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Environmental Sustainability and Social Responsibility: The Role of Higher Education in Promoting Environmental Sustainability under the National Education Policy (NEP) 2020

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ABSTRACT

National Education Policy 2020 (NEP 2020) is a revolutionary approach towards a higher education system in India where the special focus is put on environmental sustainability and social responsibility. This paper explores how NEP 2020 is efficient in ensuring environmental sustainability among Indian higher education institutions (HEIs). This study combines mixed-methods design that utilizes quantitative data comprising 485 students and 12 universities to investigate the awareness about sustainability practices, their implementation, and attitudes towards them. The research shows that 78.5 percent of the students expressed their knowledge of the concepts of environmental sustainability after the implementation of NEP, and the differences significantly differed according to the institutional contexts. The mean scores on sustainability awareness were raised in pre intervention (3.24) to post intervention (4.62) ($t(484) = 23.41$, $p=0.001$). Another gap that showed critical was infrastructure development where only 42% of the institutions showed proper green campus initiatives. The study mentions five key issues, including the lack of faculty training (68%), lack of funding (71%), student engagement (55%), inter-departmental coordination, and lack of community outreach (59%). The present research paper presents

evidence-based suggestions on how NEP 2020 should be optimally applied and developed to enhance environmental sustainability in Indian higher education, including the integrated design of curricula, institutional commitment, and stakeholder involvement.

1. INTRODUCTION

The issue of environmental degradation is one of the most acute issues of the 21 st century all over the world. Global warming, exhaustion of resources, loss of biodiversity, and pollution are threatening planetary ecosystems and human health in all countries. Learning institutions, especially higher education institutions, play a central role in solving such issues by incorporating the curriculum, developing research, and leading the institution (Chan et al., 2020). India is the fifth-largest economy in the world that experiences acute environmental pressures where rapid urbanization, industrial growth, and population growth contribute to ecological vulnerabilities.

National Education Policy 2020 (NEP 2020) became the first all-inclusive education policy in India in 21 st century and a paradigm shift of education models in the past. In contrast to the past policies, NEP 2020 puts into consideration environmental sustainability and social responsibility as key pillars in all levels of education. The policy requires that institutions of higher learning be inclusive of the environmental education that discusses climate change, pollution control, waste management, conservation of biological diversity, sustainable management of resources, and environmental justice.

Although NEP 2020 has a strong environmental agenda, empirical studies are scarce on this issue regarding effective implementation, institutional readiness, and student achievement. This disjury between policy making and practice on the ground requires intense research. The knowledge of barriers, enablers and outcomes of sustainability integration is used to develop evidenced based strategies to optimize policies and institutional change. This research paper fills this research gap by undertaking a system review of how NEP 2020 contributes to the development of environmental sustainability in Indian higher education systems.

2. BACKGROUND AND CONTEXT

2.1 Global Environmental Crisis and Education Imperative

The human species goes beyond the limits of the planet in various dimensions. The Intergovernmental Panel on Climate Change (IPCC) indicates a current CO 2 concentration of 421 ppm (2023) in the

atmosphere, which is half a century higher than the concentration before the industrial revolution. Biodiversity in the world reduced by 68 percent since 1970, and the rate of extinction is 100-1,000 times greater than the usual background levels. Extraction of resources is above the ability of the earth to replenish them, resulting in ecological debt in both developed and developing countries.

One of the main leverages of intervention in the transformation of the system is education. The UNESCO Framework 2015 on Education that aims to achieve sustainable development (ESD) acknowledges education as a critical element in creating awareness, knowledge creation, competence creation, and behavior change towards sustainability transitions. The SDG 4 (Quality Education) also highlights the role of sustainable education in the realization of all the 17 SDGs.

2.2 Higher Education's Unique Position

Universities are knowledge making institutions, institutions of youth development and institutional communities that exemplify sustainability practices. They have a twofold role to play; (1) curriculum transformation, which involves incorporation of sustainability competencies in disciplinary studies and (2) operational excellence, showing green campus practices. The institutions of higher education have a unique role of impacting the change in the society through graduate education, research focus, community service and institutional leadership.

3. OBJECTIVES AND RESEARCH QUESTIONS

3.1 Research Objectives

1. In order to assess the efficacy of NEP 2020 at fostering the environmental sustainability and social responsibility among Indian colleges of higher learning, it is necessary to analyze the barriers, enablers and outcomes of its implementation.

2. Evaluate student awareness and knowledge, and attitudes on environmental sustainability in institutions that are implementing NEP 2020.

4. LITERATURE REVIEW

4.1 Literature Review Framework and Methodology

An online literature search was conducted to identify 15 peer-reviewed articles published between 2019-2025 in Google Scholar, Scopus and Web of Science databases that had included the topic of environmental sustainability in higher education, NEP 2020 implementation, and education in sustainable

development (ESD) in India and similar settings. The paper summary has around 50 words, and the focus is on the methodology, findings, and gaps.

4.2 Synthesis of Literature Review Findings

Common Themes across Literature:

All of the 15 reviewed studies find some clear similarities in their results on the topic of environmental sustainability progress in higher education:

1. Faculty Capacity Gap: In several studies (Chakraborty et al., Busquets et al., Christie et al.), 64-74% faculty indicated a lack of adequate sustainability education integration training, which is the main barrier to implementation.

2. Challenges to Curriculum Integration: Research reports that sustainability integration takes place, but disciplinary boundaries, time limitations of curriculum (74%), and a lack of institutional coordination (64) hamper implementation. O'Byrne et al. discovered that there was a high variance in contents of curriculum programs.

3. Institutional Disparities: there exists evidence of sharp contrasts in the context of developed and developing nations (Bautista-Puig et al., Sehgal et al.), with better resource provision being disproportionately associated with institutions in the Global South.

4. Infrastructure-Outcome Connection: Atici et al. showed that there is a strong correlation between green campus infrastructure and positive outcome (r=0.72) and this is very critical because the institutional investment is critical.

5. Awareness-Behavior Gap: Awareness-enhancement, albeit a requirement, according to Debrah et al. and similar research, cannot bring about long-term behavior change unless systemic institutional backing is provided.

Research Gaps Identified:

Despite the extensive literature, the gaps of the project are as follows: (1) NEP 2020-specific impact evaluation in Indian contexts is scarce, (2) longitudinal outcomes and effects monitoring, (3) student-level perspectives and outcomes are not covered to an extensive extent, (4) cost-effective and scalability is not well-explored, (5) the implementation mechanisms are not studied in under-resource settings.

5. METHODOLOGY

5.1 Research Design

This study employed a **mixed-methods sequential explanatory design** combining quantitative and qualitative approaches. Quantitative data collection (primary phase) provided breadth and measurable outcomes; qualitative data (secondary phase) provided depth and contextual understanding. This design balances generalizability with contextual nuance.

5.2 Population and Sampling

Target Population:

- Undergraduate and postgraduate students from Indian higher education institutions (universities and colleges) with NEP 2020 implementation
- Faculty teaching sustainability-related courses across disciplines
- Administrative staff responsible for sustainability initiatives

Sample Characteristics:

- **Total Sample Size: 485 students** across 12 universities
- **Geographic Distribution:** 4 universities each from North, South, and East India
- **Institutional Types:** 5 central universities, 4 state universities, 3 deemed universities
- **Geographic Categories:** 6 urban, 4 semi-urban, 2 rural location institutions

Sampling Method: Stratified random sampling ensured representation across institutional characteristics. Within each university, random selection from student registries maintained sampling integrity.

Inclusion Criteria:

- Enrolled in undergraduate/postgraduate programs at NEP 2020-implementing institutions
- Completed minimum one semester of academic study
- Availability for survey participation

- Faculty: teaching sustainability-related courses; minimum 2 years teaching experience

Exclusion Criteria:

- First-semester students (insufficient exposure to NEP implementation)
- Non-regular/distance education students
- Students on sabbatical/leave during data collection

5.3 Data Collection Methods

Quantitative Data Collection:

Primary Tool: Structured Questionnaire (70-item instrument)

- **Development:** Instrument based on validated scales from literature combined with NEP 2020-specific indicators
- **Dimensions Assessed:**
    - Environmental Awareness (8 items; α=0.81)
    - Sustainability Knowledge (12 items; α=0.78)
    - Attitudes Toward Sustainability (10 items; α=0.75)
    - Behavioral Intentions (8 items; α=0.72)
    - Institutional Environment Perception (16 items; α=0.80)
    - Campus Sustainability Practices (16 items; α=0.74)

Response Format: 5-point Likert scale (1=Strongly Disagree to 5=Strongly Agree)

Administration:

- Online via Google Forms (325 respondents, 67%)
- In-person paper surveys (160 respondents, 33%)
- Administration during regular class hours to maximize response rates

- Duration: 15-20 minutes per respondent

Response Rate: 485 out of 620 approached students (78.2% response rate)

Qualitative Data Collection:

Focus Group Discussions (FGDs):

- 18 FGDs conducted (6 per region)
- 6-8 students per FGD (total qualitative participants: n=126)
- Semi-structured discussion guide (8 open-ended questions)
- Duration: 60-90 minutes per FGD
- Audio-recorded and transcribed verbatim
- Thematic analysis of qualitative data

Topics Explored:

- Student experiences with sustainability education
- Barriers and enablers to sustainability engagement
- Institutional support and resources
- Suggestions for policy improvement

Faculty In-Depth Interviews:

- 24 faculty interviews across participating institutions
- Semi-structured interview protocol (12 questions)
- Duration: 45-60 minutes per interview
- Audio-recorded with participant consent

Administrative Document Review:

- Institutional sustainability policies/plans (12 institutions)

- Curriculum documents (24 courses)
- Campus sustainability reports and initiatives
- NEP 2020 implementation records

6. RESULTS

6.1 Descriptive Characteristics of Sample

Student Demographic Profile (n=485):

- **Gender Distribution:** Female 48.2% (234), Male 51.0% (247), Non-binary 0.8% (4)
- **Age Range:** Mean 20.8 years (SD=1.95), Range: 18-27 years
- **Academic Level:** Undergraduate 68.0% (330), Postgraduate 32.0% (155)
- **Institution Type Distribution:**
  - Central Universities: 31.1% (151 students)
  - State Universities: 28.7% (139 students)
  - Deemed Universities: 40.2% (195 students)
- **Geographic Distribution:**
  - North India: 33.6% (163 students)
  - South India: 34.2% (166 students)
  - East India: 32.2% (156 students)
- **Socioeconomic Status:** First-generation college students: 52.6% (255)

6.2 Secondary Outcome: Institutional Sustainability Implementation Status

Table 1: Institutional Sustainability Implementation Across Campus Operations

Sustainability Component	% Institutions with Established Initiatives	Level of Implementation (Mean Score, 0-100)	Infrastructure Investment Status	Effectiveness Rating (Faculty Assessment)
Energy Efficiency Programs	83.3% (10/12)	62.4 (SD=18.5)	68% adequately funded	3.42/5.0
Water Conservation Systems	75.0% (9/12)	58.7 (SD=21.2)	42% adequately funded	3.18/5.0
Waste Management Programs	91.7% (11/12)	71.3 (SD=15.8)	71% adequately funded	3.87/5.0
Green Procurement Policies	58.3% (7/12)	41.2 (SD=22.5)	31% adequately funded	2.92/5.0
Campus Biodiversity Projects	66.7% (8/12)	52.8 (SD=19.4)	38% adequately funded	3.21/5.0
Renewable Energy Usage	50.0% (6/12)	38.5 (SD=23.1)	22% adequately funded	2.71/5.0
Composite Infrastructure Status	**69.3%**	**54.2 (SD=18.9)**	**45.3% adequately funded**	**3.22/5.0**

Note: Institutional audit of 12 participating universities; Implementation scores based on established action plans, resource allocation, and operational status; Adequately funded defined as ≥70% of planned budget allocation

Interpretation:

Application of NEP 2020 sustainability provisions have an average score with a high level of sectoral heterogeneity. The greatest implementation rates (91.7% institutions; mean score 71.3/100) were in waste management, which implies the established priorities in this area. Nevertheless, renewable energy (50% adoption, mean score 38.5) and green procurement (58.3% adoption, mean score 41.2) score significantly

lower, which can be attributed to barriers to investment and complexity of the systems. Resource constraints have been noted as key challenges as only 45.3 percent of initiatives had sufficient funding. The means of faculty effectiveness (rating 3.22/5.0) give reason to believe that the perception of the program impact is moderate and can be improved.

6.3 Differences Across Institutional Characteristics

Table : 2 ANOVA Analysis: Sustainability Outcomes by Institution Type

One-way ANOVA examined awareness score differences across three institution types:

Institution Type	n	Mean Awareness (SD)	F-statistic	p-value	Post-hoc (Tukey HSD)
Central Universities	151	4.82 (0.61)	8.42	<0.001***	Central > State; Central > Deemed
State Universities	139	4.51 (0.72)			
Deemed Universities	195	4.52 (0.68)			
Overall	**485**	**4.62 (0.68)**			

*Note: One-way ANOVA with Levene's test for homogeneity; post-hoc analysis using Tukey HSD; *** $p<0.001$*

Interpretation: There was great variation among the types of institutions ($F(2,482) = 8.42$, $p<0.001$). The highest awareness scores were in central universities ($M=4.82$, $SD=0.61$) which are much higher than those in state ($M=4.51$, $SD=0.72$) and deemed universities ($M=4.52$, $SD=0.68$). The differences are probably due to the access to better resources, faculty knowledge, and infrastructure investment that allows central universities to be fully integrated in terms of sustainability.

7. DISCUSSION

The paper concludes that NEP 2020 has led to a profound shift in environmental sustainability awareness in Indian higher education though with a disproportional institutional coverage. Although there is a high awareness increase, infrastructure development and feasible implementation is moderate and institution-specific because of multi-level impediments. The results are consistent with Capability Approach

developed by Sen, which highlights the comprehensive development of capabilities, and Institutional Isomorphism Theory, which presents primarily coercive adoption. Therefore, NEP 2020 is needed but ineffective by itself, and it is essential to allocate specific resources, capacity building, and coordination of its implementation to attain the overall sustainability results.

8. CONCLUSION

The National Education Policy 2020 is the most ambitious pledge of the integration of the environmental sustainability in higher education in India. The research which explored the impact of policies on 485 students in 12 institutions with the help of mixed-method design offers solid proof of the positive impact of policies and also uncovers key gaps in implementation.

Key Conclusions:

1. Policy Effectiveness Evidenced: NEP 2020 has demonstrated its strategic value by statistically significant changes in its environmental sustainability awareness (42.6% increase; d=1.06) and majority institutional adoption (69) of its sustainability efforts. The policy is also effective in channeling institutional focus and action toward sustainability which is core change with the peripheral nature of the previous policies.

2. Maturity Implementation is still nascent: After three years of policy implementation, policy vision is behind institutional practice. The process of infrastructure development is disjointed; faculty capacity is still an issue; systemic coordination is poor. Immediate expectations of comprehensive transformation are not realistic, realistic timelines of institutional transformation last 5-10 years.

3. Inequality Threatening: Central universities are much stronger in condition of education compared with state/deemed universities (awareness: 4.82 vs. 4.51, $p<0.001$), and environmental education inequality might be the same as the overall academic differences. The implementation should be done fairly by ensuring that under-resourced institutions and geographic areas are supported specifically.

4. Several Reinforcing Systems Necessary: Isolating individual interventions does not work but coordinated development among faculty capacity (=0.512), curriculum integration (=0.468), infrastructure (=0.341) and opportunities to engage (=0.423) are required. Wholesome solutions to these intertwined areas are those that maximize results.

5. Student Preparation and Demand Strong indicators of environmental-based student values and interest in engagement with sustainability emerge. The vices of implementation are not at the level of individual motivation but at the institutional and systemic level. This implies that there is considerable room to grow fast provided there is institutional backing.

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