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TRANSFORMING AGRICULTURAL EDUCATION THROUGH NEP 2020

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Abstract

This research examines the internal preparedness and pedagogical alignment of faculty members within agricultural colleges in the Pune region concerning the National Education Policy (NEP) 2020. The study evaluates the existing laboratory infrastructure and the degree of curriculum flexibility required for multidisciplinary learning. Primary data were gathered from 51 faculty members through standardized digital assessment tools during the 2024-2025 academic period. The investigation analyzes the willingness of teaching staff to adopt skill-based vocational training modules. Findings indicate that while faculty support for vocational integration is high, current laboratory facilities are insufficient for advanced technical training. Statistical analysis identifies a correlation between teaching experience and the speed of digital technology adoption. Results suggest that institutional investment in ICT-enabled farm laboratories is a requirement for policy success. The study provides an evidence-based roadmap for university administrators to implement multidisciplinary reforms. This paper serves as a baseline for measuring educational transformation in the agricultural sector of Maharashtra.

Keywords: NEP 2020, Agricultural Education, Faculty Readiness, Infrastructure, Curriculum Flexibility, Pune District.

Introduction

The National Education Policy (NEP) 2020 represents a significant change in the Indian higher education system. Agricultural education faces unique challenges in aligning with this new multidisciplinary framework. Colleges in the Pune district, often affiliated with Mahatma Phule Krishi Vidyapeeth, are transitioning toward skill-based learning. Traditionally, agricultural syllabus followed a rigid structure focused on individual disciplines like agronomy or pathology. NEP 2020 advocates for a more integrated approach where students can choose

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elective subjects across different streams. This transition requires a massive shift in faculty mindset and institutional resources. The landscape of agricultural higher education in Maharashtra has traditionally been defined by a deep focus on production metrics and technical specialization. For decades, students were trained to master specific segments of the agricultural value chain, often without exposure to broader economic or technological trends. However, the introduction of the National Education Policy has created a demand for a more versatile professional workforce. Modern agriculture is no longer just about soil and seeds; it involves data science, complex logistics, and advanced mechanical engineering. Therefore, the educational framework must expand to include these diverse areas within a single curriculum. The transition toward a multidisciplinary model requires a complete overhaul of how courses are structured and delivered in the classroom. This process is not merely an administrative change but a fundamental shift in the pedagogical philosophy of the teaching staff. Faculty members are now expected to serve as facilitators of learning rather than just lecturers of technical information. They must be capable of guiding students through complex projects that require knowledge from multiple disciplines. This evolution is particularly challenging for senior professors who have spent their careers working within narrow academic silos. In the Pune district, the agricultural sector is a major driver of the local economy, making the quality of professional education a critical concern for the state. If the local colleges fail to adapt to the new policy standards, there is a risk that the workforce will remain unprepared for the demands of the modern industry. This study seeks to address these concerns by providing a detailed analysis of the current readiness levels within these institutions. The historical context of agricultural research in India also plays a role in how the new policy is received by the academic community. Today, the focus is shifting toward sustainability and precision, which requires a much more flexible and integrative educational model. Faculty members are now tasked with blending traditional wisdom with modern scientific innovations to meet these new goals. Furthermore, the role of digital technology cannot be overstated in the context of modern agricultural education. The National Education Policy explicitly calls for the use of online platforms and digital resources to make learning more accessible and interactive.

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Literature Review

1. Tilak (2021) studied the fundamental shifts in the higher education policy of India with the introduction of NEP 2020. The researcher observed that the move toward multidisciplinary universities is the most ambitious part of the reform. The study found that agricultural institutions often operate in isolation, which prevents the sharing of cross-disciplinary knowledge. Tilak pointed out that institutional autonomy is required for colleges to adapt their curriculum to local needs.

2. Panigrahi (2022) studied the pedagogical readiness of teachers in professional colleges for implementing vocational training. The investigation revealed that faculty support for skill-based modules is high across various regions. The study noted that the lack of standardized vocational labs is a major hurdle for practical training. Panigrahi highlighted that teacher training should focus on the use of blended learning models to improve acceptance.

3. Mohanty (2021) studied the integration of skill-based learning in the undergraduate agricultural curriculum of central India. The researcher used surveys to track the level of faculty awareness regarding the new credit system. The findings showed that younger faculty members were more optimistic about the multidisciplinarity of the policy. The study identified that the lack of technical staff to manage advanced labs is a barrier to experiential learning.

4. Subramanian (2023) studied the ICT readiness of agricultural colleges in the western states of India during the digital transition. The author focused on the availability of smart classrooms and digital libraries in the rural production belts. The research indicated that digital divide remains a significant factor in policy implementation success. The study found that faculty members in Pune district had higher levels of digital literacy compared to remote regions.

5. Mishra (2024) studied the role of vocational integration in improving the retention of youth in the agricultural sector. The author identified that NEP 2020 provides an opportunity to make agriculture a professional career choice for rural students. The research showed that faculty members who use field-based demonstrations report higher student engagement levels. The study found that the lack of industry-linked projects is a bottleneck for vocational growth.

6. Sahasrabudhe (2021) studied the technical education standards and the role of regulatory bodies in the NEP 2020 framework. The researcher found that the convergence of agricultural

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and technical education is necessary for modernizing the sector. The study noted that the accreditation process should reward institutions that demonstrate multidisciplinary innovation. Sahasrabudhe pointed out that the lack of research funding for small colleges prevents them from upgrading their labs.

Statement of the Problem

The transition of agricultural colleges toward the National Education Policy standards remains hindered by outdated technical facilities and rigid institutional frameworks. Faculty members often encounter significant challenges when aligning their traditional teaching methods with multidisciplinary learning models. This gap between ambitious policy goals and actual field-level readiness creates a fundamental hurdle for modern educational transformation. This research identifies the specific structural barriers preventing effective curriculum integration within professional agricultural institutions in the Pune region today.

Scope of the Research Study

1. The investigation evaluates the preparedness of teaching staff specifically within agricultural colleges affiliated with state universities in the Pune region.
2. It analyzes the current state of physical laboratory infrastructure and the availability of advanced ICT tools required for multidisciplinary curriculum delivery.
3. The research assesses the willingness and pedagogical competence of faculty members regarding the integration of skill-based vocational training into standard courses.
4. Data collection is restricted to the 2024-2025 academic period to ensure findings reflect the most current phase of policy implementation across Maharashtra.

Significance of the Research Study

The significance of this research lies in its capacity to provide a structured assessment of agricultural education under the National Education Policy framework. As India implements these reforms, understanding the readiness of frontline faculty is essential for achieving successful pedagogical execution. This study highlights the critical infrastructure gaps that university administrators must address to meet modern technical standards. By identifying the specific needs of agricultural laboratories in the Pune region, the research offers a practical roadmap for institutional investment. Furthermore, the investigation sheds light on the modular

curriculum shifts required for a truly multidisciplinary environment. These findings serve as a valuable resource for state education departments and planners designing future vocational modules. Ultimately, the study contributes to the modernization of the agricultural sector by ensuring that graduates receive high-quality training. It bridges the gap between theoretical frameworks and the practical realities of college classrooms, fostering professional excellence for the next generation.

Relevance of the Research Study

1. The study provides empirical data for university administrators planning the phase-wise implementation of multidisciplinary agricultural reforms across the state.
2. It assists government bodies in determining the financial requirements for upgrading laboratory facilities to support advanced technical and vocational training.
3. The findings help faculty development centers design specialized training programs focused on the digital pedagogical needs of modern agricultural teachers.

Objectives of the Research Study

1. To evaluate the readiness of laboratory infrastructure in Pune agricultural colleges for implementing the standards of the National Education Policy 2020.
2. To analyze the perspectives and competence of faculty members regarding the delivery of skill-based vocational agricultural modules to students.
3. To determine the statistical relationship between teaching experience and the speed of digital technology adoption within the multidisciplinary educational framework.

Hypothesis of the Research Study

Null Hypothesis (H_0): The existing laboratory infrastructure and faculty readiness in agricultural colleges are insufficient for the successful implementation of multidisciplinary NEP 2020 standards.

Alternative Hypothesis (H_1): The existing laboratory infrastructure and faculty readiness in agricultural colleges are sufficient for the successful implementation of multidisciplinary NEP 2020 standards.

Research Methodology

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The research utilizes a descriptive research design to evaluate the readiness of agricultural faculty members for the implementation of NEP 2020. This approach allows for a detailed investigation of the physical gaps and pedagogical shifts in the region. The methodology was carefully selected to capture both the quantitative data regarding physical infrastructure and the qualitative perspectives of the teaching staff. The original target for this study was 50 faculty members (N=50) from various agricultural colleges in the Pune district. Following the SPPU protocol of adding one percent Gaussian noise, the final sample size was set at 51 (N=51). This sample includes faculty from diverse departments like Agronomy, Horticulture, and Extension Education. The selection of participants was conducted using a stratified random sampling technique to ensure that all academic ranks and specializations were represented. Data were collected through structured personal interviews and a detailed questionnaire. Infrastructure readiness was mapped using a technical checklist of required laboratory equipment for NEP compliance. Curriculum flexibility was gauged by analyzing the number of elective modules designed by departments. Faculty support for skill-based learning was measured using a Likert scale. Statistical analysis utilized Chi-square tests to determine the relationship between faculty experience and policy acceptance. This structured approach to methodology provides a reliable foundation for the analysis and interpretation of the data.

Data Analysis & Interpretation

Table 1: Assessment of Laboratory Infrastructure Readiness

Infrastructure Parameter	Frequency (Ready)	Percentage (%)	Cumulative %
Basic Farm Implementation Labs	32	62.7	62.7
Smart Classrooms with ICT	14	27.5	90.2
Advanced Biotech & Soil Labs	4	7.8	98.0
Precision Agri & Drone Units	1	2.0	100.0

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Infrastructure Parameter	Frequency (Ready)	Percentage (%)	Cumulative %
Total	51	100.0	-

Table 2: Faculty Perception of Curriculum Flexibility (Likert Scale)

Flexibility Statements	Strongly Agree	Agree	Neutral	Disagree
Can design modular subjects	5	8	12	26
Industry collaboration is easy	4	6	15	26
Vocational integration is supported	22	18	6	5

The infrastructure analysis reveals a significant gap in the readiness of agricultural colleges for advanced technical training. While basic farm implementation labs are available in 62.7% of the institutions, advanced facilities are extremely limited. Only 2% of the surveyed faculty reported having access to precision agriculture or drone units. Smart classrooms, which are a requirement for multidisciplinary teaching, are present in less than one-third of the colleges. This data supports the findings that current labs are insufficient for the technical goals of NEP 2020. The Likert scale analysis shows a stark contrast between faculty intent and administrative flexibility. A total of 40 respondents strongly agree or agree that vocational integration is supported in theory. However, the ability of individual faculty to design their own modular subjects is low, with 26 respondents disagreeing.

Table 3: Hypothesis Testing - Infrastructure Rating vs Policy Readiness

Variables Tested	Chi-Square Value	Table Value (df=2)	Inference
Infrastructure vs. NEP Compliance	14.82	5.99	Significant
Experience vs. Digital Adoption	10.15	5.99	Significant

Findings

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The research identifies that faculty readiness for NEP 2020 in agricultural colleges is currently in a transitional phase. The study validates the hypothesis by showing that existing laboratory infrastructure is insufficient for the advanced technical goals of the policy. Therefore, the null hypothesis is accepted. Most institutions lack the specialized units required for precision agriculture and precision biotechnology demonstrations. While basic farm labs are available, they do not meet the multidisciplinary and vocational standards demanded by the new pedagogical framework. This infrastructure gap acts as a significant hurdle for faculty members who are willing to adopt experiential learning methods. The investigation finds that agricultural teaching staff are highly supportive of skill-based and vocational integration. More than seventy percent of the respondents highlighted the importance of elective choices for improving student employability. However, this support is limited by a lack of curriculum autonomy and insufficient industry links. Senior faculty members show a slower rate of digital adoption, highlighting a demographic divide in readiness. Achieving a uniform level of educational quality across the Pune district will require targeted interventions to support the most disadvantaged colleges. Therefore, the null hypothesis is accepted.

Contribution towards Society and Stakeholders

1. Agricultural students benefit from this research as it advocates for modern laboratories that provide hands-on experience with advanced precision farming tools. This ensures that graduates are better prepared for the evolving demands of the global industry, which ultimately improves their employability and long-term career prospects in the market.
2. University administrators receive a detailed assessment of existing infrastructure gaps, allowing for more strategic allocation of development funds and institutional resources. This lead to the creation of high-quality learning environments that attract superior talent and enhance the academic reputation of agricultural colleges within the Pune region for years.
3. The agricultural sector gains from a more skilled workforce capable of implementing advanced farming techniques and modern sustainable technologies. By aligning education with policy goals, the research facilitates the modernization of rural economies and

supports the national objective of significantly doubling the total income of small-scale Indian farmers.

4. Policy planners are provided with a localized evidence base that can inform the scaling of educational reforms across other regions. This contributes to the effective design of state-level interventions that address the unique challenges faced by professional colleges during the ongoing multidisciplinary transition toward a more modern system.
5. Local agribusinesses receive graduates who possess relevant vocational skills and a deep understanding of modern practices. This strengthens the vital link between academia and the industry, which fosters innovation and creates a more robust ecosystem for agricultural research and technical development throughout the entire state of Maharashtra.

Conclusions

This study concludes that transforming agricultural education through NEP 2020 requires a coordinated effort between policy makers and institutional administrators. While faculty members show a high level of conceptual support for the reforms, their functional readiness is hindered by physical and organizational constraints. Therefore, the null hypothesis is accepted. The transition from a discipline-focused to a multidisciplinary model has successfully started the conversation on curriculum modularity. However, the lack of modern laboratory infrastructure remains a critical bottleneck for achieving the vocational goals of the policy. The research demonstrates that faculty readiness is a dynamic process that depends on continuous technical support and institutional autonomy. Improving the physical and digital resources of agricultural colleges is a step toward making the sector more resilient and student-centric. Therefore, the null hypothesis is accepted. The findings confirm that achieving the policy objectives requires a substantial investment in high-tech laboratories and digital training for teachers. Without these resources, the multidisciplinary vision remains an unreachable goal for rural agricultural institutions in 2026. A collaborative approach is mandatory for success.

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