes don't have laptops. Some don't even have electricity for part of the day. That's why mobile-first, vernacular tools matter. Students and teachers alike are already familiar with mobile phones. Education technology must meet them there—not as a compromise, but as a considered choice.

Apps in local languages, low-bandwidth video lessons, voice-based learning, and even WhatsApp-driven homework modules are proving viable in areas where traditional classroom delivery breaks down. And this isn't limited to students. Parents who've never set foot in a PTA meeting can now receive updates on their child's attendance or performance directly on their phones. Teachers can access training modules, exchange lesson plans, and coordinate logistics without needing a desktop or a broadband connection.

The example from Jajar Chingri in Uttarakhand is illustrative. There, an AI-powered robotic teacher named Eco—powered by fifth-generation technology—is helping deliver lessons to students in a government school that lacks full-time staff. It's a glimpse into how AI, IoT, and intelligent systems can plug the operational gaps in places where human presence alone may not be enough.

From Access to Inclusion

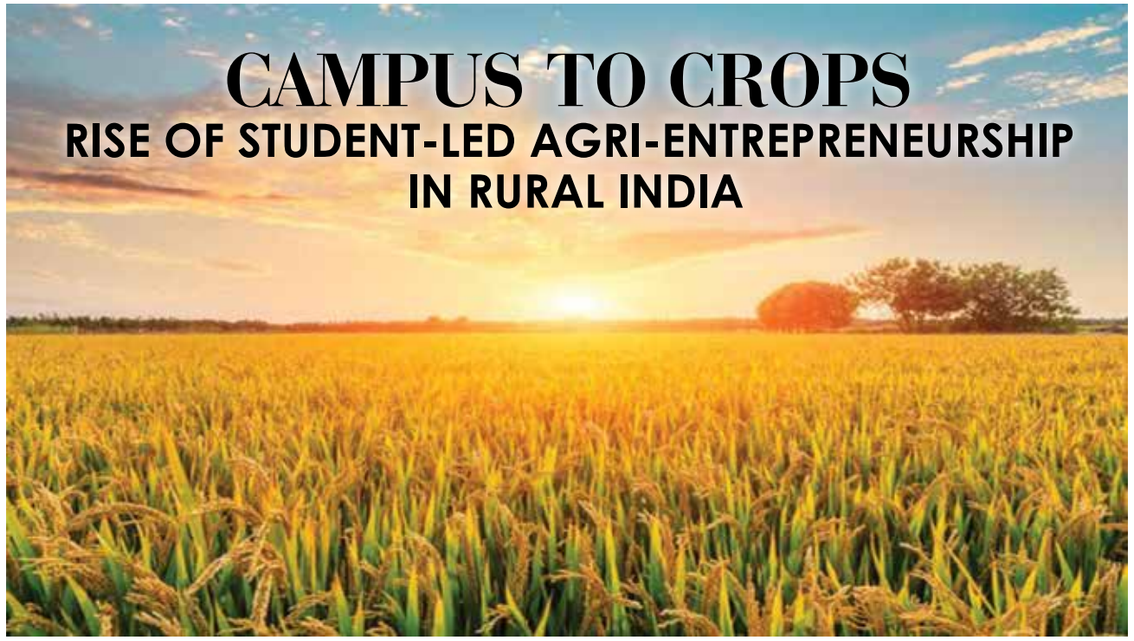
India's National Education Policy promotes inclusive, technology-enabled learning. The gap between availability and inclusion of technology is vast. Optimisation has to be thought of, keeping in mind the ground-level limitations. Hybrid models, classroom instruction augmented with technology-enabled content at home, can offer flexibility in situations where attendance will not be routine.

This approach is not second-best. It's a different design logic—one that sees mobile apps, ERP dashboards, and learning platforms not as add-ons, but as essential infrastructure. A student who learns part-time in class and part-time on a shared phone at home is still learning—just through a model tailored to their environment.

Building Smarter Systems That Respond, Not Just Record

A tech-enabled school system doesn't just log data. It responds to it. It notices when a classroom is overburdened, when a teacher hasn't checked in, when dropout rates creep up, or when textbook delivery lags behind schedule. It connects people across roles—planners, principals, parents, and policymakers—so that interventions are timely, not reactive.

Ultimately, optimising rural school operations is not about automation. It's about augmentation—about giving people the right information, at the right time, to make better decisions for the children they serve. When rural India is equipped not just with tools, but with systems that listen, adapt, and guide, education can stop being a struggle and start being a promise kept.



CAMPUS TO CROPS

RISE OF STUDENT-LED AGRI-ENTREPRENEURSHIP IN RURAL INDIA

Colleges in India are becoming engines of agri-entrepreneurship, guiding students to create farmer-focused solutions, adopt emerging technologies, and build startups that strengthen rural livelihoods and local economies, finds ***Pragya Kumari.***

"If agriculture goes wrong, nothing else will have a chance to go right.
M S Swaminathan (Father of the Green Revolution in India)

India is witnessing a major shift in the way young people perceive agriculture. Once seen mainly as a traditional livelihood dependent on monsoons and limited market access, farming is transforming into a tech-enabled and innovation-driven sector.

This change is powered not just by government policies or private investment but increasingly by educational institutions that are turning into hubs for rural entrepreneurship.

India, often called the land of the Green Revolution, transformed its agricultural landscape in the 1960s and 70s through scientific innovation and policy support. High-yield seed varieties, expanded irrigation, and widespread use of fertilizers helped the country shift from food scarcity to self-sufficiency within a decade.

Punjab, Haryana, and western Uttar Pradesh became symbols of this transformation, recording rapid rises in wheat and rice production. The Green Revolution strengthened India's food security and created a foundation for modern agricultural research and extension systems.

Today, this legacy continues to inspire new waves of agri-innovation, especially among students exploring technology-driven solutions for rural needs.

Across the country, agricultural universities, engineering colleges, and private institutes are building ecosystems that encourage students to launch agri-startups, develop solutions for farmers, and strengthen rural economies.

Over the last decade, India has seen a sharp rise in agriculture-related startups. The Department for Promotion of Industry and Internal Trade reports that India now has more than 3,000 agri-startups as of 2024, up from fewer than 50 in 2010.

A NASSCOM report shows that the agri-tech sector recorded around fivefold growth between 2018 and 2023, boosted by wider access to digital tools, strong smartphone penetration in rural areas, and increasing interest in precision and sustainable farming.

Colleges and universities have played a crucial role in enabling this entrepreneurial wave, especially in areas where agriculture continues to be the main livelihood.

This shift comes at a time when Indian agriculture faces multiple challenges. Nearly 55% of the workforce still depends on agriculture, yet the sector contributes only 17% to India's GDP.

Small and marginal farmers make up 86% of India's farming population and often face systemic issues like limited credit access, lack of technology, and poor market linkages.

These gaps create opportunities for innovation, encouraging colleges to nurture graduates who can offer viable solutions.

The rise of agri-entrepreneurship in colleges

Agricultural education in India traditionally focused on agronomy, plant science, soil science, horticulture, and livestock management.

In recent years, however, entrepreneurship, innovation, and technology have taken center stage. This change has been shaped by the National Education Policy 2020, which promotes multidisciplinary learning, innovation, and incubation.

Today, major agricultural universities such as the Indian Agricultural Research Institute, Tamil Nadu Agricultural University, Punjab Agricultural University, and University of Agricultural Sciences Bengaluru run incubation and entrepreneurship programs.

Through these platforms, students convert academic research into workable business models. Since 2018, the central government's RKVY-RAFTAAR program has supported more than 1,200 agri-startups through universities.

Many colleges now introduce agricultural entrepreneurship at the undergraduate level. Courses in agri-marketing, agro-processing, farm business management, agri-fintech, and supply chain operations help students explore opportunities beyond traditional farming.

An ICAR study in 2023 reported that 41% of agriculture students expressed interest in starting their venture, a steep rise from just 12% ten years ago.

Incubation centers: college-based innovation hubs

Incubation centers have become core components of agri-startup development. These centers provide mentorship, training, seed funding, access to research infrastructure, and connections to investors.

They also help students test prototypes, carry out field trials, and refine their ideas with farmer feedback.

India now hosts more than 85 dedicated agri-business incubators in universities and research institutions. Many are supported by the Atal Innovation Mission, NABARD, ICAR, and state agriculture departments.

These centers nurture ventures in areas such as AI-based crop analytics, drone spraying services, hydroponics, fodder biotechnology, farm advisory apps, and climate-smart agriculture solutions.

AgHub at Professor Jayashankar Telangana State Agricultural University is one such example, supporting startups creating soil health monitoring tools and climate-resilient technologies.

Another, a-IDEA at ICAR-NAARM, has incubated more than 350 agri-startups since its launch. These hubs bridge the gap between theoretical knowledge and real-world applications and give students exposure to industry networks, hackathons, and investor interactions.

Technology adoption accelerating on campuses

The growing integration of technology into agriculture has expanded the scope of rural entrepreneurship. Colleges now train students in drones, GIS mapping, IoT sensors, machine learning, and remote sensing.

According to the Ministry of Electronics and Information Technology, more than 70 agri-tech pilots are active across India, supporting real-time crop monitoring, micro-irrigation, and climate forecasting.

Students trained in these technologies are launching cost-effective, practical solutions for local farmers. Drone-based spraying ventures launched by students in states such as Haryana and Maharashtra have improved efficiency and reduced health risks for farm workers.

IoT-based automated irrigation systems developed by agricultural and engineering students in Tamil Nadu have reduced water use by nearly 35%, making a significant difference in drought-prone areas.

Digital agriculture has also gained strong traction. Many colleges now teach data analytics, agri e-commerce, and digital advisory systems.

Students learn to interpret satellite data, track market trends, and build mobile applications. This has enabled a new generation of agri-startups focused on precision, sustainability, and scale.

Practical exposure and farmer engagement

One of the biggest strengths of college-driven entrepreneurship is students' access to hands-on experience with farmers. Many agricultural universities operate in or near rural regions, allowing students to conduct field research and pilot innovations.

The Rural Agricultural Work Experience (RAWE) program mandated by ICAR plays a major role in this process. Every year, about 30,000 agriculture students work directly with farmers for several weeks, gaining insights into real-world challenges and identifying areas for innovation. Many successful agri-startups trace their origins to ideas formed during RAWE assignments.

Experiential learning modules have also expanded, allowing students to manage campus farms, run small processing units, and organize agri-business expos. These experiences teach financial literacy, market understanding, and problem-solving.

Government support strengthening the ecosystem

Government initiatives significantly boost agri-entrepreneurship emerging from colleges, offering students both financial and institutional support to scale their ideas.

Programs such as RKVY-RAFTAAR, which provides up to ₹25 lakh for early-stage ventures, and the Agriculture Infrastructure Fund, which supports storage, warehousing, and supply chain projects, play a major role in strengthening agri innovation.

Start-up India adds further momentum through tax benefits and patent assistance, while ICAR's National Agricultural Innovation Fund helps research-driven student ventures access resources and mentorship.

NABARD's Rural Innovation Fund also supports farmer-centric solutions, ensuring that innovations reach the grassroots. Together, these initiatives enable student-led startups to move beyond campus experiments and successfully enter real markets.

Success stories emerging from campuses

Several startups launched by students reflect the growing impact of college-driven entrepreneurship.

In Madhya Pradesh, a group of students created a pest prediction app using satellite data, which now supports more than 20,000 farmers by helping them anticipate crop risks.

In Kerala, a student team set up an agro-processing unit that purchases produce directly from small farmers, boosting their earnings by removing middlemen and ensuring better price realization.

Meanwhile, an IIT-based team developed a drone precision farming venture that has expanded across five states and works with over 8,000 farmers, offering efficient spraying and monitoring services.

Impact on rural economies and employment

Agri-startups emerging from colleges are creating new rural jobs such as drone operators, soil testing technicians, agri-data analysts, rural supply chain coordinators, and crop advisory specialists. This shift is crucial at a time when rural youth unemployment remains a serious concern.

A 2024 report from the Ministry of Skill Development estimates that agri-startups could generate more than 3 million rural jobs by 2030.

Many startups also help increase farmer income by improving productivity, reducing post-harvest losses, and connecting farmers to better markets. This creates wider economic benefits for local communities.

Challenges ahead

Despite significant progress, several challenges continue to hinder the growth of student-led agri-startups. Many ventures struggle with limited early-stage capital, making it difficult to refine prototypes or scale their ideas.

In some regions, inadequate rural infrastructure further slows expansion and affects the reliability of services. Startups that perform well locally often face barriers when trying to grow at a national level due to uneven market access and logistical hurdles.

There is also a clear need for stronger partnerships between colleges and private industry to provide mentorship, technology support, and market linkages.

Additionally, inconsistent access to modern equipment and advanced facilities on campuses restricts students from fully developing or testing their innovations. Addressing these gaps will require coordinated efforts from colleges, government bodies, and industry stakeholders.

The road ahead

India's agricultural future depends heavily on innovation, technology, and youth leadership. Colleges are increasingly becoming the foundation for this change, nurturing rural entrepreneurs who can develop solutions tailored to local needs.

With stronger incubation, better digital access, and robust mentorship networks, India is poised to see a new wave of agri-startups led by students.

As more colleges embrace the culture of entrepreneurship, the country can expect widespread improvements in productivity, sustainability, and rural income levels.

With continued support, young innovators can drive India toward becoming a global leader in agri-tech and rural development.

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MONTHLY DIGEST

AI Curriculum to Begin from Class 3 in Schools by 2026



The Ministry of Education announced that Artificial Intelligence (AI) and Computational Thinking (CT) will be introduced into school curricula starting from Class 3 in the 2026–27 academic year.

Education Ministry Pushes UPI Payments for School Fees



The Ministry of Education has urged all states, UTs, and school bodies (NCERT, CBSE, KVS, NVS) to adopt UPI and other digital payment modes for admission and exam fees to increase transparency and convenience.

NCERT and IIT-Madras Sign MoU for EdTech & AI Innovation



NCERT has teamed up with IIT Madras to jointly develop AI-/ML-enabled learning tools, multilingual content, and teacher-training platforms, in line with NEP 2020's vision.

Model Youth Gram Sabha (MYGS) Piloted Across Schools



A collaboration between MoE, MoPR, and Tribal Affairs launched the MYGS initiative in 1,000+ schools, enabling students to simulate Gram Sabha proceedings and learn local governance.

MONTHLY DIGEST

Viksit Bharat Buildathon 2025 Invites Student Innovators



The Viksit Bharat Buildathon is a nationwide innovation challenge for school students (Classes 6–12) to design prototypes under themes like "Vocal for Local" and "Atmanirbhar Bharat."

'AI by HER' Challenge to Promote Women-Led AI Solutions



Under the India-AI Impact Summit 2026, the government announced the "AI by HER" challenge to recognize women-led AI innovations, with a total prize pool of ₹5.85 crore.

Hurdles in Eklavya Model Residential Schools (EMRS) Expansion

The government's drive to build 740 EMRS schools for tribal populations is facing challenges: many approved schools aren't functional due to land criteria, population thresholds, and teacher shortages.



Veerashaiva Groups Demand Withdrawal of Revised Textbooks

The Akhila Bharata Veerashaiva Mahasabha has strongly opposed new school textbooks, claiming they misrepresent the 12th-century saint Basavanna and distort non-Vedic Indian philosophies.



Global Youth AI Challenge (YUVAi) Launched for Students

The Ministry of Electronics & IT has opened the YUVAi Global Youth AI Challenge (ages 13–21) to nurture innovation in AI with social impact; applications close Oct 31, 2025.

MONTHLY DIGEST



Digital Divide and Learning Losses Revisited

Despite reopening schools, a large digital and learning gap persists: many students couldn't access remote education during the pandemic, leading to significant learning losses.



Centre Issues Advisory on "Tomato Flu" in Children

The Health Ministry classifies the so-called "tomato flu" (seen in children) as a variant of hand, foot, and mouth disease. The advisory warns schools / parents to enforce hygiene and isolate symptomatic kids.

Union Education Minister Criticizes TN's Two-Language Policy

Dharmendra Pradhan opposed Tamil Nadu's two-language policy, asserting that refusal to adopt the three-language formula (NEP-recommended) threatens central education funding under Samagra Shiksha.

Comprehensive Sexuality Education Curriculum Rolled Out

Study Hall Educational Foundation introduced "Sex, Relationships, and Society," a curriculum for schools to promote open, respectful conversations about identity, consent, and relationships.

MoE Proposes Binary Accreditation for Higher Education Institutions

The government is set to overhaul the higher education accreditation system by replacing the multi-tier grading model with a binary "accredited/not accredited" system to simplify quality assessment.

UGC Simplifies Regulations for Indian–Foreign University Collaborations

New UGC norms now allow Indian universities to enter MoUs with foreign ones for dual, joint, or twinning degree programmes — easing cross-border academic partnerships.

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SCHOLARSHIP PROGRAM

Top Scholarships to Watch: 2025–26 Edition

Your complete guide to government, CSR, and private scholarships active through December 2025

Financial aid opportunities in India are growing rapidly — supporting students from economically weaker backgrounds, marginalized communities, technical streams, and the arts. This curated list highlights 15 major scholarships — beginning with Government schemes, followed by CSR & private scholarships — that students should either apply for now or prepare for in the 2026 cycle.

SECTION - A
GOVERNMENT SCHOLARSHIPS

1. Central Sector Scheme of Scholarship (CSSS) – 2025–26

Who Can Apply : Class XII meritorious students entering UG/PG programs.
Purpose : Supports higher education for academically strong students from low-income families.
Benefits : 12,000/year (UG), 20,000/year (PG).
Status : 2025 cycle closed; next cycle opens mid-2026.
Website : https://scholarships.gov.in

2. National Fellowship & Scholarship for Higher Education of ST Students

Who Can Apply : Students belonging to Scheduled Tribes in notified institutions.
Purpose : Tuition + maintenance for higher education.
Status : 2025–26 processing completed; next cycle 2026.
Website : https://scholarships.gov.in

3. AICTE Pragati Scholarship for Girls

Who Can Apply : Girl students in AICTE-approved technical degree/diploma courses.
Purpose : Encourage women in engineering, technology & technical education.
Benefits : Tuition + contingency support. Status: Annual; next window opens 2026.
Website : https://scholarships.gov.in

4. AICTE Saksham Scholarship for Specially-Abled Students

Who Can Apply : Students with 40% or more disability pursuing AICTE-approved technical programs.
Purpose : Inclusive education support for engineering/technology aspirants
Status : 2026 cycle expected.
Website : https://scholarships.gov.in

5. Post-Matric Scholarship for Students with Disabilities

Who Can Apply : Class 11 to Ph.D. students with 40%+ disability.
Purpose : Tuition fees, maintenance allowances, disability grant.
Status : Active; next cycle 2026.
Website : https://scholarships.gov.in

6. Ishan Uday Scholarship for Students of the North-East

Who Can Apply : Students from NE states entering undergraduate courses.
Purpose : Promote higher education in the North-Eastern region.
Benefits : Monthly allowance + tuition support.
Status : Active; next cycle 2026.
Website : https://scholarships.gov.in

7. Post-Matric Scholarships for OBC / EBC / DNT Students (PM YASASVI + others)

Who Can Apply : OBC/EBC/DNT students enrolled in post-matric studies.
Purpose : Tuition + maintenance support for backward communities.
Status : Many states open until late 2025; next national cycle 2026.
Website : https://scholarships.gov.in

8. Post-Matric Scholarship for SC Students (Central + State Schemes)

Who Can Apply : SC category students pursuing Class 11 to Ph.D.
Purpose : Fee reimbursement & maintenance allowances.
Status : Example — Delhi window closes 31 January 2026.
Website : https://scholarships.gov.in

9. ICCR Scholarship Scheme (Arts, Culture, Education) – 2025–26

Who Can Apply : Students pursuing Indian arts, culture, humanities, and specific academic fields.
Purpose : Promote cultural exchange & Indian heritage studies.
Status : 2025 cycle active; next opens 2026.
Website : https://iccr.gov.in

10. State-Level Scholarships (SC/ST/OBC/ Minority) – Various States

Who Can Apply : Domicile-based eligibility; varies by state.
Purpose : Fee reimbursement, merit scholarships, minority aid.
Status : Many states open till Jan 2026 (e.g., Delhi).
Website : Visit state scholarship portals (e.g., Delhi: https://scstwelfare.delhi.gov.in)

SECTION - B
CSR & NON-PROFIT SCHOLARSHIPS

11. Parivartan ECSS Programme (2025–26)

Who Can Apply : Class 1–12, UG, PG, ITI, diploma students from financially weak families.
Purpose : Prevent school/college dropouts during financial distress.
Benefits : Up to 75,000.
Deadline : 31 December 2025.
Website : https://www.buddy4study.com

12. Vidyasaarathi Scholarships (Multiple 2025–26 Programs)

Who Can Apply : Students from school to PG (varies by sponsor).
Purpose : Multiple CSR-funded scholarships providing fee support.
Deadline : Several programs run till late December 2025.
Website : https://www.vidyasaarathi.co.in

13. Vidyadhan Scholarship (SDF)

Who Can Apply : Class 10 passed students from low-income families in selected states.
Purpose : 2–6 years of continuous support through higher secondary & UG.
Benefits : 10,000– 60,000 per year.
Status : Ongoing; multiple state cycles open throughout 2025–26.
Website : https://www.vidyadhan.org

14. Kotak Kanya Scholarship (CSR Initiative)

Who Can Apply : Meritorious female students pursuing professional undergraduate degrees.
Purpose : Promote women entering engineering, medical, finance & management fields
Benefits : Up to 1.5 lakh/year.
Status : Expected reopening Aug–Oct 2026
Website : https://www.buddy4study.com

15. HDFC Badhte Kadam Scholarship

Who Can Apply : Students from Class 1–PG facing financial distress, family crises, or socio-economic disruptions.
Purpose : Crisis-response scholarship ensuring uninterrupted education.
Benefits : 18,000– 1,00,000 depending on level.
Status : Annual; expected to reopen 2026.
Website : https://www.buddy4study.com

What Students Should Do Now

- **Act quickly:** Parivartan ECSS & Vidyasaarathi remain open till Dec 2025.
- **Prepare early:** Most major government scholarships open June–October each year.
- **Watch state portals:** SC/ST/OBC state scholarship windows often remain open till January 2026.
- **Stay updated:** Scholarship portals release new cycles frequently — checking monthly is essential.

MATHEMATICS CHALLENGE

CMT – SERIES PROBLEMS – by GANIT MATH (गणित मठ)

CMT-2020/67:

For $x > 0$ and $y > 0$, α and β are acute angles, if

$$17x^2 + 19y^2 - 34x - 95y = 521,$$

$$7x^2 + 11y^2 - 14x - 55y = 259,$$

$$\frac{374}{x\tan\alpha + y\tan\beta} - \frac{399}{x\tan\alpha - y\tan\beta} = 120,$$

$$\frac{561}{x\tan\alpha + y\tan\beta} + \frac{266}{x\tan\alpha - y\tan\beta} = 24,$$

and, $\left(\frac{\tan\alpha + \sec\alpha - 1}{\tan\alpha - \sec\alpha + 1}\right) - \left(\frac{\tan\beta - \sec\beta + 1}{\tan\beta + \sec\beta - 1}\right) = \frac{p}{q}$

where p and q are coprime natural numbers, then,
$p + q = ?$

CMT-2020/68:

For $x, y \in \mathbb{R}$, if

$$\left(\frac{x^7 + y^7}{1 - xy - 2x^2y^2 + x^3y^3}\right)^2 + \left(\frac{x^7 - y^7}{1 + xy - 2x^2y^2 - x^3y^3}\right)^2 = 2$$

then,

$$\left(\frac{x^5 + y^5}{1 - xy - x^2y^2}\right)^2 + \left(\frac{x^5 - y^5}{1 + xy - x^2y^2}\right)^2 = \ ?$$

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If $\operatorname{cosec}^2(3\theta) + \cot^4(3\theta) = 3\cot(3\theta)\{\operatorname{cosec}^2(3\theta) + \cot(3\theta)\}$, then $\tan^8(3\theta) + \cot^8(3\theta) = ?$
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Answers:

CMT-2020/66.1: **35** CMT-2020/66.2: **1008**

Answers will be published in the next issue. You can ask any queries and send your solution to: Email: ganitmath.india@gmail.com, M: +91 8826337312.
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