

Reframing B.Sc. Agriculture as B.Tech. Agrotechnology: A Strategic Paradigm for Future-Ready Agricultural Education in India

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Abstract

This article proposes the academic restructuring of the traditional Bachelor of Science (B.Sc.) in Agriculture into a Bachelor of Technology (B.Tech.) in Agro technology in India. Grounded in the rising need for a tech-integrated agriculture sector, agriculture education must aligns with modern industry demands, national policy goals, and global agri-tech trends. The transition is not merely nominal but foundational, demanding interdisciplinary curriculum reform, faculty upskilling, infrastructure enhancement, and institutional policy alignment. The benefits of such a shift span increased employability, improved academic prestige, and a stronger innovation ecosystem. This article consolidates current trends, policy guidelines, and global practices to justify the transformation.

Introduction

India's agriculture sector is evolving rapidly, driven by technological interventions such as artificial intelligence (AI), Internet of Things (IoT), drone technology, and data analytics. These innovations are redefining the skillsets required in modern agriculture, creating a strong imperative for aligning education systems accordingly. Despite agriculture's centrality to India's economy—employing nearly 42% of the population—it continues to be served primarily by a classical science-based education system, namely the B.Sc. in Agriculture, which does not fully equip students for the demands of 21st-century agri-tech ecosystems. In the modern era, contemporary agriculture demands more than traditional agronomic knowledge. The sector increasingly requires professionals capable of handling AI-enabled crop monitoring, sensor-based irrigation systems, autonomous tractors, and precision farming analytics. A curriculum under the B.Tech. framework would systematically incorporate these technologies, producing graduates adept at developing and managing such innovations (FAO, 2022). Engineering proficiency, combined with domain-specific agricultural knowledge, would bridge the gap between farm-level practices and tech-based solutions.

The perception of agriculture as an unattractive career option among high-performing students is a persistent issue. Entrepreneurship and Innovation Therefore, the degree must align with with Industry Needs and renamed ass a Bachelor of Technology in Agrotechnology (B.Agrotech) with refined and modernized curriculum, This will elevate the discipline's perception, and improve employability outcomes. This reform aligns with national policies such as the National Education Policy (NEP) 2020 (Ministry of Education, 2020) and global benchmarks in agri-education. It also resonates with emerging employment trends in India's fast-growing agri-tech sector, which is projected to reach \$24 billion by 2025 (NSDC, 2023).Graduates of B.Sc. Agriculture often face limited job prospects in comparison to their engineering counterparts. The perception of the "B.Sc." degree as less technically robust can also disadvantage students in high-growth sectors like digital agriculture, agribusiness analytics, and automation. The B.Sc. framework, while founda-

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tional, does not adequately reflect the innovation potential and cross-disciplinary opportunities in modern agriculture. By introducing a B.Tech. degree, institutions can attract top-tier students from urban and semi-urban areas who are interested in applied sciences, robotics, coding, and entrepreneurship. This will elevate the talent pool entering agriculture and enhance the sector's prestige (ICAR, 2020).According to a 2023 report by the National Skill Development Corporation (NSDC), India's agri-tech sector is growing at a compound annual growth rate (CAGR) of 20%, creating a demand-supply mismatch in technically skilled professionals. A transition to a B.Tech. model would address this gap.

The National Education Policy 2020 advocates for holistic, multidisciplinary, and skill-oriented education that breaks traditional silos between science, engineering, and vocational disciplines. The introduction of a B.Tech. Agrotechnology program would operationalize this vision by merging agriculture with data science, electronics, AI, and geospatial technology (Ministry of Education, 2020). Moreover, this reform aligns with India's broader national missions, including viksit Bharat, Digital India, and the Doubling Farmers' Income initiative. India is witnessing a boom in agri-tech startups, including DeHaat, Ninjacart, and Stellapps, which operate at the intersection of farming, logistics, and digital services. These startups require a workforce with dual expertise in agriculture and technology. A B.Tech. Agrotechnology program would empower students to pursue innovation-driven entrepreneurship, develop market-relevant products, and create scalable solutions for farmers, thereby strengthening the rural economy (NASSCOM, 2023).

The pathway for the successful transition from B.Sc. to B.Tech. Agrotechnology requires institutional, curricular, and infrastructural reforms. The Indian Council of Agricultural Research (ICAR), in partnership with the All India Council for Technical Education (AICTE), must lead curriculum modernization by integrating classical agricultural sciences with subjects like embedded systems, AI, robotics, and climate informatics. Such reforms should follow international models, including those in Israel and the Netherlands, where agriculture and engineering are tightly interwoven. Universities must be encouraged to develop interdisciplinary modules that cover soil science, crop physiology, and irrigation engineering alongside cloud computing, data visualization, and machine learning. Additionally, infrastructure upgrades are essential. This includes establishing smart labs, IoT-equipped farms, drone training centers, and AI-based crop modelling simulators. These hands-on resources will help students apply theoretical knowledge in real-world contexts, enhancing learning outcomes and job-readiness. Faculty development must also be prioritized. Many instructors, currently trained in classical agricultural disciplines, will require upskilling to teach advanced technology-based subjects. Partnerships with technology institutes, industry stakeholders, and global agri-tech firms will be essential in organizing training workshops and exchange programs. To ensure seamless student-industry integration, mandatory internships and capstone projects with real-life applications should be built into the curriculum.

In the nutshell, reframing the B.Sc. Agriculture degree as B.Tech. Agrotechnology is not just a rebranding exercise; it is a necessary response to the evolving nature of agriculture in India and globally. The shift reflects a deeper structural alignment between education and the future of work in agri-tech, ensuring that graduates are not only scientifically competent but also technologically empowered. Such a reform promises to elevate the quality of agricultural education, enhance employment outcomes, attract better talent, and strengthen India's position as a leader in sustainable and tech-driven farming. As agriculture becomes increasingly data-driven, precision-oriented, and innovation-centric, the time for this transformation is now. This academic and policy realignment will position Indian agriculture to meet the challenges of climate change, resource efficiency, and global competitiveness with confidence and capacity.

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