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EDITORIAL NOTE

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It is with great pleasure that we present this issue of the Journal of the North Eastern Council, a testament to the rich intellectual diversity and multidisciplinary scholarship that characterizes research in India's northeastern region. This volume exemplifies our journal's commitment to fostering academic discourse across varied domains while maintaining a special focus on the unique socio-economic, cultural, and environmental dimensions of Northeast India.

The present issue brings together sixteen scholarly contributions that span an impressive range of disciplines—from education and agriculture to technology, culture, and sustainable development. This multidisciplinary approach reflects the complex, interconnected nature of the challenges and opportunities that define the northeastern states, requiring holistic perspectives that transcend traditional academic boundaries.

Our contributors have addressed critical contemporary issues with remarkable depth and insight. Mayuri Rahang and Prof. Polee Saikia examine academic performance among Karbi students in Kamrup district, highlighting educational disparities that demand urgent attention. In the realm of technology and finance, Nazim Uddin Ahmed and Junybirth T. Sangma explore the transformative potential of artificial intelligence in banking operations, while Niku Ghosh and Dr. Mridusmita Sharma provide a comprehensive analysis of Assam's social welfare schemes, tracing their evolution from subsidy-based models toward sustainable frameworks.

Environmental sustainability and biodiversity conservation—themes of paramount importance to the Northeast—are thoughtfully addressed by multiple contributors. Jonmani Kalita, Lalit Mohan Goswami, and Manisha Choudhury examine the delicate balance between biodiversity preservation and food security in the Brahmaputra floodplains, while Dr. Pankaj Kumar Sharma and Mahar Swrang Daimary investigate the emerging potential of cocoa cultivation in Assam. Ningthoujam Irina Devi contributes a fascinating study on traditional cleanliness practices and community governance in Manipur, demonstrating how indigenous knowledge systems can inform contemporary sustainability initiatives.

The cultural richness of the Northeast finds eloquent expression in several articles. Catherine Lalrodingi and Prof. K.C. Lalthlamuani offer a Kristevan reading of Lalrammawia Ngente's "Spirit Kawn," while K. Malsawmtluangi and Dr. Lalremruati Khiangte explore the digital transformation of Mizo folklore in the age of social media. These contributions underscore the dynamic nature of northeastern cultures and their adaptive responses to globalization.

Educational transformation receives significant attention through Prof. J.P. Verma's analysis of higher education restructuring under NEP 2020, and Gitanjali Dutta and Prof. Dulumoni Goswami's examination of multilingual education challenges and opportunities. Tourism and sustainable development are explored by Nongsaibam Lisan, Dr. Naorem Bobby Singh, and Irom Luckychand Meitei in their study of geotourism in Southern Mizoram, complemented by Anusuya Talukdar and Mahuya Deb's investigation of homestays as sustainable tourism alternatives in Guwahati.

The issue also addresses contemporary challenges in agriculture, media influence, and technological applications. Dr. Tamalika Sikder presents a comparative study on organic versus conventional farming practices, while Rajneesh Bharadwaj, Dr. Bidisha Lahkar Das, and Dr. Sumee Dastidar examine electronic media's role in shaping public perception regarding India's development vision. The technical dimension of power system load frequency control applications is represented by Piyali Das and Nrilanjal Debnath. Jolly Chakrabortty, and Dulumoni Goswami's work on Gamification of teacher training is an interesting take on game based pedagogical scenarios.

We extend our sincere gratitude to all contributors whose scholarly rigor and dedication have made this diverse compilation possible. Their research not only advances academic knowledge but also provides valuable insights for policy makers, practitioners, and communities across the Northeast. The interdisciplinary nature of these contributions reflects the journal's core mission of promoting comprehensive understanding of the region's multifaceted development trajectory.

We hope this issue will stimulate further research and dialogue, contributing to the broader discourse on sustainable development, cultural preservation, and inclusive growth in Northeast India and beyond.

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JOURNAL OF NORTH EASTERN COUNCIL

DISCLAIMER

ACADEMIC PERFORMANCE OF KARBI STUDENTS WITH SPECIAL REFERENCE TO KAMRUP DISTRICT OF ASSAM: AN EMPIRICAL STUDY

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Abstract

Academic performance is a vital indicator of a student's intellectual growth and overall success. It measures not only grades but also the development of essential skills, knowledge, and the ability to apply learning effectively. This study aims to explore the level of academic performance and gender disparities in performance among students. It also examines the factors related to the academic outcomes of Karbi secondary school students, which could adversely impact their academic success. In this context, a descriptive survey method was utilised, and a sample of 140 Class XI secondary school students was randomly selected. The findings indicate that 55% of Karbi tribe students achieved an average level of academic performance. Additionally, the results reveal no statistically significant difference between the academic performances of male and female students, showing that both genders perform at similar levels. The study found both external and internal factors affecting students' academic performance, including Illiteracy of parents, unfavourable home background, low level of aspiration, adjustment problems, peer influence and lack of awareness. Addressing the underlying challenges that hinder academic outcomes is crucial. Overcoming these obstacles is essential for fostering and improving the academic success of students.

Keywords: *Academic performance, Karbi students, gender, secondary school.*

Introduction

In today's competitive world, the quality of performance becomes the key factor for students' progress. Academic performance indicates the extent to which a person has achieved educational goals. Academic achievement shows how well a person has met the goals set in educational settings, such as schools, colleges, and universities. Excelling in the academic sphere can lead to advanced educational opportunities, scholarships, and attractive career prospects (Gayary & Kalita, 2024). However, it is essential to ascertain the environmental factors that correlate with children's academic performance and how much they account for unique variances in developmental status. Many interconnected elements influence academic achievement, including social, personal, psychological, environmental, and economic factors. Numerous studies over the years have demonstrated a connection between academic performance and the home environment. According to Chapagai (2024), the home environment, teaching-learning facilities, campus facilities, students' habits, relations between students and teachers, and factors related to particular institutions significantly impact students' academic achievement. Self-management skills alsohave a positive impact on students' academic achievement through the mediating effect of self-efficacy (Zhao, Ren & Yang, 2023).

Although extensive studies have been conducted on academic performance in Assam as well as in other regions, a review of existing literature reveals a lack of research specifically focused on the Karbi tribe students. Therefore, this study aims to fill that gap.In this research paper, the researcher has examined the academic performance levels of secondary school students concerning gender (boys and girls), exploring the differences between boys' and girls' academic performance, as well as the key factors influencing their academic performance of Karbi students in government provincialized secondary schools in Kamrup Metro, Assam.

Literature Review

Ejang, Sendagi (2024) investigated the academic performance of students in government-aided secondary schools within Alebtong District, Uganda, using quantitative data from 115 participants, including students, teachers, and school board members.

Sample and sampling technique

Simple random sampling technique was used for the current study sample of 140 (70 boys and 70girls from class XI) Karbi tribe students from various Government-Provincialized Secondary schools in Kamrup Metro district of Assam.

Research instrument

- ·Academic performance was measured using the total percentage of marks obtained in earlier classes. To collect this data, the students were given self-constructed information sheets and asked to report their total marks obtained from the last class.
- ·An informal interview has been conducted with the students to understand the various factors affecting their academic performance.

Statistical tools for analysis of data

Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS) version 27.0. The investigator employed descriptive analysis in the present study, which included frequency, percentage, mean, standard deviation, t-test, and graphical representation.

Results

Objective 1: To find out secondary school students' academic achievement levels.

Division	Range	frequency	Percentage	Category
1st Division	360-600	47	33.60%	High
2nd Division	270-359	77	55%	Average
3rd Division	180-269	16	11.40%	Low

Table 1: Shows the number and percentage of Academic performance of Karbi tribe students at different levels

Fig 1. Showing the academic performance of students

Interpretation

Table No. 1 and Figure 1 show the academic performance of boys and girls based on their scores. The table shows that 55% of students have secured the 2nd division, followed by 33.6% who obtained 1st division, and 11.4 % of students have secured 3rd division. This data highlights that most Karbi tribe students (55%) fall into the average category which shows secondary school Karbi students achieved neither high nor low marks.

Objective no.2 To find out the differences in academic performance between Karbi boys and girls.

Variable	Gender	N	Mean	SD	p-value	.05 level of Significance
Academic Performance	Boys	70	324.24	50.88	0.698	Not Significant
	Girls	70	327.7	54.22		

Table no.2 Shows Mean, SD, p-value, and level of significance of Karbi boys' and girls' students on academic performance

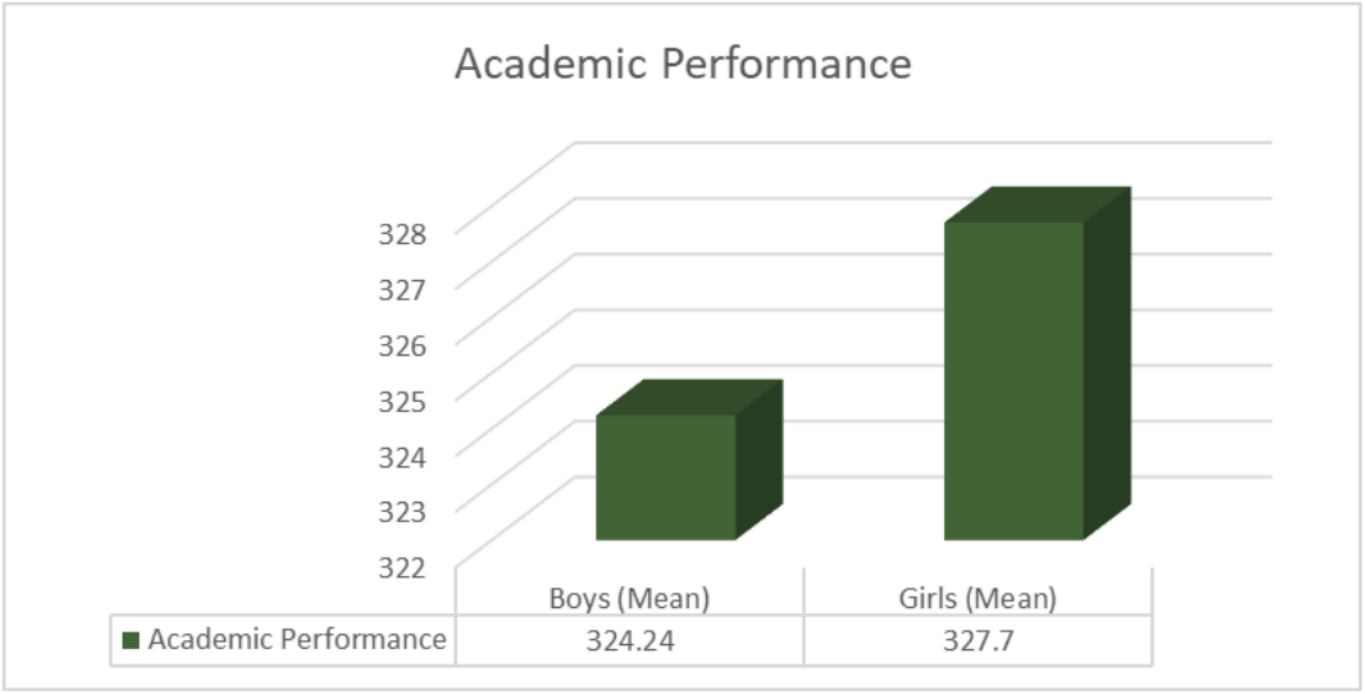

Fig 2.Showing Mean of Boys and Girls students on academic performance

Interpretation

Table no. 2 highlights the comparison between boys and girls regarding the student's academic performance. The results reveal that the Mean and Standard deviation for males are 324.24 and 50.88, respectively. Meanwhile, for females, the mean is 327.70 and SD 54.22. The calculated value for the difference in scores is .698. Therefore, the null hypothesis is that'There exists no significant difference in academic performance of Karbi students between boys and girls,'can be retained.

Objective 3: To investigate the factors affecting the academic performance of Karbi students

SL. No.	Factor	Total No.	Percentage
1	Illiteracy of Parents	54	38.60%
2	Poor economic condition	63	45.00%
3	Lack of awareness	43	30.70%
4	Unfavourable home environment	50	35.70%
5	Peer influence	30	21.40%
6	Low aspiration level	82	58.60%
7	Adjustment problem	48	34.30%

Table 3:Showing the Factors affecting academic performance of Karbi students (N=140)

Interpretation

·Illiteracy of parents: The issue of parental illiteracy is complex and calls for a diversified strategy to support the holistic development of students. Findings reveal that approximately 54 (38.6%) studentsreported difficulties in receiving academic assistance or motivation at home due to their parents' lack of education.Students with illiterate parents often exhibit poorer levels of academic self-efficacy, self-esteem, and a sense of belonging than their literate parents.

·Poor economic condition: Poor economic condition significantly influences the decision of parents to enroll their children in secondary schools in the study area. Factors such as the high cost of educational materials, transportation expenses play a crucial role in hindering the enrolment of secondary school students. With63 (45.0%) students out of 140 total sample studentsfacing financial difficulties, which affect the ability to afford necessary educational materials, access to academic support services, cope with stress, and participate in extracurricular activities.

·Lack of self-awareness: A lack of self-awareness significantly affects students' ability to manage their learning effectively. As a core element of self-regulated learning, it enables learners to evaluate their progress, adapt learning strategies, and adjust their social and environmental contexts to optimize learning. In this study, 43 students (30.7%) struggled with low self-awareness, which impacted their academic performance.

·Unfavourable home environment: The quality of the home environment plays an important role in shaping a child's personality and academic performance. In the current investigation, 50 (35.7%) students reported living in an unstable or chaotic home environment, often marked by frequent parental conflicts. Such a situation adversely impacts students' mental well-being, which in turn hinders their concentration, demotivates them from studying, and weakens their healthy relationship with parents.

·Peer influence: Peer influence plays a significant role in the academic performance of secondary school students. Good peer relationships can promote the physical and mental development of adolescents and improve learning outcomes. Conversely, bad peer influence can promote the occurrence of problematic behaviour among students, such as skipping class, substance use, and a lack of interest in studies. In this study, 30 students (21.4 %) identified peer influence as a major factor affecting their academic performance.

Low aspiration level: In the present study, it was found that 58.6% of students reported having low academic and career aspirations. The level of aspiration plays a pivotal role in determining a student's motivation to learn. High levels of aspiration are typically associated with greater motivation, persistence, and effort.

·In contrast, low levels of aspiration are often linked to decreased motivation and a lack of academic drive. Students who set low goals may believe that their efforts won't make a difference or that they are incapable of achieving anything beyond the basic requirement. This lack of motivation can lead to disengagement, procrastination, and a tendency to avoid challenging tasks.

·Adjustment problem:In contemporary Indian society, the adjustment problems of adolescents are on the rise, largely influenced by the forces of modernization and westernization. Ensuring the development of sound physical and mental health among youth has become crucial to mitigate these issues during adolescence. The findings of the study revealed that a significant proportion of students, 34.3 % out of the total sample of 140 students,experienced considerable adjustment problems in social and emotional domains within the school environment.

Discussion

The primary objective of the study was to measure the academic performance among secondary school Karbi students. The results revealed that their performance ranged from good to poor with most students (77%) falling into the average category (2nd division) out of the total sample of 140 respondents. These results are consistent with the previous findings of Rabha & Saikia, (2019). The present study also aimed to examine the differences in academic performance with respect to gender.The outcomes of the t-test analysis revealed no discernible difference in academic performance between males and females, aligning with the study conducted by Rani et al. (2023) and Kaur et al. (2024), who also reported no gender-based variation in academic performance.In addition, the results related to no significant difference in academic performance is acceptances with the results of Parajuli & Thapa (2017) and Jain & Mohta (2019). However, these results contradictthe previous studies by Nadji (2015), Khare & Garewal (1996), Rabha & Saikia (2019), and Kumar (2022) in their study, they revealed significant differences in academic performance scores betweenmales and females.Furthermore, the study identified several key factors influencing the academic performance of the students- Parental illiteracy, Poor socio-economic conditions, Lack of awareness, negative home environment, negative peer influence, and low aspiration levels among students. These findings align with the perspectives of Davaatseren et al. (2024) & Patidar (2023).

Conclusion

This study concludes that the level of academic performance of Karbi secondary school students is generally moderate. It is neither poor nor highly favourable. Most students achieve average results, indicating room for academic growth. To improve performance and academic engagement, it is crucial to address both internal and external factors, such as students' aspirations and self-perception, and external factors, such as home environment, parental support, and peer influences. A targeted, holistic approach involving schools, families, and communities is essential for fostering better academic outcomes among students.

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APPLICATIONS OF ARTIFICIAL INTELLIGENCE IN BANKING OPERATIONS: AN INVESTIGATION OF PROMISING LITERATURE AND FUTURE RESEARCH AGENDA

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Abstract

The banking industry has undergone rapid digital transformation in the context of Artificial Intelligence (AI) driven technologies, such as chatbots, automated loan processing, fraud detection, and personalized customer services are reshaping operational efficiency and customer experience. This paper aims to bridge the knowledge gap by analysing the extent of AI adoption, its benefits, challenges, and its effectiveness in the banking sector. Understanding of these aspects is crucial for policymakers, banking professionals, and researchers to develop strategic frameworks for AI integration, ensuring improved financial services, security, and operational excellence. Additionally, the review of earlier research studies will provide insights into the impact of AI on employment, decision-making, and customer satisfaction, thereby contributing to the broader discourse on technology driven banking reforms. Hence, the paper is an attempt to examine the present state of Artificial Intelligence in the banking sector based on the promising literature in this emerging area to comprehend the direction for future research.

Keywords: *Artificial Intelligence, literature, banking, efficiency, and bank operation.*

1.0 Introduction

The initiation of big data necessitated the development of methods to analyse and extract valuable insights from vast datasets. This led to the increasing importance of analytics, which in turn brought Artificial Intelligence (AI) to the forefront (Kok et al., 2009). It became evident that the full potential of big data could only be harnessed through the application of machine learning algorithms (Huang and Rust, 2018).

Since the turn of the 21st century, AI, big data (Guerra et al., 2023), machine learning (Wang et al., 2023), cloud computing, and blockchain technologies have gained significant momentum due to advancements in computing systems (Ratia et al., 2018) and the proliferation of big data (Haenlein and Kaplan, 2019). AI has gained rapid traction because its application across various industries have delivered substantial benefits, such as cost reduction, enhanced customer satisfaction, mitigation of fraudulent activities, and more efficient resource utilization (McKinsey Global Institute's Report, 2018). A comprehensive AI report published by Stanford University in 2023 (Nestor et al., 2023) underscored the global investments in AI and their subsequent growth. The United States leads AI investment with $248.9 billion, followed by China at $95.1 billion, and the United Kingdom in third place with $18.2 billion. Israel, Canada, and India follow, with India ranking sixth, investing $7.73 billion in AI. Further, India ranks sixth in the deployment of machine learning systems, according to the same report. In addition to AI investments, India's economic and financial development over the last six years attracted the authors' interest in exploring AI's role in the Indian banking sector. According to Forbes (2024), India's AI market is projected to grow at a rate of 33.28% between 2023 and 2028, signalling a promising trajectory for the sector.

In India, one of the biggest challenges facing banks today is poor data and customer segmentation. The emergence of payment technology companies such as Airtel Payments Bank and Paytm Payments Bank, the emergence of neo banks and neo banking platforms, and the emergence of NBFCs have made it difficult for banks to survive in the existing paradigm. In the new era, banks are using new technologies to further develop and improve their services to customers. AI is helping banks transform their entire business, from insurance to sales, contracts to cyber security.

Banks are using analytics, blockchain, and machine learning to future-proof their products and services. AI in banking and finance improves the efficiency and competitiveness of banks and financial institutions (Pattanayak, 2021). Banks are using AI for a variety of purposes, including fraud detection, improving customer experience, monitoring customer behaviour to provide better service, and checking the credit history of users' products to predict loan risk.

2.0 Objectives of the study

The objective of the study is to review the earlier literature application of AI in banking sector and the relationship between the implications of AI and the bank's performance to educate future research direction.

3.0 Research Methodology and Approach

The researchers strategically visited various theories and models that are related to artificial intelligence and banks' efficiency. A review of past notable research related to the aforesaid subject on the themes, viz., artificial intelligence in the banking sector; review of bankers' and customers' perceptions on AI; artificial intelligence and bank performance; and methodological review, has also been done in this modest attempt.

4.0 Review of Previous Research and Discussions

This review is aimed at appraising and evaluating the available literature on cases of Artificial intelligence technology concerning the banking sector. A thematic review of related literature has been presented in the following paragraphs to highlight the gap of the proposed study.

4.1 Application of Artificial Intelligence in the Banking Sector

The online banking increases the banking operation more flexible and also offers cost savings as it decreases the utilization of traditional banking activities (Katyal, 2021). Technologies used by AI significantly enhance the decision-making process by providing data-driven and automated complex tasks. This also reduces the legal risk and potential losses of business. The comprehensive impact of AI extends across various sectors, leading to smarter business operations, reduced errors, and optimized resource management, ultimately driving better outcomes and strategic advantages in a highly competitive landscape. Despite the benefits of AI and digital banking, several challenges persist. Mithra et al. (2023) examined ethical dilemmas, data security concerns, and regulatory issues associated with AI implementation in banking. El-Gohary et al. (2021) noted that neobanks have struggled to gain traction due to consumer knowledge gaps, highlighting the need for AI-driven customer education. Revathi (2019) identifies online banking challenges such as security concerns, transaction convenience, and technical issues. Jain & Tiwari (2011) emphasized that while the internet banking enhances operational efficiency, security, privacy, and trust remain major concerns for consumers. Tapas (2023) highlighted the emerging challenges of digital banking in the post-COVID era, including cyber security risks and the digital divide. Kaur & Budhiraja (2017) discussed infrastructural limitations, lack of consumer awareness, and the need for employee training as barriers to e-banking adoption in India.

AI and digital technologies play a crucial role in risk management within the banking industry. Doumpos et al. (2023) identified risk assessment as one of the primary areas where AI and OR techniques have been utilized effectively. Mithra et al. (2023) validated the fraud detection as a key benefit of AI in banking, helping financial institutions mitigate security threats. Manser Payne et al. (2018) highlighted AI's capability to interpret external data accurately and achieve banking objectives while maintaining flexibility. Mohammed & Shariq (2011) found that ATMs were the most widely adopted e-banking technology, helping banks manage operational risks efficiently. Malhotra & Singh (2009) argued that internet banking has led to better asset quality and management, reducing the risks associated with traditional banking models. Ahmed et al. (2024) examined the standard of cyber security in online banking focusing in two major banks in the UAE in the Middle East and explored the factors influencing consumer trust and cyber security perceptions using a descriptive survey and established a strong positive correlation between cyber security perceptions and consumer trust contributing a significant implication for the UAE banking industry.

4.2 Perceptions of Bank Employees and Customers on Artificial Intelligence

AI has revolutionized customer experience by providing personalized banking services and seamless interactions.

AI has revolutionized customer experience by providing personalized banking services and seamless interactions. Pfoertsch & Sulaj (2023) highlighted the role of AI-driven chatbots and virtual assistants in improving customer service through empathetic interactions. Fernandes & Oliveira (2021) emphasized AI's role in offering 24/7 services, financial advice, and efficient portfolio management. Mithra et al. (2023) discussed AI applications in enhancing customer interactions and addressing fraud detection concerns. Sardana & Singhania (2018), suggested that collaboration between traditional banks and fintech firms can create a balanced approach to digital banking adoption. Convenience is a key driver of customer satisfaction and AI enhances convenience by ensuring 24/7 service availability, access to real-time information, and engaging customer interactions through bots (Dhingra, 2011). Services that are easily accessible and time-efficient foster stronger customer relationships. Besides, customization involves tailoring services to individual customer preferences. AI facilitates this by leveraging customer data, behavioural insights, and prior interactions to deliver personalized solutions. Despite ongoing concerns about data protection, customized AI services enhance brand loyalty and customer retention. Trust or confidence is foundational in banking, where customers rely on secure handling of their financial assets and personal information (Kanakodi & Khan, 2008). AI fosters trust by offering personalized services and secure platforms, enhancing user experience through seamless digital interfaces (Kalla & Bohra, 2023). Transparent communication and robust data protection measures are crucial in building long-term customer relationships (Wang, 2018).Customer retention plays a significant role in sustainable banking success. Regular updates, timely issue resolution, and customized offerings contribute to emotional bonding and brand advocacy (Kou et al, 2021). AI supports retention by detecting consumer needs, preventing fraud, and upgrading services using machine learning. These capabilities foster a competitive advantage and increased customer loyalty. In the same manner, customer experience is crucial for understanding and adapting to customer feedback and expectations (Kumar et al, 2016). AI facilitates the delivery of secure, efficient, and proactive services that align with user needs (Potapova et al, 2022). Prompt and reliable support, minimal wait times, and personalized service delivery contribute to customer satisfaction. AI-enabled services also offer opportunities for upselling and cross-selling while reducing operational costs. These benefits ultimately enhance firm performance (Alexandru & Laurentiu, 2008). Customer recovery service refers to the process of addressing customer dissatisfaction, resolving complaints through AI-enabled services, and restoring trust between the customer and the business (Jewandah, 2018).

Veerla (2021) pointed out the survey report conducted by Infosys on 1600 business executives in decision-making roles, where 75% executives regarded AI as fundamental to the success of the organization's strategy. Forbes magazine claimed that the application of AI can reduce the operational cost of organizations up to 22%. Further asserted that AI serves as a transformative predictive model in the banking sector and concluded by emphasizing the impact of AI on strategy implementation, customer service enhancement, fraud detection, compliance assurance and credit assessment. Adeyemo & Okoronkwo (2024) examined the effect AI on the operational efficiency of deposit money banks in Lagos State, Nigeriaand concluded that AI significantly contributed to operational efficiency, such as Service Innovation, Cost reduction, Service quality and Customer satisfaction. Kurode (2018) evaluated the strategies of adoption and implementations of AI in International banks and financial services industry in Indian context using the secondary data and concluded that AI's automation capabilities help banks eliminate unproductive and repetitive tasks that require human labour, allowing human employees to focus on more strategic and creative roles, which can ultimately enhance business efficiency.

4.3 Artificial Intelligence, Operational Efficiency and Banks' Performance

The banking industry has increasingly leveraged AI and operational research (OR) techniques to enhance efficiency. Noreen et al. (2023) suggested that AI-based technologies can significantly improve banking operations and profitability. Doumpos et al. (2023) provided a comprehensive review of AI and OR in banking and highlighted key areas such as bank efficiency, risk assessment, and performance improvement. Naeem et al. (2024) studied the impact of AI Investment on banks' performance in Pakistan from 2011 to 2022, covering 18 banks. Net Profit Margin, Return on Equity, and Return on Assets were used as proxies to measure the bank performance and concluded that AI investment positively contributed to bank performance. This remark has been found to be in the same directions as Fotheringham & Wiles (2023); Mikalef & Gupta (2021); and Alexandru and Laurentiu (2008) asserted that ROA, ROE, EPS and ROS are important indicators for business performance, while Biker (2010) regarded Return on Assets, Return on Capital, and Net Interest Margin as indirect performance indicators for financial institutions.Uppal (2010) emphasizes the importance of full automation in banking to maintain competitiveness, improve services, and enhance operational efficiency.

Moreover, Gupta & Mittal (2023) examined how automation and digital initiatives have led to significant improvements in both public and private sector banks. The advent of AI in the corporate world holds the potential to significantly impact the economy and employment, much like the industrial and digital revolutions of the past (Agerfalk, 2020). This type of automation affects not just manual tasks but also those that require analytical, intuitive, and empathetic abilities (Huang & Rust, 2021).

4.4 Methodological Review of Artificial Intelligence and Banking Sector

Technology Acceptance Model (TAM) has gained attention and confirmation in a wide array of areas and applications to understand end-users' intention to use new technology and systems (Venkatesh et al, 2003). Although TAM has not been widely applied to examine the adoption and acceptance of AI, TAM has been found to provide consistently superior explanations or predictions of behaviour (Taylor & Todd, 1995; Morris et al., 2003). Many existing studies in the context of technology acceptance have shown that individual's attitude directly and significantly influences behavioural intention to use a particular technological application (Gribbins, Shaw, & Gebauer, 2003; George, 2002). Studies conducted are not directly related to AI, but they are indirectly linked to AI because of the technology involved. TAM has received much attention from researchers and practitioners as an ungenerous yet powerful model for explaining and predicting usage intention and acceptance behaviour. This can be a useful model for assessing the acceptance of AI.

The implications of Artificial Intelligence refer to the outcomes, effects, and consequences that arise from the adoption and integration of AI technologies. These implications encompass both positive outcomes, such as operational efficiency (Fethi & Pasiouras, 2010; Jewandah, 2018), improved decision-making (Brachman, 2006 & Jiang et al., 2017) and high-quality customer experience (Zineldin, 2006), and negative consequences such as job displacement (Chui et al., 2016), ethical dilemmas (O'Neil, 2016) and privacy concerns (Zuboff, 2019). In general, the term refers to how AI transforms processes, systems, organizational strategies and human behaviour. Kalla (2023) examined the impact of AI in the operations of public and private banking sector banks in India on the basis of employees' attitudes, awareness, and satisfaction with AI in the banking sector. In this respect, the considered variables are "Understanding and Familiarity", "Implementation of AI-Driven Automation" (Kurode, 2018), "Transparency and Mechanism", and "Operational Impact", and demonstrated that AI's application in banking benefited the employees of the banks. Impact on Employment (Brynjolfsson & McAfee, 2017); Training and Development (Rai, 2020; Davenport & Ronanki, 2018); Impact on customer services & Personal banking (Lee & Chung, 2009; Vedapradha, 2018) ; Automation of Administration (Muthukannan et al., 2021; Varian, 2019); Growth of AI (Iansiti & Lakhani, 2020 and Brynjolfsson et al., 2021); Cyber security and Fraud detection (Gupta & Mittal, 2021; Dhingra, 2024) are some of the variables considered for the implications of AI adoptions and integrations. Nevertheless, all these variables are not considered to draw any significant relationship with the bank performance. However, existing literature demonstrated that the AI adoptions and implementations (Naeem et al., 2024) contributed to improve the bank performances.

Research Breach

Despite the growing integration of AI in banking operations, a significant research gap exists in understanding its consistent impact on the banking sector. While numerous studies explore AI adoption in banking at a national and global level, limited research specifically examines its implementation, effectiveness within the unique economic and infrastructural landscape. Additionally, existing literature pays little focus on employee experience and fraud detection, overlooking operational efficiencies, risk management, and decision-making improvements enabled by AI in banks. Addressing these unexplored areas will provide valuable insights into optimizing AI strategies for enhanced banking performance. Review of related literature has also revealed that the implementation of AI has a positive implication in banks operation and the AI adoption, which is motivated by perceptions of usefulness and convenience of use as perceived by the Technology Acceptance Model (TAM) has added greatly to our understanding of AI's influence in the banking industry. Furthermore, existing literature has indicated that AI investment has significantly improved bank performance.

Agenda for Future Research

The research studies focused on specific areas of application of AI in banking sector. Only a few studies look into the overall impact of AI on the banking organization as a whole and the broader context of the banking industry. Hence, there is a need for more studies that look into how the banking organization manages the adoption of AI and transforms the banking industry in particular.

The research needs to adequately explore the role of service providers as effective partners in accelerating AI adoption in the banking industry. Tech giants and international consultancy firms have strong visibility. The partnership of traditional banks with fintech as a service provider is another option that can be explored to accelerate AI adoption in the banking sector. Besides these, the lack of a skilled workforce is one of the deterrents to the adoption of AI. This opens the floor for further research on how institutions can help increase the talent pool for AI-driven technologies. This can start from identifying the skillsets required to develop and implement AI. In addition, most of the studies focussed on a single perspective, either of the customer or the banker; multi-perspective studies look into areas where the synergistic cooperation among multiple stakeholders in AI adoption can be strengthened to address pressing barriers in AI adoption

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FROM SUBSIDY TO SUSTAINABILITY: A COMPREHENSIVE ANALYSIS OF ASSAM'S SOCIAL SCHEMES UNVEILED

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Abstract

This paper analyses the transformative economic impact of some of the key government financial interventions in Assam drawing from mixed methods of household surveys, stakeholders' interview and secondary statistics. Through the discussions that revolve around schemes like Atal Amrit Abhiyan, Orunodoi, Swanirbhar Nari, and Sarothi Start-up, the study analyses the extent of success in terms of healthcare access, women empowerment, entrepreneurship, financial inclusion etc. While these programs advance economic mobility and welfare goals, unforeseen side effects such as labour market exit and implementation inefficiencies underscore and the importance of data-driven governance, real-time impact monitoring, and targeted reforms.

Key Words: Government schemes, financial inclusion, Atal Amrit Abhiyan, Orunodoi,

Swanirbhar Nari, Sarothi, economic impact, women empowerment, DBT (Direct Benefit Transfer), rural development, policy innovation, welfare optimization, startup support.

1.0 Introduction

In recent years, a number of focused government financial initiatives have been implemented in Assam, a state with a variety of socioeconomic challenges. These programs seek to alleviate poverty, encourage entrepreneurship, empower women, secure healthcare, and meet the basic needs of those who are most in need. To improve welfare delivery and optimize developmental outcomes, policymakers and stakeholders must have a thorough understanding of the initiatives' actual economic impact.

2.0 Objective

Evaluate the economic and social impacts of key government financial initiatives in Assam —including schemes like Atal Amrit Abhiyan, Orunodoi, Swanirbhar Nari, and Sarothi Start-up. The study aims to understand their effectiveness in promoting healthcare access, women's empowerment, entrepreneurship, and financial inclusion. It also seeks to highlight the unintended consequences of such interventions (e.g., labor market exit, dependency), and underscores the need for data-driven governance, targeted reforms, and real-time monitoring.

3.0 Overview of Key Government Financial Initiatives

3.1 3.1: Kushal Konwar Briddha Pension Scheme (SKKBPS):
Launched in 2018, this old-age pension scheme provides financial support to residents above 60 years, with an income ceiling of ₹2.5 lakh per annum. It covers both BPL and eligible APL families, reaching approximately 13 lakh beneficiaries.[1 & 2]

3.2 Atal Amrit Abhiyan Health Insurance Scheme:
Initiated in 2016, this health insurance scheme offers coverage up to ₹2 lakh per annum for BPL and low-income APL families (income up to ₹5 lakh), targeting catastrophic health expenditures and improving access to critical care [3,4 & 5].

3.3 Swanirbhar Nari – Atmanirbhar Assam Scheme:
Launched in 2020, this scheme empowers economically disadvantaged women by creating individual and community assets, promoting entrepreneurship, and integrating with MGNREGA and other state missions. The first phase aimed to benefit around 4 lakh families [6, 7 & 8].

3.4 Aponar Apon Ghar Home Loan Subsidy Scheme:
This scheme provides subsidies up to ₹2.5 lakh on home loans for first-time house buyers, supporting the vision of "Housing for All" for permanent residents of Assam [9, 10, 11 & 12].

3.5 Sarothi – The Start Up Assam:
A startup loan scheme launched in 2016-17, Sarothi offers up to ₹10 lakh with 5% interest subvention to first-generation entrepreneurs and MSMEs, aiming to address funding challenges for new ventures [13, 14, & 15].

3.6: Assam Orunodoi Scheme:
Introduced in 2020, Orunodoi provides direct benefit transfers of up to ₹1,450 per month to over 26 lakh low-income households, prioritizing women and vulnerable groups to support essential needs such as health, nutrition, and utilities [10, 11, & 14].

4.0 Methodology

The on-ground research was conducted in five districts of Assam using a mixed-methods approach:

- **Household Surveys**: Structured questionnaires administered to 3250 beneficiaries across all major schemes.
- **Focus Group Discussions**: Conducted with women's collectives, pensioners, and startup entrepreneurs.
- **Key Informant Interviews**: With scheme administrators, local officials, and bank managers.
- **Field Observations**: Visits to self-help groups, market centres, and cooperative societies.
- **Secondary Data Analysis**: Review of government reports, audit documents, and beneficiary records.

5.0 Data Collection and Survey

Fig 1: Taking Survey at Kamrup (Metro)

Fig 2: Explaining about the Survey at Nagaon District

Analysis of Economic Impact

Positive Impacts

- **Entrepreneurship and Employment:** Local entrepreneurship, especially among women and young people, has been stimulated by the Sarothi Startup Loan Scheme and Swanirbhar Nari. Particularly in rural areas, beneficiaries reported higher household incomes and the establishment of new microbusinesses. [6, 13 & 14].

- **Women's Empowerment:** Swanirbhar Nari has led to asset creation and skill development for women, fostering self-reliance and reducing gender disparities [6, 7 & 8].

- **Healthcare Security:** By lowering out-of-pocket medical expenses, "Atal Amrit Abhiyan" has improved access to vital care and kept families from experiencing financial hardship as a result of medical emergencies. [3, 4,& 5].

- **Housing Access:** Aponar Apon Ghar has enabled many low- and middle-income families to own homes, stimulating the construction sector and related trades [9, 10, 11 & 12].

- **Financial Inclusion**: Orunodoi's direct benefit transfers have improved banking access, especially for rural women, and provided a safety net for essential needs [11, 13].

6.0 Mixed or Negative Outcomes

- **Dependency and Labor Market Distortion:**

Despite the vital assistance that Orunodoi has given, field interviews and focus groups showed a pattern in which some recipients chose to live off of the monthly transfer rather than engage in daily wage labor, animal husbandry, milk cooperatives, or agricultural work. As a result, local productivity has decreased, and some groups may be losing their work ethic.[12].

- **Implementation Challenges:**

Particularly in pension and DBT schemes, problems like irregular beneficiary targeting, delays in fund disbursement, and a lack of regular audits were noted. [2 & 13]

7.0 Case Studies

Case Study 1: Women's Poultry Cooperative (Swanirbhar Nari)

Using funds from Swanirbhar Nari, a group of women founded a poultry cooperative. Their average monthly income doubled in less than a year, and multiple members launched side ventures, illustrating the multiplier effect. [6, 8].

Case Study 2: Orunodoi Beneficiary

A daily wage worker's family, after receiving Orunodoi benefits, reduced their engagement in agricultural labor, relying more on the monthly transfer. Over time, this led to a decline in overall income and skills, corroborated by local panchayat records [5]

Case Study 3: Startup Success (Sarothi Scheme)

To start a food processing business, a young businessman applied for a ₹10 lakh loan through Sarothi. The company currently has 12 employees and purchases its produce from nearby farmers, demonstrating how the program promotes economic ties between rural and urban areas. [13, 14, & 15].

8.0 Survey Results and Discussions

Statistics:

3258 Respondents from 5 Districts of Assam: Barpeta, Nagaon, Hojai, Morigaon, Kamrup Rural and Kamrup Metro

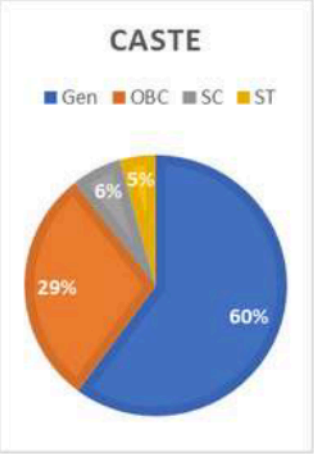

Fig: 8.1: Caste Record of Respondents

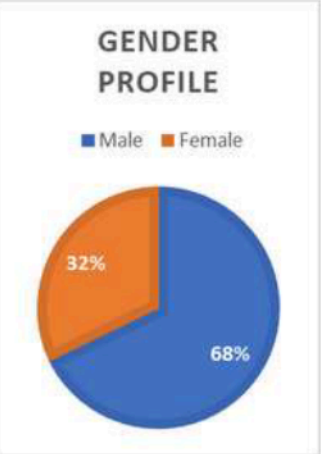

Fig: 8.2: Gender Record of Respondents

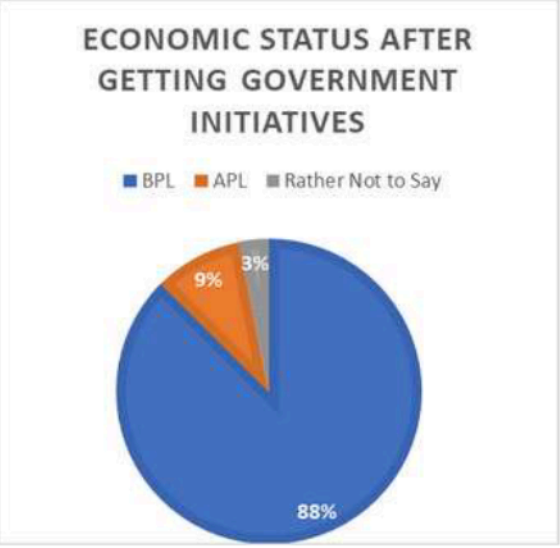

Fig: 8.3 Economic Status after getting Government Initiatives

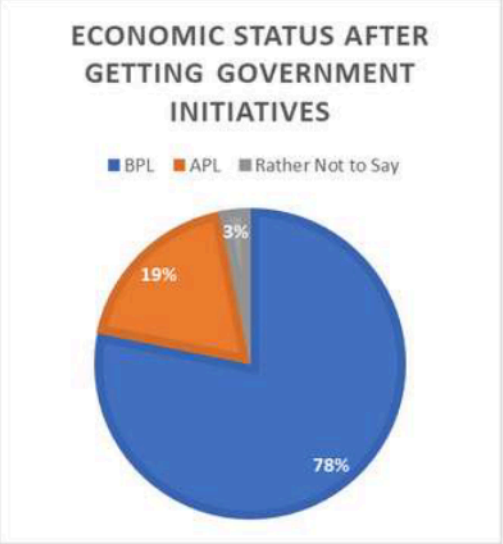

Fig: 8.3 Economic Status before getting Government Initiatives

Discussion: Outcomes and Challenges

Positive Outcomes:

- Enhanced economic security for the elderly, women, and vulnerable families.
- Improved access to healthcare and housing.
- Growth in women's entrepreneurship and local startups.

Challenges:

- The need for improved monitoring, regular impact assessments, and grievance redressal;
- The risk of dependency and decreased labour force participation, particularly under unconditional cash transfer programs like Orunodoi.
- Obstacles to implementation, like late payments and the exclusion of qualified recipients[15].

Conclusion

Government financial programs in Assam have had a significant positive impact on housing, entrepreneurship, healthcare access, and women's empowerment. Unconditional cash transfers, however, run the risk of causing dependency and decreasing involvement in productive sectors even though they temporarily ease distress. Although the economy is doing well overall, specific reforms are required to optimize gains and reduce unforeseen consequences.

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LIVING WITH THE RIVER: BIODIVERSITY AND FOOD SECURITY IN THE BRAHMAPUTRA FLOODPLAINS

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Assam exists in northeastern India as a territory where rivers Brahmaputra and Barak, together with more than 50 tributaries, have both formed the landscape and established the local way of living. The rivers create fertile floodplains which support farming and fishing activities, yet they destroy the landscape through periodic floods and soil erosion. The highlands' heavy monsoon rains cause river water levels to rise, while the ongoing process of silt accumulation elevates riverbeds, which increases the risk of flooding (Choudhury et al., 2022). The flood-prone areas in Assam cover 39.6% of its total land, which exceeds four times the national flood-prone area percentage and impacts millions of people each year. The Majuli Island serves as an example of how vulnerable this region is because it faces both cultural and ecological threats. The 1950 earthquake triggered a 763 sq. km reduction of the original 1,246 sq. km area of Majuli Island because of continuous flooding and riverbank erosion (Majuli District Administration 2019; Gait 2012). The region's unpredictable environment became evident through the 1755 flood, which changed the course of the Brahmaputra River (Chetry, 2020). The article examines how environmental damage interacts with health problems and food scarcity in the Brahmaputra floodplains while promoting solutions that combine local resilience with traditional knowledge.

Adapting to a Dynamic Landscape

The people of Assam have learned to live with the Brahmaputra river's natural cycles throughout many centuries. The farmers of Assam grow bao dhan (red rice), which survives in flooded areas, and construct their houses on bamboo stilts to protect against floods (Cremin, 2012). The Mising people of Majuli Island use flood patterns to determine their planting schedule for mustard and pulse crops, which they cultivate on the exposed riverbeds. However, these adaptations are expensive. The repeated need to relocate causes economic problems and health dangers, and disrupts the ability of families to earn a living while they live in temporary shelters. The process of erosion leads to two major problems: it reduces land area while simultaneously breaking down cultural connections between people and their sacred sites and ancestral fields. The enduring strength of Assam's people provides a basis for sustainable solutions through the combination of traditional methods with contemporary approaches.

Health and Nutrition Challenges

The floods in Assam generate multiple health and nutritional crises. Waterborne illnesses, together with vector-borne diseases and parasitic infections, emerge in contaminated water and poor sanitation and crowded relief centres, according to Paterson et al. (2018). The parasitic infection of the intestinal linings produces two effects that simultaneously lead to reduced nutrient absorption and worsen malnutrition for pregnant women and young children. According to Das et al. (2014) and Choudhury et al., (2022), hookworms in flood-prone areas cause anaemia as well as stunted growth and cognitive impairment in children, while pregnant women face dangers of low birth weight babies and medical issues. The combination of destroyed crops and broken supply chains, and reduced food diversity results in poor food security. In 2022, the floodwaters covered more than 2.5 million hectares of agricultural land, which destroyed essential rice and vegetable crops for local food supplies (Assam State Disaster Management Authority 2022).

The cycle between infections and malnutrition creates poverty and illness because disease-prone individuals have decreased nutrient absorption, while poor nutritional status makes them more disease-prone. A high proportion of underweight and stunted, and wasted children were found in areas affected by floods. The major flood event in Barpeta district revealed that 45.5 per cent of children under five were moderately underweight, while 24.2 per cent were severely underweight. The prevalence of stunting in Morigaon district reached 47.6 percent, and moderate and severe wasting affected 46.1 percent and 20.6 percent of the population respectively. The prevalence of severe underweight reached 50.9% in Barpeta district children aged 24–35 months. The prevalence of undernutrition among preschool children living in flood-prone regions was confirmed by the Composite Index of Anthropometric Failure which revealed 48.6% (Das et al. 2024). Lakhimpur district's upper Brahmaputra floodplain (UBF) contains groundwater with elevated arsenic (As) concentrations due to geogenic contamination. The region's geomorphology along with groundwater dynamics and sediment deposition combined with natural and human-induced disturbances accelerate arsenic leaching into groundwater. The increased flood risk of arsenic contamination threatens the drinking water security of people who obtain their water from these sources (Goswami et al. 2022).

The breeding habitats of mosquitoes and other vectors become more favourable due to floods, thus increasing the risk of vector-borne diseases like Japanese encephalitis and West Nile virus, which are present in Assam through animal vectors (Berthe et al. 2022; Dhiman, 2014). The expansion of these diseases into new areas is a growing concern. The flooding conditions produce an environment that causes waterborne diseases like diarrhoea and dysentery, and skin infections to spread. A rise in fever and communicable diseases becomes frequent during flood periods primarily because of contaminated water sources and insufficient sanitation systems (Saha, 2023).

The healthcare services were suspended in various regions, including the distant char-chaporis (riverine islands). The path to healthcare treatment became challenging because floodwaters had damaged essential infrastructure, and roads were inaccessible. The healthcare system faces multiple access restrictions because subcentres remain non-functional, while transportation remains limited, and patients face financial difficulties (Saha 2023). Zoonotic diseases add another layer of complexity. When floods occur the number of human-animal and human-wildlife contacts rises, which allows disease pathogens to spread. Research in this area has documented the presence of zoonotic diseases toxoplasmosis, alongside paragonimiasis, fasciolopsiasis, taeniasis/cysticercosis, hydatidosis, cryptosporidiosis, and gnathostomiasis (Berthe et al. 2022).

Flooding in rural Assam leads to the proximity of domestic and wild animals, thus raising the chances of pathogen transmission. The unregulated operation of wet markets violates established rules and increases the risk of zoonotic disease transmission because of poor hygiene practices and direct animal-human contact (Berthe et al. 2022). The traditional pig farming practice operated by many as a source of income is linked to parasites Ascaris lumbricoides and Trichuris trichiura, which spread through polluted water and soil (Roepstorff et al. 2011; Singh et al. 2010). African swine fever, a viral disease that affects pigs, has caused outbreaks in the Indian state of Assam. In 2020, authorities killed more than 30,000 pigs, which resulted in major losses to the local pig population (Das et al. 2014; Bhattacharyya 2020). The incidents have raised worries about food security and the way economic instability affects human wellness (Berthe et al. 2022).

A Threatened Biodiversity Hotspot

The Brahmaputra Basin exists within the Indo-Burma biodiversity hotspot, which stands as one of the planet's most ecologically diverse areas. The forests of Assam cover 59% of its territory while supporting multiple ecosystems, which include wetlands, together with grasslands and tropical and temperate forests, and alpine habitats. The Convention on International Trade in Endangered Species (CITES) lists more than 600 plant species, including medicinal plants and orchids, as rare or threatened (Goswami 2008). The 3,500 wetlands of Assam, including 177 wetlands larger than 100 hectares, serve as essential habitats for biodiversity and support human existence. Deepor Beel, which is a Ramsar site near Guwahati, supports fisheries and flood retention and provides habitat for migratory birds, including the Siberian crane. The ecosystems experience increasing pressure from siltation, which diminishes water storage capabilities, while urban expansion and agricultural activities cause habitat encroachment (Lodhi and Amonge, 2022). The excessive nutrient runoff from fertilizers causes eutrophication, which results in algal blooms that consume oxygen from water bodies and destroy aquatic species. The construction of dams and roads, together with other infrastructure projects, creates habitat fragmentation, which endangers various species.

Climate change intensifies the existing environmental strain. The Himalayan glacial melt and changing rainfall patterns cause river flow disruptions, which modify both flood cycles and wetland ecosystems (INCCA 2010). The Indian Network for Climate Change Assessment identified the Brahmaputra Basin as an ecologically sensitive area because biodiversity decline creates food system and livelihood disruptions. Local knowledge provides essential guidance to solve the challenge of protecting this hotspot

by finding equilibrium between nature preservation and human requirements.

The Power of Traditional Knowledge

Over many generations, Assam's communities developed resource management systems that stem from ecological wisdom. According to Gadgil and Berkes (1991), the Mising people develop Dhesa or Bhainsa, which are floating gardens to cultivate vegetables during flooding periods, thus guaranteeing food stability. The Mishing community of Assam has a long practiced traditional methods of food preservation to ensure food security during flood emergencies. Drying fish, pork, and selected vegetables over fire is one of such practices. These foods are smoked and stored for extended periods, to access essential nutrition even when fresh food becomes scarce during prolonged floods. This indigenous technique reflects the community's resilience and deep-rooted knowledge of sustainable living in a flood-prone region. (Deka, 2013). The Bodo people combine trees with their agricultural land through agroforestry systems, which helps them maintain stable soil while increasing their revenue streams. The documented systems, which Farooquee et al. (1999) and Farooquee et al. (2004) highlight, show their direct connection to climate adaptation. Organic farming methods combined with flood-prone rainwater harvesting systems in villages create resilient environments that decrease environmental pressure (Akanwa et al. 2020). The impact of modern planning will expand when this knowledge is incorporated into community-based agroecological projects, which can generate sustainable flood-resistant models for worldwide flood-risk areas.

The Mishing people build elevated bamboo houses called chang ghars through stilts as a way to defend against seasonal floods. The local construction methods produce buildings that shield inhabitants and their property during flood times and enable quick restoration of damaged structures. The community maintains proper food storage systems and maintains boats close by to enable prompt evacuation during flood emergencies (Dey 2012). The indigenous flood management system demonstrates effective adjustments to survive in flood-prone areas. The local communities employ their indigenous technical knowledge to understand meteorological signs, together with weather patterns and animal behaviors, which serve as flood prediction indicators.

The knowledge allows people to take preventive measures by moving livestock and storing food, and securing vital items in advance (Bordoloi and Muzaddadi, 2015).

The flood-resistant ponds in Dhemaji's flood-prone areas combine elevated dykes with turf and vegetation stabilization to prevent breaches in low-lying zones. The fishing techniques along with equipment receive modifications for both flood and post-flood situations, while drying and smoking serve as preservation methods to maintain food accessibility throughout and after floods (Bordoloi and Muzaddadi 2015).

A Framework for Resilience

A framework that combines different sectors must be used to tackle the multiple challenges of the Brahmaputra floodplain. Key interventions include the following:

Sanitation and Clean Water: The installation of elevated latrines together with solar-powered water purifiers in flood-prone areas will reduce waterborne diseases. The implementation of hygiene education programs enables communities to sustain sanitation practices during flood events.

Deworming and Healthcare: The healthcare system should run mobile clinics to provide vaccinations and nutritional supplements for pregnant women and children who need regular deworming treatments. The clinics should offer vaccinations and nutritional supplements to help people break the malnutrition-infection cycle.

Nutrition Security: The promotion of bao dhan and nutrient-rich pulses as flood-resistant crops should be combined with community seed bank establishment to protect local varieties. Food supplementation programs should focus on vulnerable groups to guarantee they receive enough dietary diversity.

Veterinary and Zoonotic Control: The veterinary services need improvement through scheduled livestock health checks and vaccination programs to decrease the risk of zoonotic diseases. The implementation of biosecurity training for communities will help stop outbreaks of African Swine Fever.

Climate Resilience: The implementation of fish farming and handicrafts as diversified livelihoods should combine with traditional knowledge to develop disaster preparedness plans. The combination of early warning systems with flood-resistant infrastructure helps reduce the extent of damage.

Conclusion

The Brahmaputra floodplains demonstrate how humans have interacted with nature through intricate patterns of relationship. The communities of Assam have developed exceptional flood and erosion resistance through their centuries-old adaptive practices which protect both human lives and biodiversity and food security.

Assam can establish itself as a resilience model by integrating traditional wisdom with contemporary solutions including sanitation practices and healthcare systems and sustainable farming methods and conservation strategies. The protection of wetlands together with disease prevention and nutritional security measures defends both local ecosystems and livelihoods while providing valuable lessons for flood-prone areas worldwide. The Brahmaputra serves as both a vital resource and an obstacle which demands community-based solutions that respect the river's strength while building a sustainable future for Assam's inhabitants and natural biodiversity.

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EMERGING POTENTIAL OF COCOA CULTIVATION IN INDIA: A REGIONAL FOCUS ON ASSAM AND THE DEVELOPMENTAL TRAJECTORY OF THE COCOA SECTOR

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Abstract

Cocoa (Theobroma cacao L.), though historically marginal in Indian agriculture, is gaining renewed attention as part of efforts to diversify cropping systems and boost farmer incomes. This study explores the historical development, regional patterns and emerging prospects of cocoa cultivation in India, with a special focus on Assam. Adopting a mixed-methods approach, it combines secondary data from national agencies with qualitative insights from 25 semi-structured interviews across four states. The analysis shows that while Andhra Pradesh and Kerala lead in production, Karnataka achieves notable yield efficiency. India's cocoa production grew at a CAGR of 8.17% between 2016 and 2023, reflecting productivity gains amid systemic constraints. Thematic analysis using NVivo highlights four critical dimensions: agronomic practices, institutional support, commercial viability and operational risks. Assam's pilot initiatives, particularly with genotype VTLC19, reveal promise but face barriers in market access and agronomic support. The findings underscore the potential for cocoa expansion in non-traditional regions and call for integrated policy and infrastructure strategies to ensure sustainability.

Keywords: Cocoa cultivation, Assam agriculture, Crop diversification, NVivo analysis, Agronomic practices, Sustainable livelihoods

Introduction

Cocoa (Theobroma cacao L.), a tropical evergreen species native to the Amazon basin, was introduced to India during the early 20th century under colonial agricultural experimentation (Jayasekhar & Ndung'u, 2018). Although it was accorded plantation crop status alongside tea and coffee, cocoa has not yet achieved similar prominence in India's agrarian economy due to its relatively limited cultivation scale and inadequate institutional support (ICAR–Directorate of Cashew Research, 2023).

The state of Kerala initially led the expansion of cocoa cultivation, reaching nearly 29,000 hectares by 1980–81. However, market volatility and the absence of organized procurement mechanisms discouraged sustained investment. In subsequent years, Karnataka, Tamil Nadu, and Andhra Pradesh experienced growth in cocoa cultivation, supported by the 11th and 12th Five Year Plans that promoted hybrid varieties and improved agronomic techniques (Reddy et al., 2022).

Cocoa cultivation requires a tropical climate with moderate temperatures, high humidity, loamy soils, and well-distributed rainfall. Successful propagation depends on shade management, pruning, and nutrient application (Kongor et al., 2024). However, widespread scalability faces persistent challenges, including the unavailability of quality planting materials, weak extension systems, and underdeveloped post-harvest and marketing infrastructure (ICAR–Directorate of Cashew Research, 2023).

India's cocoa exports grew at an impressive CAGR of 29.89% between 2013–14 and 2017–18 (Karpagalakshmi et al., 2019), yet domestic production lags behind rising consumption, leading to increased imports. Although organic cocoa presents profitability and sustainability benefits, its broader adoption is limited by poor access to certified inputs, low awareness, and labor shortages (Jaganathan et al., 2015; Effendy et al., 2019).

Moreover, empowering smallholder farmers—particularly women—through improved access to credit, training, and value chain integration is vital for rural development (Effendy et al., 2019). Environmental concerns over unsustainable monocultures highlight the need for agroforestry-based alternatives (Prabakaran, 2023).

Notably, India has begun exploring cocoa cultivation in non-traditional regions such as Goa and the North East. In Assam, preliminary genotype trials at the Kahikuchi research station have shown promise with VTLC19, though long-term viability and commercial scalability remain to be validated (Singh et al., 2020).

Accordingly, this study investigates the historical trajectory and emerging prospects of cocoa cultivation in India, with a focused exploration of Assam's potential. By integrating field-based insights with secondary data, it seeks to evaluate commercial viability, regional adaptability, and the policy interventions necessary for sustainable cocoa development.

Literature Review

Cocoa cultivation, traditionally associated with West Africa and Latin America, has been gaining traction in India's tropical agro-climatic zones (Jayasekhar & Ndung'u, 2018). Government policy interventions, particularly during the 11th and 12th Five Year Plans, supported intercropping with coconut and arecanut, enhancing land use efficiency and microclimatic suitability (Reddy et al., 2022; George & Raju, 2022).

Regional performances reveal mixed outcomes. Kerala continues to exhibit yield stability; Tamil Nadu shows high production growth accompanied by volatility; while Karnataka reflects high productivity despite slower area expansion (Anila et al., 2023; ICAR–Directorate of Cashew Research, 2023). These variations underline the role of regional agro-climatic conditions, policy execution, and farmer engagement.

Major cultivation constraints identified include low availability of high-yielding planting material, poor soil quality, pest and disease pressures, and insufficient post-harvest infrastructure (Karpagalakshmi & Muthusamy, 2019). Additionally, limited access to extension services and technical training hinders knowledge dissemination at the farm level.

Organic cocoa, though ecologically promising, remains underutilized due to barriers such as certification complexities, input constraints, and lack of farmer training (Jaganathan et al., 2015; Effendy et al., 2019). Precision farming techniques have emerged as viable solutions to improve efficiency and resilience, with nitrogen optimization for genotypes like VTLCH-1 yielding encouraging results (Nayana et al., 2024).

The environmental sustainability of cocoa is another growing concern. Over-reliance on monoculture systems increases vulnerability to soil degradation and biodiversity loss, prompting calls for integrated agroforestry approaches (Prabakaran, 2023). Cocoa cultivation is now being piloted in newer regions such as Goa and Northeast India. Assam, in particular, is considered climatically suitable, but remains under-researched. Trials with genotype VTLC-19 at the Kahikuchi station have demonstrated agronomic potential, yet there is a conspicuous lack of systematic evaluation of its economic viability and farmer-level adoption (Singh et al., 2020). These emerging zones highlight the need for region-specific studies to inform localized development strategies.

Need and Objective:

Cocoa cultivation, though traditionally limited to select regions in India, is witnessing gradual expansion into non-traditional areas like Assam. However, its commercial viability, sustainability, and regional adaptability remain insufficiently studied. There is a pressing need to assess both the historical context and the evolving dynamics of cocoa cultivation to inform policy and practice. This study aims to explore the historical introduction, regional expansion, and emerging commercial potential of cocoa in India, with a specific focus on Assam, while identifying the key agronomic, economic, and institutional challenges affecting the sector's sustainable development.

Research Methodology

This study adopts a mixed-methods research design to explore the historical development, regional dynamics and commercial viability of cocoa cultivation in India, with a specific focus on Assam. By integrating qualitative and quantitative approaches, the research captures both macro-level trends and localized insights into agronomic, institutional and socio-economic factors.

Secondary data were sourced from the Indian Council of Agricultural Research (ICAR), Directorate of Cashewnut and Cocoa Development (DCCD), state agricultural departments, policy documents and academic literature. These data collected inform analyses of cultivation trends, production levels and trade patterns. Growth performance was evaluated using the Compound Annual Growth Rate (CAGR), calculated as:

CAGR (%) =(Antilog b–1) ×100

where b is the regression coefficient from a semi-log trend model. The Cuddy-Della Valle Instability Index (CDVI) was used to assess temporal variability in cultivation and output.

The formula to measure CDVI is as follows:

CDVI (%) = C.V ×)

Where, R^2 is the coefficient of determination of the time series.

Primary data were collected via semi-structured interviews with 25 purposively selected stakeholders, including farmers, extension agents and policy officials from Kerala, Tamil Nadu, Andhra Pradesh and Assam. Open-ended interview guides were used to elicit perspectives on farming practices, institutional challenges and commercialization.

Qualitative responses were coded and analysed thematically using NVivo software, with Latent Dirichlet Allocation (LDA) aiding topic clustering. The study is exploratory and descriptive, offering insights into the constraints and opportunities for scaling cocoa in non-traditional regions like Assam.

Results and Discussion

This section integrates longitudinal statistical data with field insights to critically evaluate the performance and potential of cocoa cultivation in India, particularly in emerging regions such as Assam. The analysis is supported by descriptive statistics, growth trends, and instability indices across major cocoa-producing states.

1. National Trends in Area and Production

Table 1: Area and Production of Cocoa in India (2016–2023)

Year	Area (Ha)	Production (MT)
2016-17	82,940	18,920
2017-18	88,515	19,866
2018-19	94,008	23,981
2019-20	97,563	25,783
2020-21	103,376	27,072
2021-22	105,975	28,426
2022-23	108,985	29,792
CAGR	4.65%	8.17%

Source: Directorate of Cashewnut and Cocoa Development, India.

The compound annual growth rate (CAGR) in area and production was 4.65% and 8.17% respectively. The faster growth in production suggests improved yield performance and adoption of better cultivation practices.

2. State-wise Overview

Table 2: State-wise Area and Production of Cocoa in India (2022–23)

State	Area (Ha)	Production (MT)
Andhra Pradesh	43,904	10,535
Karnataka	14,269	4,061
Kerala	18,233	10,535
Tamil Nadu	32,580	3,061

Source: Directorate of Cashewnut and Cocoa Development, India.

Andhra Pradesh and Kerala dominate in terms of production, while Tamil Nadu shows large cultivated area with lower yield, pointing toward agronomic inefficiencies.

3. Regional Growth Patterns

Table 3: Andhra Pradesh Cocoa Trends

Year	Area (Ha)	Production (MT)
2016-17	24,156	7,700
2017-18	28,756	8,085
2018-19	32,949	9,615
2019-20	36,455	10,384
2020-21	39,714	10,903
2021-22	41,874	11,448
2022-23	43,904	10,535

Source: Directorate of Cashewnut and Cocoa Development, India.

Andhra Pradesh saw steady growth in both area and output, peaking in 2021–22. A dip in 2022–23 could reflect climate or market challenges.

Table 4: Karnataka Cocoa Trends

Year	Area (Ha)	Production (MT)
2016-17	13,685	2,420
2017-18	13,685	2,541
2018-19	14,085	3,341
2019-20	14,134	3,542
2020-21	14,216	3,719
2021-22	14,252	3,905
2022-23	14,269	4,061

Source: Directorate of Cashewnut and Cocoa Development, India.

Despite almost static area, Karnataka achieved consistent yield gains, implying agronomic efficiency.

Table 6: Tamil Nadu Cocoa Trends

Year	Area (Ha)	Production (MT)
2016-17	29,205	1,650
2017-18	29,480	1,733
2018-19	30,080	2,518
2019-20	30,080	2,669
2020-21	32,080	2,803
2021-22	32,080	2,943
2022-23	32,580	3,061

Source: Directorate of Cashewnut and Cocoa Development, India.

Tamil Nadu shows improvement but remains constrained by low yield despite expanded acreage.

4. Growth and Instability Index

Table 7: CAGR and Instability Indices (CDVI) of Cocoa in Major States

State	CAGR Area (%)	CAGR Production (%)	CDVI Area(%)	CDVI Production(%)
Andhra Pradesh	10.24	6.49	5	7.18
Karnataka	0.77	9.42	0.82	7.05
Kerala	2.08	6.97	0.99	2.85
Tamil Nadu	2.03	11.39	1.47	9.8

Source: Directorate of Cashewnut and Cocoa Development, India.

Kerala exhibits stable performance with minimal variation, while Tamil Nadu shows highest production growth but also high output volatility. Karnataka's low CDVI despite static area signifies efficient yield management.

5. Export-Import Trends

Table 8: Export and Import of Cocoa Products in India

Year	Export Qty	Export Value	Import Qty	Import Value
2016-17	25,700	1089.99	63,613	1542.31
2017-18	29,583	1144.37	71,822	1473.1
2018-19	27,607	1350.86	87,595	1845.89
2019-20	28,259	1274.34	85,276	1833.97
2020-21	25,768	1108.38	89,069	2020.98
2021-22	27,319	1145.48	111,187	2713.93
CAGR	**-0.24%**	**0.27%**	**10.24%**	**11.37%**

Source: Directorate of Cashewnut and Cocoa Development, India.

While export quantities remained static (CAGR: -0.24%), import quantities surged at a CAGR of 10.24% and value at 11.37%. The growing import dependency suggests an urgent need to boost domestic production.

6. Assam's Emerging Cocoa Potential: Regional Opportunities and Challenges

Table 9: Summary of Cocoa Cultivation in Assam

Parameter	Value / Range
Pilot area (Sonapur, Dimoria Block)	115 Ha across 4 villages, 285 farmers
Cocoa plants distributed	~30,000 since 2018
Potential area (NE region)	Up to 50,000 Ha identified as suitable
Farmers' seminar participation	~200 attended in 2023; 5,000 target by 2025
Best-performing genotype (VTLC19)	48.40 pods/tree/year; 1.76 kg dry bean/tree

Sources: Directorate of Cashewnut and Cocoa Development (DCCD), Assam Agricultural University, Journal of Plantation Crops, Times of India (2023)

Though still in its early stages, cocoa cultivation in Assam represents a significant opportunity for diversification in the agrarian economy of North East India. Pilot initiatives in the Sonapur area of the Dimoria block have covered 115 hectares across four villages, involving 285 farmers and the distribution of over 30,000 cocoa plants since 2018. These efforts, led by Assam Agricultural University and the Directorate of Cashewnut and Cocoa Development, signal a growing institutional interest in mainstreaming cocoa into the region's cropping systems.

Comparative Productivity Analysis

Data from preliminary genotype trials in Assam identified VTLC19 as a top-performing cultivar, yielding an average of 48.4 pods per tree per year, translating to 1.76 kg of dry bean output per tree under the region's agro-climatic conditions (Singh et al., 2020). In comparison, established cocoa-growing states like Kerala and Andhra Pradesh demonstrate higher cumulative yields per hectare due to longer cultivation history, integrated input systems, and organized market linkages. For instance, Kerala's average dry bean yield is reported to exceed 500 kg/ha annually (ICAR–Directorate of Cashew Research, 2023), while Andhra Pradesh benefits from mature intercropping systems and superior extension coverage that enhance input-output efficiency.

Although Assam's per-tree yield is promising, large-scale productivity remains constrained by infrastructural limitations and inconsistent agronomic support.

Barriers to Adoption in North East India

Despite the evident ecological compatibility, Assam's loamy soils, high humidity and partial shade under arecanut and banana plantations several barriers impede the scaling up of cocoa cultivation in the region:

- **Lack of Post-Harvest Infrastructure:** Absence of centralized fermentation and drying units affects bean quality and market readiness.
- **Weak Extension Systems:** Farmers report inadequate access to trained agricultural officers or cocoa-specific field guidance.
- **Low Awareness Levels:** Many farmers are unaware of cocoa's commercial viability or the long gestation period required before harvesting begins.
- **Input Accessibility:** Delays in the supply of planting material, fertilizers, and bio-pesticides are common in remote districts.
- **Market Linkage Deficits:** No formal procurement mechanism currently exists, forcing farmers to rely on ad hoc or informal buyers.

These constraints reflect a broader structural gap in the agri-value chain infrastructure across the North East.

Policy Momentum and Institutional Initiatives

Notably, there is growing policy-level momentum aimed at unlocking cocoa's potential in Assam. A state-level seminar organized in 2023 at Sonapur witnessed participation from over 200 farmers and outlined plans to scale operations to over 5,000 cultivators. The government aims to transform Dimoria into a 'Chocolate Block', a model agro-economic zone dedicated to cocoa production and value addition (Times of India, 2023). The initiative draws conceptual support from the Central government's call for diversification and the North East Region Vision Document. However, institutional support must extend beyond pilot schemes to include:

- Long-term training modules
- Quality certification programs
- Linkages with national chocolate manufacturers and exporters
- Financial incentives for intercrop conversion and organic adoption

Table 10: NVivo-Based Thematic Clusters and Descriptions

Theme	Cluster Label	Top Keywords	Representative Insight
Theme 1	Institutional and Agronomic Integration	Improved, Agronomic, Practices, Institutional	"Drip irrigation and grafting helped us, but we need regular guidance."
Theme 2	Policy and Sustainability Synergies	Support, Environmental, Improved, Practices	"We practice organic methods, but awareness and policy support are low."
Theme 3	Commercial Viability and Perceived Opportunity	Commercial, Potential, High, Awareness	"Cocoa gives better returns than some traditional crops."
Theme 4	Operational Constraints and Risk Factors	Pest, Disease, Management, Issues	"Pests and lack of disease management make cocoa risky to grow."

Discussion

To supplement quantitative trends and provide deeper interpretative value, this study employed qualitative methods using semi-structured interviews with 25 purposively selected stakeholders, including cocoa farmers, agricultural extension officers, and policy implementation agents across key cocoa-producing states and emerging regions such as Assam. The interview schedule was designed with open-ended prompts to elicit rich, narrative responses related to cultivation practices, institutional support, market access, environmental awareness, and perceived challenges and opportunities within the cocoa sector.

All interviews were transcribed and thematically coded using NVivo software. A grounded thematic approach was adopted to identify recurring patterns, which were further organized into clusters using Latent Dirichlet Allocation (LDA)—a machine learning technique that model's topic frequency across textual data. This dual-layered method ensured both researcher-driven and data-driven insights, improving the credibility and analytical depth of the findings.

Five major coding categories emerged from the NVivo analysis: **Improved Agronomic Practices, Market Access Challenges, Lack of Institutional Support, Pest and Disease Management Issues, and Environmental Sustainability Awareness.** These categories were further grouped into four overarching thematic clusters, which are discussed below:

Cluster 1: Institutional and Agronomic Integration

This cluster encapsulated discussions around cultivation efficiency and the role of extension systems. Respondents frequently cited the adoption of grafting and drip irrigation, along with shade management under coconut and arecanut palms, as vital agronomic innovations. However, the effectiveness of these practices was often contingent on the availability of institutional support. Many farmers emphasized the lack of access to consistent agronomic advice and planting material, pointing to systemic gaps in knowledge dissemination and input provisioning.

"*Drip irrigation helped improve yields, but we only learned this through a one-time program—there's no regular follow-up or field assistance,*" noted a farmer from Andhra Pradesh.

Cluster 2: Policy and Sustainability Synergies

Several participants highlighted the growing relevance of sustainable farming methods and the gradual shift toward organic practices. However, the transition was hampered by limited policy incentives and low awareness. Where training programs had been implemented, participants reported moderate to high utility; nonetheless, uptake remained inconsistent across regions. The intersection between environmental consciousness and effective institutional support emerged as a crucial enabler for scaling sustainable cocoa practices.

"*We are willing to go organic, but there is no clarity on where to get certified inputs or training,*" explained an extension officer in Kerala.

Cluster 3: Commercial Viability and Perceived Opportunity

This theme captured stakeholders' perceptions of cocoa as a viable commercial crop. Cocoa was generally viewed as economically promising when cultivated as an intercrop under existing plantation systems. Respondents from both traditional and emerging regions acknowledged higher returns compared to certain seasonal crops. However, price volatility, lack of structured procurement systems, and weak market linkages were cited as barriers to scalability.

"The returns are good if you find the right buyer, but marketing is left to the farmer alone," shared a farmer from Tamil Nadu.

Cluster 4: Operational Constraints and Risk Factors

The final cluster brought to light widespread concerns regarding pest and disease management. Respondents reported frequent crop loss due to inadequate pest control knowledge and limited access to plant protection materials. Additionally, aging plantations and soil degradation were mentioned as structural constraints impeding long-term productivity.

"We lose crops to pests every season. No one tells us how to control them without harming the soil," stated a farmer from Kerala.

Overall, the qualitative analysis reveals a nuanced understanding of cocoa cultivation as situated within complex agronomic, institutional, and economic realities. While the potential for regional expansion, particularly in Assam, was recognized, it is contingent on a holistic policy framework that integrates training, input provisioning, sustainability incentives, and market facilitation. These thematic insights reinforce the argument that cocoa's future in India lies not just in expansion but in consolidation through strategic interventions that are both locally adapted and institutionally supported.

Discussion: Secondary and Primary Insights on Cocoa Cultivation in India

1. Insights from Secondary Data Analysis

The secondary data reveal an uneven but progressive expansion of cocoa cultivation in India, marked by yield-driven growth rather than land expansion. Andhra Pradesh's significant acreage, Kerala's efficiency and stability, Karnataka's agronomic optimization, and Tamil Nadu's volatility illustrate the diverse regional trajectories. However, India's increasing import dependence, despite production gains, exposes a structural weakness in value chain integration and post-harvest management.

These trends underscore the role of targeted institutional support, market linkages, and region-specific policy execution. States with dedicated cocoa schemes under earlier Five Year Plans and better access to planting material, credit, and training infrastructure saw stronger performance. Yet, the lack of export competitiveness and underutilization of newer regions like the North East point toward untapped potential and the need for inclusive cocoa development strategies.

2. Insights from Primary Qualitative Data (NVivo Analysis)

The thematic analysis of interviews conducted across Kerala, Andhra Pradesh, Tamil Nadu, Karnataka, and Assam adds essential nuance to the quantitative picture. Using NVivo, four key thematic clusters emerged: Institutional and Agronomic Integration, Policy and Sustainability Synergies, Commercial Viability and Perceived Opportunity and Operational Constraints and Risk Factors.

- Institutional gaps were consistently reported, especially around access to extension services, technical training, and consistent guidance post-planting. Even in states with high production, farmers highlighted the need for more localized, real-time agronomic support.
- There is growing interest in sustainable and organic cultivation, particularly in Kerala and emerging regions like Assam. However, poor access to certified inputs and training hinders widespread adoption.
- Cocoa's appeal as a high-return intercrop was evident across regions, especially under coconut or arecanut plantations. Yet, market risksincluding price fluctuations, absence of procurement structures, and lack of buyer assurance discourage scaling efforts.
- Pest and disease risks, along with aging plantations and soil fatigue, were also cited as major threats to long-term viability. Farmers expressed concern over the lack of low-cost plant protection solutions and advisory services.

Importantly, in Assam, interview responses reflected enthusiasm but also uncertainty. While early adopters reported satisfaction with productivity from genotypes like VTLC19, they also flagged issues related to delayed input supply, absence of processing units, and no guaranteed buyer systems. The planned "Chocolate Block" initiative offers hope, but its success will depend on follow-through in terms of infrastructure, institutional coordination, and sustained farmer engagement.

Synthesis and Strategic Implications

By triangulating secondary and primary findings, this study identifies key leverage points for scaling cocoa sustainably in India:

- Productivity gains must be complemented with quality post-harvest practices and domestic value addition to reduce import dependency.
- Extension services and input provisioning systems need to be decentralized and tailored to regional needs, particularly in new cocoa zones.
- Policy momentum like in Assam must be backed by long-term investment in farmer education, certification, market infrastructure and industry linkage.
- Finally, the commercialization of cocoa in non-traditional regions should be embedded in agroforestry models that safeguard ecological integrity while enhancing rural incomes.

Conclusion

This study offers a comprehensive examination of cocoa cultivation in India, combining historical insights, regional performance data, and qualitative field-based evidence to present a nuanced understanding of the sector's growth trajectory and sustainability challenges. While traditional cocoa-producing states such as Kerala, Andhra Pradesh, and Karnataka have made significant strides—demonstrating improvements in productivity, agronomic efficiency, and partial market stabilization—systemic issues such as post-harvest infrastructure gaps, yield volatility, and limited extension support continue to hinder optimal sectoral performance.

The emerging prospects of cocoa cultivation in Assam and other North Eastern states highlight the untapped potential of agro-climatically suitable yet institutionally underserved regions. Pilot trials in Assam indicate promising genotype performance and farmer engagement, but the transition from pilot to commercial success will depend heavily on targeted interventions. These include robust extension mechanisms, dedicated procurement systems, infrastructure for post-harvest processing, and sustained policy support that aligns with regional agro-ecological realities.

The study reinforces the argument that scaling cocoa cultivation in India—especially in non-traditional zones—must go beyond land expansion. It requires a holistic strategy integrating agronomic innovation, institutional facilitation, market connectivity, and region-specific policy frameworks. Assam, with its ecological advantages and rising institutional interest, could emerge as a strategic growth zone in India's cocoa economy if these interventions are delivered in a timely and coordinated manner.

Future research could further explore the socio-economic impacts of cocoa adoption among smallholders in the North East, including its role in enhancing rural incomes, promoting agroforestry systems, and contributing to climate-resilient agriculture.

Scope for Further Study

While this study provides valuable insights into the regional dynamics and emerging potential of cocoa cultivation in India, particularly Assam, several avenues remain open for future research. Longitudinal studies are needed to assess the economic returns and livelihood impacts of cocoa adoption among smallholder farmers, especially in the North East. Further research should also examine the integration of cocoa within agroforestry systems and its ecological benefits under diverse climatic conditions. In-depth evaluations of post-harvest infrastructure, market linkages, and gender-based participation in cocoa value chains can enrich policy and institutional frameworks. Moreover, experimental trials focusing on genotype-environment interactions and adaptive agronomic practices in non-traditional zones like Assam will be essential to inform scalable, sustainable expansion strategies.

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CULTURAL PATHWAYS TO SUSTAINABILITY: TRADITIONAL CLEANLINESS PRACTICES AND COMMUNITY-LED GOVERNANCE IN MANIPUR

Ningthoujam Irina Devi

Abstract

Traditional knowledge reflects the cultural ethos of communities and is typically transmitted orally across generations. Such knowledge—comprising beliefs, customs, and practices—plays a vital role in promoting health and hygiene, particularly through cleanliness rituals. In the global pursuit of Sustainable Development Goals, especially SDG 6 (Clean Water and Sanitation), the significance of culturally rooted hygiene practices is increasingly recognized. Cleanliness, when embedded as both a personal discipline and a collective responsibility, becomes a cultural asset. Yet, cultural dimensions are often marginal in mainstream development discourse, despite being integral to people's capabilities and well-being, as emphasized by Amartya Sen. This paper seeks to explore how cleanliness practices are orally transmitted among the Meitei community of Manipur through ethnographic insights and secondary sources. The Meitei tradition reveals a deep integration of hygienic practices within both household and community settings. However, state policies have largely overlooked these indigenous systems, often failing to protect them from the homogenizing forces of the market economy. By highlighting the ingenuity and sustainability of Meitei practices, this study advocates for their preservation and calls for integrating traditional knowledge into contemporary sanitation and development policies. This approach provides pathways to harmonize cultural heritage with modern sustainability frameworks.

Keywords: traditional knowledge, community norms, brooms, cleanliness

Introduction: Sustainable Cleanliness Practices and Governance

Cleanliness refers to both the state of being clean and hygienic—free from germs, dirt, trash, or waste—and the habit of maintaining that state. It is achieved through regular cleaning and sanitizing. Cleanliness and good health are closely interconnected, with positive impacts on social and economic outcomes that enhance overall human well-being.

Sanitation encompasses both personal and public hygiene, reflecting a community's collective efforts to maintain cleanliness. Personal sanitation includes menstrual hygiene management, household toilet maintenance, garbage disposal, and individual hygienic behavior. Public sanitation involves waste collection, transfer, treatment, and disposal; maintenance of drains, streets, schools, public toilets; and the management of sewer systems and treatment plants.

Sustainable cleanliness in sanitation and hygiene refers to practices that promote safe and healthy living conditions while minimizing environmental impact and improving resource efficiency. It covers waste management, water resources, and hygiene practices with the ultimate goal of safeguarding public health and the environment. The absence of such practices leads to the spread of diseases and exacerbates human insecurity.

The importance of cleanliness and sustainable sanitation is underscored by the United Nations Sustainable Development Goals (SDGs), adopted in 2015. India, as a signatory, has committed to these goals through domestic implementation, especially in alignment with Universal Health Coverage as defined by the World Health Organization (WHO). SDG 3 (Good Health and Well-being), SDG 6 (Clean Water and Sanitation), and SDG 12 (Responsible Consumption and Production) are particularly relevant, with targets set for 2030.

The Brundtland Commission's (1987) definition of sustainability—"development that meets the needs of the present without compromising the ability of future generations to meet their own needs"—underpins the SDG framework. This is further supported by four key pillars: economic, environmental, social, and cultural sustainability. Together with the broader guiding principles of People, Prosperity, Planet, Peace, and Partnership, these pillars promote holistic development and long-term well-being.

Achieving sustainable well-being can also be understood through Denhardtian "co-governance," which emphasizes state–citizen partnerships. Public Service Logic theory (Osborne et al., 2013, 2015; Osborne, 2021) supports this model, integrating insights from public service delivery and marketing. This participatory governance framework

values community strengths and views communities as key actors in promoting sustainable livelihoods and social well-being. Urban development literature echoes this sentiment: "The long-term strategic needs of the city for sustainable development and economic prosperity cannot be separated from the need to involve citizens at all levels of society in innovative ways of fashioning and participating in urban development processes." Communities contribute beyond formal economies, engaging in informal and social economies that draw upon human creativity. This approach fosters a more democratic, localized, people-centered, and ecologically sustainable system.

Culture plays a dual role here: as a domain of intrinsic value—where art and tradition are valued for their own sake—and as a set of beliefs and practices that can support or constrain development (Throsby, 1995).

Against this backdrop, this paper explores traditional cleanliness and hygiene practices of the Meitei community in Manipur, a state in northeast India. It examines how culturally rooted practices can enrich public policy, enhance well-being, and strengthen social cohesion. The study is based on secondary literature and insights from the author's lived experience and community narratives.

Community Role in Achieving SDGs in Manipur

The northeastern states of India—Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura—have actively engaged in the localization of SDGs. Vision documents for SDG implementation were released as early as 2016 in Assam, followed by Manipur in 2019, and Nagaland in 2021.

Preceding the SDGs, the North Eastern Region Vision 2020, launched in 2008, emphasized self-governance and participatory development as cornerstones of regional progress. As noted in Vision 2020:

"While designing local planning approaches, care must be taken to harmonize the functions and rights of traditional tribal self-governing village institutions such as the Syiemships and Dorbars of the Khasi hills of Meghalaya, the Kuki-Impi of the Kukis in Manipur, the Clubs of the Manipur valley and peoples' organizations of various tribes in Nagaland, with institutional mechanisms designed for modern development and service delivery."(NER Vision 2020, Vol. 1, pp. 18–19)

According to the NITI Aayog, MDoNER, and UNDP's NER SDG Index Report 2021–22, Manipur ranked fourth among eight northeastern states. This ranking, based on 84 indicators and 50 targets across 15 SDGs, evaluated the performance of 120 districts in the region.

Manipur is home to a diverse population, including Meiteis, Nagas, and Kukis. Rich in natural resources—forests, rivers, and minerals—the state's forests and tree cover span 77.2% of its geographical area, providing livelihood to many ethnic groups. However, Manipur faces serious development challenges: political instability, ethnic conflicts (e.g., the 2023 clashes), inadequate infrastructure, weak governance, limited market access, and over-dependence on centrally-sponsored welfare schemes. The state ranked lowest in the Government of India's Good Governance Index 2020–21.

Manipur's healthcare system also suffers from a declining number of primary sub-centers, doctor shortages, and heavy reliance on out-of-pocket expenditure. This paper aims to explore how traditional Meitei practices of cleanliness might offer community-driven solutions to address such systemic challenges.

The Meitei, comprising about 53% of Manipur's population (2011 Census), are the largest non-tribal ethnic group, mainly residing in the Imphal Valley, while the hill regions are inhabited by tribal communities.

Cleanliness and Sanitation among the Meitei in Manipur

The traditional Meitei home, known as Yumjao (see Fig. 1), is more than a dwelling—it is a sacred space deeply rooted in religious and cultural life. Guided by the principles of Yumballon—the art of household and family management—cleanliness is central to Meitei cultural and spiritual identity. Daily bathing before meals and regular cleaning of the surroundings are common household routines.

This emphasis on physical, mental, and environmental harmony has historical validation. British ethnographer R. Brown (1873) noted the general cleanliness of Meitei habits, including the use of traditional shampoo and hair care practices by women. Though he described the use of fermented rice water as hair rinse as potentially odorous, he acknowledged that most women removed the smell through thorough washing.

In *The Statistical Account of Manipur*, R. Brown wrote: "In their habits generally the Manipuris are cleanly, and they bathe their bodies frequently. The women have a disagreeable habit of cleaning their hair with putrid rice water which, if not carefully removed (which usually is), leaves a very offensive smell. Their houses are kept clean." (Brown, 1873, p. 57)

Similarly, T.C. Hudson (1908) praised the community's hygienic standards: "The Manipuris far surpass the people to the west in the cleanliness of their garments."

Such historical accounts highlight how Meitei cleanliness practices were recognized and respected even by colonial observers. These practices, deeply interwoven with cultural values, continue to offer a resilient foundation for community-led health and sanitation efforts in Manipur today.

Fig 1: Traditional Meitei Yumjao

These traditional knowledge embodies the cultural values of a community which is passed (mostly orally) from one generation to another. Material culture is the sum total of objects or belongings of a group while non- material culture reflects their ideas, attitudes and beliefs, knowledge and customs. According to Tylor, culture is —That complex whole which includes knowledge, habit, art, moral, law, custom and other capabilities acquired by man as a member of society‖ (cited by Yogesh Atal, 2012:66). Such beliefs, practices and customs of people related to cleanliness matters in improving the health of indi iduals and sanitary aspects of the environment. Such practices if sustained and promoted can plays a role as a driver and enabler of development since the cultural and creative industries that produce cultural goods and services can generate growth, income, employment, etc.

This paper will try to study such tools and means of maintaining cleanliness like broom and the traditional shampoo chinghee and traditional sanitising herbs and how they are being sustained in the present days.

Brooms –Shumjit: Traditional broom locally known as Shumjit, are produced from different plants available locally and from the hill districts of Manipur. There are different types of brooms based on its uses and purposes in household sanitation process. One positive reflection is in the use of various types of brooms tailored to specific cleaning purposes and still in use because of its affordability, accessibility, and versatility.

1.Yumgi Shumjit: This broom is use for cleaning all the spaces of the house besides the cooking area like all rooms and verandas. It is made of broom grass (Thysanolaena) tighten with bamboo ropes or with some rubber ropes.

2.Chakhum Shumjit: This broom is use for cleaning the kitchen cooking areamade of hay and shorter in structure, half the size of commonly use house broom. During cooking and after cooking whenever required this broom is use to clean the cooking area. However anybody without taking bath or anyone restricted to access the kitchen cannot touch this chakhum Shumjit-for example family women during their menstrual cycle.

3.Uurom Shumjit: This broom is use for cleaning the compounds or surrounding of the house made from the stems of Sida acuta (broom weed). Its stems are fibrous and tough, making them suitable for broom making.

Usually in Meitei tradition, from all these above broom, a gendered role can be seen with Uurom Shumjit as this is use more by man to clean its surrounding symbolically signifying that outside space to man. Usually the other two brooms are use by women members of the house.

This division of labour subtly reinforces the gendered boundary between the interior (female-associated) and exterior (male-associated) domains in Meitei culture. This cleanliness with time becomes associated with the notion of purity and impurity within the community affecting the socio-cultural dynamics with others communities as well.

Traditional Chinghi: In many traditional Meitei homes—particularly in rural areas—a pot containing Meitei sticky rice-washed water, locally known as Chinghi Chafhu, holds more than just a household remedy. It is the base of Chinghi, a traditional herbal shampoo revered for its natural hair-care benefits and cultural significance. It is prepared by boiling this sticky rice-washed water with a blend of fragrant, medicinal herbs native to the region. Some of the commonly used herbs include: Yengsil, Yenpat Shangbrei Mana, Nashik Mana ,Lalukok Chorot, Khongja Napi. The resulting concoction forms a gentle, herbal shampoo that has been widely used by the Manipuri Meitei community. Traditionally, it is believed to nourish the scalp, promote long and black hair, and even calm the mind, making it a holistic part of self-care.

Despite its longstanding usage and the observable benefits reported by users, scientific documentation on the preparation and effectiveness of Chinghi remains limited. Scholars such as A. Ibeyaima, I. P. Sarethy, and A. Phurailatpam (2022) have pointed out the need for in-depth research into this traditional practice. Understanding its chemical composition, verifying its efficacy, and preserving its preparation methods could open doors to larger-scale applications and public use.

Recognizing its potential, local entrepreneurs have begun transforming Chinghi into commercial products. Startups such as Ima Chinghee and MadhabiGi Fermented Rice Water Shampoo are leading the way in bridging traditional knowledge with modern cosmetic innovation. These brands aim to preserve the cultural roots of Chinghi while introducing it to wider markets.

Chinghi is more than just a shampoo—it's a testament to the deep relationship between indigenous knowledge and sustainable living. As interest in natural and eco-friendly hair care products continues to rise globally, Chinghi has the potential to become a symbol of traditional wisdom meeting contemporary wellness. However, for this transformation to be sustainable and respectful, it is crucial to invest in research, ethical sourcing, and community involvement. By doing so, this age-old tradition can not only be preserved but also celebrated and shared with the world.

Traditional practice of sanitisation using 'Khoiju-Leikham' leaves: In the rich ceremonial traditions of the Meitei community of Manipur, sanitisation is deeply intertwined with ritual and symbolism, particularly during moments of birth and new life. One such practice involves the use of sacred smoke generated from the leaves of Khoiju (Ternifolius D. Don) and Leikham (Goniothalamus sesquipedalis). During the welcoming rituals for newborn babies, a small earthen plate known as a 'Kambi' is used to burn the dried leaves of Khoiju and Leikham. The aromatic smoke that arises serves a dual purpose:

- Sanctification of the delivery room
- Purification of the pregnant mother and new-born

This fumigation ritual is believed to cleanse the environment of negative energies, pathogens, and impurities, ensuring a safe and sacred space for both mother and child. It reflects an intuitive understanding of air purification through plant-based antimicrobials, long before the modern science of disinfection. Both Khoiju and Leikham leaves are valued not only for their cultural relevance but also for their medicinal properties. These plants are known in traditional herbal systems to have antibacterial and antiviral effects, aligning with their use in postpartum sanitisation. This practice highlights how the Meitei community blends ritual, health, and ecological wisdom—creating a tradition that's both spiritually meaningful and scientifically insightful.

Besides the above practices, traditionally, Meitei had use firewood ashes and charcoal ashes as natural scrub for cleaning utensils. Seasonal purging—where homes and surroundings were thoroughly cleaned—often took place during the lunar new year (Cheiraoba), signifying renewal and health.

Cleanliness innovation and Public Policies to Market: Potential and challenges

The rich tapestry of traditional knowledge and sustainable social practices in Northeast India is gaining renewed recognition, not just as cultural treasures, but as viable, scalable models for commercial enterprise. With the rising focus on inclusive and grassroots-led growth, both central and state governments are investing in these innovations through targeted schemes and funding support.

One of the initiatives is Prime Minister's Development Initiative for North East Region (PM-DevINE) announced in the Union Budget 2022-23 as a new Central Sector scheme with 100% Central funding to create livelihood for youth and women in the region. This scheme is implemented by North East Center for Technology Application and Reach and they have successfully supported technology-driven development by supporting innovation, entrepreneurship, and sustainable solutions. Projects like Yoga Mat made from Water Hyacinth; Saffron (KESAR) farming in North-East India, etc are some of the successfully funded and supported.

We also have Pradhan Mantri Van Dhan Yojana, a program run by the Tribal Co-operative Marketing Development Federation of India Limited (TRIFED) under the Ministry of Tribal Affairs which aims to improve the livelihoods of tribal communities by promoting entrepreneurship and enhancing market access for minor forest produce (MFPs).

TRIFED plays a role in promoting and supporting the production of hill brooms and other tribal products. Accordingly, they promote Kamjong district in Manipur as producer of hill brooms and are a source of livelihood for local tribal communities but also represent an untapped branding and export opportunity. Interestingly, these locally made brooms are available in Imphal for ₹100 for four pieces, sold by street vendors[1]. And according to the local vendors, due to the ongoing conflict of Meitei-kuki since 3rd May2023, the valley based Meitei vendors are not able to procure the hill broom grass. In contrast, the same type of broom, when packaged and branded by Milton (manufactured by Hamilton in Kamrup, Assam), sells for ₹210 in urban retail stores—highlighting the massive profit in the value addition and branding of tribal products. Similarly northeast region has under Invest India we have One District One Products policy where a product can be supported and imported commercially with government support to another corporate commercial marketing chain.

Conclusion

There are indeed concerns in Northeast India, including Manipur, regarding the appropriation and commercialization of indigenous knowledge and traditional practices without proper acknowledgment, benefit-sharing, or consent from the original communities. This reflects some of the ideas raised by Vandana Shiva, who critiques how corporations and institutions sometimes extract and patent traditional wisdom—from seeds to medicines—without recognizing the communities that nurtured them. Otherwise the paper has shown that Meitei traditions emphasize respect for the environment and a sustainable way of life, which can be valuable for addressing current environmental concerns. A cleanliness practices which often involve community participation, fostering social cohesion and a sense of shared responsibility. Traditional practices may include natural remedies and hygienic methods for maintaining health, potentially complementing modern medical approaches. Cleanliness rituals and practices are often intertwined with cultural ceremonies and beliefs, helping to preserve Meitei heritage.

However there are challenges to Traditional Cleanliness Practices with rapid development and urbanization leading to changes in lifestyle and a decline in traditional practices, potentially impacting cleanliness standards. The way forward is Integration, Recognition, and Respect of the local culture. This includes:

- Documenting and legally protecting traditional knowledge systems.
- Educating younger generations on the relevance and science behind these practices.
- Supporting community-led entrepreneurship with proper branding, marketing, and profit-sharing.
- Encouraging collaboration between traditional knowledge holders and modern scientists, allowing innovation to emerge with respect.

By embracing a holistic approach that recognizes the value of both traditional wisdom and modern advancements, it is possible to ensure the sustainability of Meitei cleanliness practices while addressing the challenges posed by modernization and environmental degradation. It's not just about reviving old practices, but about reimagining them for the future with dignity, justice, and sustainability at the core.

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DISCOVERY OF THE SELF: A KRISTEVAN READING OF LALRAMMAWIA NGENTE'S "SPIRIT KAWN"

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Self-discovery in Literature

Self-discovery, or discovery of the self; is an analytical term that refers to the process of understanding, or study of one's identity, values, desires, belief and affirmation of purpose (Cambridge, 2025) . It typically involves an individual's inward journey, often catalyzed by external circumstances such as conflict, trauma, societal expectations or displacement, through which hidden fears, contradictions, or suppressed truths within are confronted in the progression of the narrative. This confrontation is not merely psychological, but also deeply ethical and existential, as the characters are shown to be navigating their places in the world, as well as the meanings of their experiences.

In literature, M.H. Abrams identifies the significance of self-discovery as a relevant motif in the Bildungsroman and romance traditions; where characters confront and journey into the unknown, both literal and metaphorical, to ultimately emerge transformed (Abrams, 2009). Such narratives not only chart the character's personal growth, but reflect broader philosophical inquiries into autonomy, morality, and the essence of selfhood. Notable classic examples are Charlotte Bronte's Jane Eye where the titular character progresses from an orphaned child to a self-assured, independent and morally resolute woman, where emotional trials, moral dilemmas and personal resistance to patriarchal control is a key component marking her path to integrity. Similarly, in A Portrait of the Artist as a Young Man by James Joyce; the protagonist Stephen Dedalus rejects both religious dogma and nationalist expectations and through this, he forges a new artistic and intellectual identity through rebellion. Through these varied examples, literature is reflective of how self-discovery could emerge through vastly different experiences whether in the form of emotional resistance, ideological rebellion, cultural dislocation, or even tragedy, demonstrating that the search for selfhood is a universal literary concern. Abrams further discusses through his analysis of chivalric romance how it is not just a theme, but a structural axis around which many literary plots revolve by stating how it is inherently featured in the romance narrative structure, applicable both as a literary theme and a philosophical pursuit, therefore rendering it as not only a narrative device, but also reflective of human consciousness (Abrams 190-192).

Self-discovery through Abjection

Julia Kristeva, widely recognized for her work on the concept of "abjection" is a Bulgarian-French philosopher, psychoanalyst, linguist, and influential feminist thinker. In her seminal work Powers of Horror: An Essay on Abjection (1982, originally Pouvoirs de l'horreur), Kristeva defines abjection as a psychological and symbolic process by which the human subject defines and protects the boundaries of the self by ejecting what is perceived as impure, threatening, or disturbing. However, the abject is not simply stigmatized into pure bad, or evil; but perceived as an inconvenience which disturbs system, order, and identity. (Kristevap. 4)

Furthermore, abjection exists between the subject and the object, what is abject being often both repulsive and alluring. This is a notable factor in exploration of identity construction and self-discovery through rejecting perceived impure, foreign, or disturbing to the subjects. Kristeva further explains,

Abjection preserves what existed in the archaism of pre-objectal relationship, in the immemorial violence with which a body becomes separated from another body in order to be. (10)

Kristeva conceptualizes abjection as a psychological process through which the subject forms identity by expelling what is perceived as impure, defiled, or threatening to the coherence of the self. It goes beyond simple rejection; but abjection is a necessity to purge the 'other within' – a mechanism by which boundaries are drawn between self and non self, the sacred, and the profane.

In literature, characters who encounter the abject, manifested through death, trauma or bodily disruption and the like, often undergo a profound reconfiguration of selfhood. The theme of self-discovery, in such instance typically unfolds as an inward journey, marked not only by clarity or order, but by fragmentation and complexity. This transformation rarely follows a linear or purified path, but rather it demands a confrontation with what society and the individual have rejected or suppressed. Viewed through the lens of abjection, such moments reveal the psychological and existential ruptures that catalyze the emergence of new, albeit destabilized identity. Abjection is the reaction to a breakdown in meaning caused by the loss of the distinction between self and other, inside and outside: "what does not respect borders, positions, rules." (4)

It is a common trope in literature for abjection to manifest itself through imagery of death, bodily fluids, madness, trauma, cultural location, or other experiences which unsettle the subject's sense of coherence. The paradox therefore lies in how these moments of destabilization become the very crucibles through which a deeper sense of self becomes discovered (Duschinsky, 2013). It is an argument for this essay therefore, in locating that self-discovery, when theorized through abjection, is a process of confronting the rejected or un-assimilable aspects of the self and the world, resulting in a fragmented, but authentic subjectivity.

Kristeva's theory is rooted in psychoanalytic semiotics, where abjection is not merely about disgust, but a psychic necessity for the constitution of the subject. The abject is manifest when she states, "I expel myself, I spit myself out, I abject myself within the same motion through which 'I' claim to establish myself." (Kristeva3).

Noel Carroll prominently articulated in his influential book The Philosophy of Horror: Or, Paradoxes of the Heart (1990) a parallel pattern to Kristeva by examining the nature of horror from the perspective of self-discovery, where objects of horror such as monsters are embodiments of aspects of the self that must be confronted, such as existential fears of emptiness, repressed desires or guilt, past actions or suppressed identities which is also relevant in this study. By confronting these symbolic figures, protagonists of narratives engage in a process akin to abject self-discovery and reconstitute the self through the encounter with what has been othered or repressed.

Whether in the introspective solitude of modernist texts, or the rites of passage in young adult fiction, etc, the theme of self-discovery continues to resonate. It is, in essence, a universal motif, deeply shaped by context, culture and theory. By tracing the self's emergence in literature, we not only analyze character arcs, but we also reflect on the evolving nature of human identity itself.

In the Mizo context

Mizoram, a north-eastern state of India, is renowned for its distinct ethnic identity, cultural practices and social cohesion. Through its multi-dimensional characteristics pertainingto history and religious transformation, tradition and modernity is seen to co-exist; its most significant social transformation being the advent of Christianity in the late 19th century. S.M. Bekker states and emphasizes upon how for the Mizo community, Christianity is not merely a faith but an institutional framework that has redefined education, morality and civic life (Bekker, 1986).

The introduction of Christianity to the region led to the decline of animistic and pagan worship. Most prominently, the community has as a result rejected under the lens of religion, the prominent cultural traditions and manners, notably among these being a stigmatization of alcohol and alcoholism which has become a relevant testimony of the Mizo society as not static but evolving through negotiation or adaptation as well as rejection whilst maintaining its identity in India's diverse cultural mosaic. Adoption of Christianity can also be stated as a significant moment of cultural and spiritual self-discovery, the conversion not being just a change in belief systems, but a deeper re-evaluation of values and ethics as well.

This redefinition signifies how the community actively reconstructed its moral compass, aligning communal ethics with new religious values. Stigmatizing alcohol and emphasising upon education exemplify this ethical reorientation which is resonant with the internal trials faced in literary self-discovery narratives. Kristeva states, "abjection preserves what existed in the archaism of pre-objectal relationship, in the immemorial violence with which a body becomes separated from another body in order to be."
(Kristeva10)

This can be mapped into Mizoram's transition from the primitive past to a Christian moral and institutional self-discovery. Abandoning certain traditional practices and beliefs once central to Mizo identity can be seen as an act of collective abjection whereby older beliefs were cast out as impure or morally suspect in the light of the new Christian worldview.

Kristeva's theory allows us to read Mizo society's transformation as more than historical, but also a psycho-cultural process of self-discovery through abjection; shedding elements of their pre-Christian past, engaging in cultural individuation.Conveniently, this mirrors the internal tension and transformation seen in literary narratives of self-discovery where protagonists must first confront and reject the undesirable aspects of the self or the past to progress.

Self-discovery and Abjection in Spirit Kawn

The short story "Spirit Kawn" (RamhuaiLiamkawn) is a relevant work of Mizo literature written by Lalrammawia Ngente, a prominent Mizo writer and academician. Originally written in Mizo and translated into English, the story itself employs the narrative style of suspense-building for the reader and provides an unexpected twist which leads the reader to primarily focus upon its possibility for popular appeal and entertaining qualities more than its thematic or introspective factors as is obvious in its narrative style of humour. However, a critical and analytical study also opens up a wider possibility of theoretical interpretations. In Mizo, 'Kawn' refers to a street junction, and in folk traditional belief, Spirit Kawn is a junction, a meeting, or passing place of spirits, or 'Ramhuai' where they either manifest among themselves or to unsuspecting mortals.

The story narrates the incident of supposed spirits encountered in the lives of a couple, Pi Ɒawli and her husband Pu Ngura, but primarily by Pi Dawli during the evening hours while her husband was usually out in his constant alcohol indulgence and playing cards with his friends. These "spirits" manifest through strange sounds like heavy breathing, sounds of walking and muffled talks, and Pi Dawli, being too scared to go and verify, usually was forced to bear it out in her husband's absence. These ramhuai became a source of constant terror for the wife, but coincidentally, these sounds ceased or are altogether absent whenever her husband was in the house, returning home usually from a bout of binge-drinking. Little by little, the circumstances began to evoke suspicious thoughts in the mind of Pi Dawli, especially in her observance of her husband's manners and behaviour.

For the time being she continued to be indiscreet as far as her husband was concerned, but nevertheless dropped subtle hints how alcoholics are more prone to viewing these ramhuai directly than those who never drank. In retaliation, her husband jibed her back on her religious Christian devotion and vehement prayers, rejecting at every possible instance her attempts to reform him to the renewed Christian faith through Gospel camps and sermons which are usually hits and misses. But eventually, towards the end of the tale, as Pi Dawli continued to guilt-trip her husband, stating in subtlety how they themselves just might be the cause of their sufferings by encouraging these ramhuai through some erroneous behaviour of theirs; even stating as far as giving warning that some calamity or tragedy might befall upon them as a result of their misbehaviours; a religious and spiritual effort of Pi Dawli to reform her husband bore fruit in the form of a passionate religious transformation and prayer, making him a new and reformed man.

A close verification of their premises also revealed shocking evidence of the "ramhuai's" activities like , vandalism desecration of their domestic chickens, and even evidences of brewing Zu (Mizo rice-beer) on the sly, which have all been revealed from the darkness of mystery, to the light of discovery and impending reformation. Likewise, the religious influence that had so enormously steeped its way into Mizo culture and society is also greatly evident as a narrative factor in the story. At the very end, Pi Dawli stated, "The ramhuai that stole our pot and had a penchant for losing his shoe has now attained salvation", suggesting through this declaration that the adversary had not been an external force, but one that had stemmed from within, but has now been conquered in a spiritualistic fashion.

In the story, the ramhuai represent a folk embodiment of the abject, an intrusive force which disturbs Pi Dawli's domestic peace and her religious identity, challenging the integrity of both her mind and her faith. They are not seen directly, but manifest through disembodied sounds such as heavy breathing, footsteps and whispers; bodily cues associated with presence and vitality, but presented in a ghostly, non-corporeal manner blurring boundaries between body and spirit. This aligns with Kristeva's identification of the corpse or ghost as the ultimate abject: "The corpse... is the utmost of abjection. It is death infecting life." (Kristeva, 1982, p. 4) The Spirit Kawn becomes a metaphorical site of abjection (a crossroads) where boundaries between the visible and invisible, sacred and profane, as well as self and other are violently transgressed.

Furthermore, abjection is deeply embodied and moral, expressed through Pu Ngura's alcoholism. His drunken state creates an ethical and psychological rupture in the household and becomes the source of disorder. His physical presence correlates with the absence of spirits suggesting that the haunting is not external but internal: his own behavior and moral decay. This is especially relevant to Kristevan abjection as internalized otherness, the parts of ourselves which we refuse to acknowledge, yet which resurface as threats to our identity. Pu Ngura's denial of his vices and his ridicule of his wife's faith signify a refusal to confront the abject within himself until he undergoes a moment of self-recognition and spiritual transformation. Pi Dawli in contrast, attempts to repress and expel the ramhuai through prayer and religious devotion, adhering to the Christian moral order. Her insistence on gospel camps and sermons is a form of moral purification, a symbolic attempt to cleanse the household of spiritual impurity. But important is the fact also that she subtly realizes that the spirits, or ramhuai, may not be external. When she states "we ourselves just might be the cause", it marks a moment of introspective confrontation with the abject.

This moment, where the blame shifts from external forces to internal flaws, is crucial. It reflects the abjection of guilt, addiction and moral failure, initially projected into spirits; being reintegrated into consciousness. Pi Dawli's spiritual work is thus a form of abject processing, wherein both she and her husband are forced to reclaim and purify what has been disavowed.

The final line referring to Pu Ngura's salvation is a satirical, yet profound acknowledgement that the spirit was never external, but his own abject self who is now reformed. Here, the abject other is symbolically reintegrated into the self. The threat has been confronted, named, and neutralized through spiritual redemption, a process which solidifies how identity is constructed through the negotiation with what one expels.

Pi Dawli's experience in the story can be seen as a psychological journey into the unknown, where she transitions from being a passive observer of her husband's spiritual deterioration to an active agent in his redemption. Initially rooted in disbelief and social conformity, her moral compass evolves as she becomes attuned to the emotional undercurrents surrounding her husband's condition. The haunting presence of the ramhuai acts as a trigger for abjection, destabilizing her sense of normalcy and forces her to question the boundaries between the rational and the supernatural. Through this, she moves closer to self-discovery. Her journey is not just about understanding her husband's predicament, but reassessing her own assumptions and fears as well as emotional resilience. She embodies a nurturing and mediating force between the known and the unknown, and her engagement with her faith symbolizes her acceptance of the irrational and the abject, not for rejection; but for integration. In this way, she discovers a deeper moral strength and capacity for love which transcends ordinary domestic existence.

Pu Ngura's trajectory is a more direct embodiment of abjection because his alcoholism and erratic behavior represents a breakdown of social and personal identity, collapsing into a space where he no longer adheres to communal norms or rational thoughts. In this case, the ramhuai also acts as a spiritual or cultural representation of suppressed guilt, symbolizing the abject force that was initially denied but now violently returns to demand recognition. In this case, the ramhuai is not merely a ghost or spirit but a projection of his fragmented self, a part of him that he has pushed away through intoxication and denial. It thus becomes psychological and existential; his failure to reconcile with his inner demons leading to alienation from society / family and self. However, as his wife intervenes through her prayers (which also serve as communal rites of purification and reintegration), PuNgura begins to recover. The spiritual ceremony acts as a symbolic purge of the abject; an attempt to cast out the foreign body (the ramhuai) and allow for personal transformation. His eventual healing is not simply spiritual deliverance, but a narrative of reclaiming identity through confrontation with the abject past. In doing so, he reintegrates into his family and community with a renewed self-awareness.

Conclusion

"Spirit Kawn" therefore is effectively narrates and ties self-discovery to abjection, not as a destructive force; but as a necessary passage through which the protagonists reclaim lost parts of themselves. Pi Dawli discovers emotional strength through her engagement with the irrational, while Pu Ngura undergoes a painful, but transformative confrontation with the abject aspects of his identity. The ramhuai that terrorizes them is not a folkloric entity but a metaphor for the return of the repressed, catalyzing self-awareness and healing, which aligns with the view that abjection is integral to the formation of subjectivity. The story affirms that true self-discovery often requires passing through the dark, repressed, and terrifying for the emerging of a more integrated, holistic identity.

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EXPLORING GEOTOURISM IN SOUTHERN MIZORAM: OPPORTUNITIES AND CHALLENGES FOR SUSTAINABLE DEVELOPMENT

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Abstract

Geotourism has emerged as a significant option in ensuring sustainable rural development in places like Mizoram, rich in unique culture and environment, but not yet fully developed. The three southern districts of the state, Lunglei, Lawngtlai, and Siaha, have diverse geosites, but these regions remain neglected in both research and tourism. The study addresses the research gap by exploring the status of geotourism in the region, along with its opportunities and challenges. By using a mixed-methods approach, primary data were collected from 245 respondents settled nearest to the 35 geosites identified. The results indicate that geotourism is an alternative source of income for locals, andthe districts' tourism business accounts for almost 16.73% of it. However, challenges such as poor road conditions, a lack of awareness among the local communities, seasonal access, and low investment from the government persist. It emphasises that it is necessary to develop infrastructure, promote the regions with communities and use inclusive planning to follow the Sustainable Development Goals (SDGs 2 and 8). The study highlights that, by solving this issue, southern Mizoram could attract many tourists and support poverty reduction, alternative sources of livelihoods, and sustain its rural economies.

Keywords: Geotourism, Sustainable development, Geosites, Southern Mizoram

Introduction

The world tourism sector represents the third-largest export category, comprising 7% of global trade (UNWTO, 2020). National Geographic, United States, characterised geo-tourism as "Tourism that sustains or enhances the geographical character of the place being visited, including its environment, culture, aesthetics, heritage and the well-being of its residents"(Hose, T. A., 1996). The projected worldwide growth in geotourism highlights the need for enhanced knowledge and comprehension of its diverse implications. The 2017-2018 Annual Report of the Geotourism Standing Committee of the Geological Society of Australia defines geotourism as a visitor experience that emphasises geological and landscape features to enhance public engagement, learning, and enjoyment (Robinson et al. 2018).

Geotourism, which emphasises geological and landscape features as tourist attractions, has emerged as one of the fastest-growing market segments in tourism over the past decade (Ólafsdóttir, R., 2019). Domestic tourism, such as inbound tourism, is becoming a crucial catalyst for economic growth. According to the Ministry of Tourism (MOT) 2023 annual report for 2023-24, India registered Foreign Tourist Arrivals (FTAS) of 9.24 million from January to December, reflecting a growth of 43.5% compared to the same period the previous year. The annual tourism data for 2023-24, published by the Mizoram Tourism Department, shows that 2,15,265 domestic tourists and 3,884 foreign tourists, a total of 219,149 visitors, arrived in the state. Despite the presence of several potential tourism geosites in southern Mizoram, such as picturesque lakes, waterfalls, sanctuaries, and mountainous landscapes, these remain unsustainable because of inadequate transportation and communication infrastructure.

Consequently, socioeconomic and tourism growth could not materialise in this region. No tourism-related work was conducted, particularly in the southern region of Mizoram. This region has diminished inventive activity and economic development compared to other Mizoram districts. It is essential to investigate and study geosites, analyse numerous aspects, and provide strategies for the sustainability of tourism, as SDG 8 (target 8.9)

mandates the formulation and execution of policies by 2030 to foster rural sustainable tourism that generates employment and enhances local culture and products. Rural geotourism in southern Mizoram may enhance local revenue and contribute to the attainment of SDG 2, which seeks to eradicate hunger. Therefore, this study analyses how the opportunities and challenges of geotourism are influenced by the foundational tourism facilities and amenities. This research will explore household surveys and assess whether underlying variables determine livelihood and geotourism development.

Study Area

The study area encompasses three districts, Lunglei, Lawngtlai, and Siaha, all in the southern region of Mizoram. Its geographical location lies between 21°58' N and 23°28' N latitude and 92°18' E and 93°34' E longitude. As per 2011 census report, the literacy rate in this region is lower than the state average (91.85%); that is, Lunglei, Lawngtlai and Siaha had literacy rates of 89.40%, 66.41%, and 88.41% and these districts are predominantly inhabited by Mizo, Lai, and Mara tribes, respectively.

Mizoram has a vast opportunity for tourism potential because its people are honest, the environment is safe, and it has people of strong integrity. The people in the state trust each other, so there is a culture among Mizo society called "Nghahlohdawr", a unique kind of shops where goods are sold openly on the roadsides, left unattended, and customers pay honestly (NCERT, 2017). Moreover, the state had not faced any major disturbances for many years, the central government offered it a peace bonus of ₹182.45 crore in 2000–01 (Business Standard, 2015).

Data Sources and Methodology

This study is based on the conceptual framework of geotourism, with data collected through closed-ended questionnaires. Investigation into geotourism systems requires diverse datasets. This study used both primary and secondary data sources. Primary data were obtained from local individuals to achieve the objectives of this study. Three districts in Southern Mizoram were selected as the study area, and 35 potential geosites were identified from 10 rural development blocks (RD).

A total of 245 respondents were interviewed from three districts, comprising 140 from Lunglei, 55 from Lawngtlai, and 50 from Siaha, encompassing the 21 villages nearest to the geosites (Table 1), by random sampling. Primary data were collected from respondents through field surveys and observations conducted by the researcher. Monthly data on income, occupation, and alternative occupations were gathered through a comprehensive field survey and observations.

Tourism data were collected from the state department website. Additionally, the Ministry of Tourism website, Census of India, and some published research papers were used as references. A Likert scale is used to analyse the facilities.

The raw data obtained were subsequently converted into statistics to understand the significance of the data. Descriptive statistics, particularly the mean, were used to comprehend the facilities collected using a Likert scale. Income, occupation, and alternative occupation data were analysed using inferential statistics. The primary data entry is done with the help of SPSS software. The tables and maps were prepared using MS Excel and QGIS 3.30.

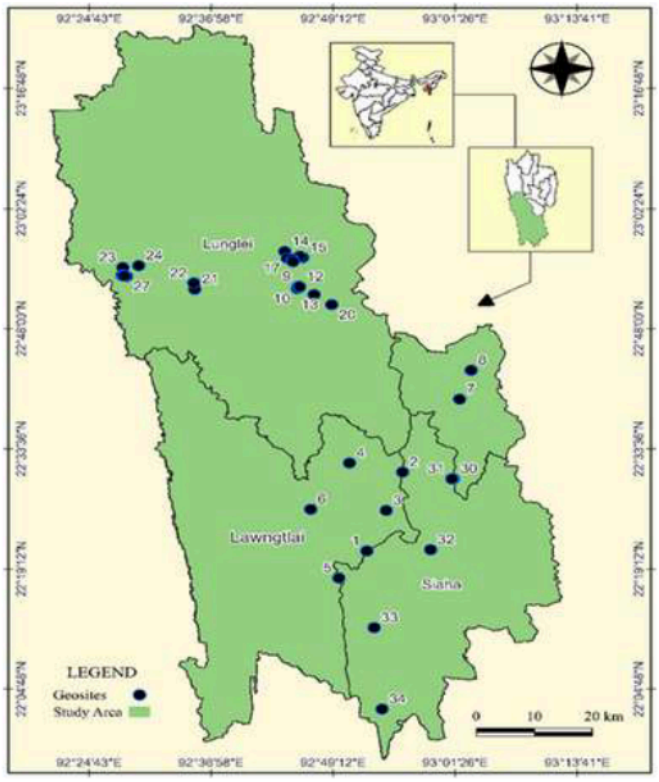

Figure 1: Locational Map of the Study Sites

Table1: Geographical Location of the Surveyed Geosites

Geosite No.	District	RD Block	X coordinate	Y coordinate
1. Kolodyne	Lawngtlai	Lawngtlai	22° 21' 21"	92° 52' 34"
2. Tuipui Ferry	Lawngtlai	Lawngtlai	22° 30' 49"	92° 56' 9"
3. Paithar	Lawngtlai	Lawngtlai	22° 26' 13"	92° 54' 30"
4. Mampui Lake	Lawngtlai	Lawngtlai	22° 31' 54"	92° 50' 50"
5. Castle of Bawinu/Beino	Lawngtlai	Lawngtlai	22° 18' 7"	92° 49' 46"
6. Ngengpui W.S.	Lawngtlai	South Bungtlang	22° 26' 21"	92° 46' 56"
7. Phawngpui N.P.	Lawngtlai	Phawngpui	22° 39' 33"	93° 1' 52"
8. Hranglung Experience	Lawngtlai	Phawngpui	22° 43' 1"	93° 3' 2"
9. Theiriat	Lunglei	Lunglei	22° 52' 5"	92° 47' 17"
10. Zomuan Park	Lunglei	Lunglei	22° 53' 5"	92° 45' 46"
11. Bethesda Futsal Court	Lunglei	Lunglei	22° 53' 2"	92° 45' 40"
12. City Garden	Lunglei	Lunglei	22° 52' 48"	92° 45' 36"
13. Ding Dong Park	Lunglei	Lunglei	22° 52' 57"	92° 45' 48"
14. ThakimaHuan	Lunglei	Lunglei	22° 53' 1"	92° 45' 49"
15. LZ Resort & Futsal	Lunglei	Lunglei	22° 57' 15"	92° 44' 21"
16. Pukpui Helipad	Lunglei	Lunglei	22° 21' 21"	92° 46' 7"
17. Laldenga Park	Lunglei	Lunglei	22° 30' 49"	92° 45' 50"
18. TLK Resort	Lunglei	Lunglei	22° 26' 13"	92° 44' 35"
19. LDF Park	Lunglei	Lunglei	22° 31' 54"	92° 45' 4"
20. Pukpui	Lunglei	Lunglei	22° 18' 7"	92° 45' 10"
21. Lunglei District Park	Lunglei	Lunglei	22° 26' 21"	92° 49' 3"
22. BDO Park	Lunglei	Lungsen	22° 39' 33"	92° 35' 19"
23. ThihhZawnabung	Lunglei	Lungsen	22° 43' 1"	92° 35' 13"

Table1: Geographical Location of the Surveyed Geosites

Geosite No.	District	RD Block	X coordinate	Y coordinate
24. Khawthlangtuipui	Lunglei	Tlabung	22° 53' 5"	92° 28' 6"
25. Peheli	Lunglei	Tlabung	22° 53' 2"	92° 29' 41"
26. Post Office	Lunglei	Tlabung	22° 52' 48"	92° 28' 1"
27. Inspection Bungalow	Lunglei	Tlabung	22° 54' 21"	92° 28' 13"
28. Civil Hospital: Tlabung	Lunglei	Tlabung	22° 52' 57"	92° 28' 11"
29. Leprosy Hospital: Tlabung	Lunglei	Tlabung	22° 53' 1"	92° 28' 27"
30. Police Station Tlabung	Lunglei	Tlabung	22° 52' 5"	92° 28' 2"
31. Tlahpi Mountain View	Siaha	Siaha	22° 21' 21"	93° 1' 14"
32. Tlahpi Forest Park	Siaha	Siaha	22° 30' 49"	93° 1' 5"
33. Serkawr	Siaha	Tipa	22° 26' 13"	92° 58' 58"
34. Pala Tipo	Siaha	Tipa	22° 31' 54"	92° 53' 18"
35. Tokalo W.S.	Siaha	Tipa	22° 18' 7"	92° 54' 5"

Source: Primary Survey, March-April 2024

Results and Discussions

Respondents' profile

Of the 245 respondents (Table 2), 153 (62.45%) were male and 92 (37.55%) were female; 85.3% lived in nuclear families and 14.7% lived in joint families. In the case of the religious composition of the respondents, 95.1% are Christians and 4.9% are Buddhists. Of these, 72.4% were married, 26.53% were unmarried, and 12.5% were widowed.

Table 2: Respondents' Profile in Percentage

Gender	Frequency	Percentage		**Household Type**	Frequency	Percentage
Male	153	62.45		Nuclear	209	85.3
Female	92	37.55		Joint	36	14.7

Marital Status								
Married	177	72.24		**Alternative Occupation**				
Unmarried	65	26.53		Jhum		44		18
Widow	3	1.23		Fisherman		12		4.9
Occupation				Tourist spot cleaner		10		4.1
Primary	128	52.24		Farming (agriculture)		5		2
Secondary	17	6.94		Others (taxi service, retail shop, daily labour)		3		1.2
Tertiary	55	22.45						
Quaternary	1	0.41		Weaving		1		0.4
Non-workers	44	17.96		Vehicle Service (workshop)		1		0.4
Religion				Carpentry		1		0.4
Christianity	233	95.1		Non-Worker		113		46.1
Buddhism	12	4.9						

Source of Livelihood				
District	Respondents		Average Per Capita Monthly Income (in ₹)	
	Tourism	*No Tourism Income	Tourism	Other Sources
Lunglei	25(17.86%)	115(82.14%)	5,540	16,231
Lawngtlai	9(16.36%)	46(83.64%)	3,536	14,101
Siaha	7(20.00%)	43(80.00%)	2,452	15,492
Total	41(16.73%)	204(83.27%)	4,460	15,602
N=245				

Source: Primary Survey, March-April 2024

Economic benefits of geotourism activities on livelihood

The formation of geoparks during geotourism development may create new employment opportunities, stimulate economic activity, and generate additional income flows, particularly in rural areas (Farsani et al., 2011). A study in China demonstrated that a 10% increase in per capita GDP was associated with a 0.88% increase in inbound tourist arrivals (Zhu et al., 2024). Siaha district holds the highest share of income at 20% from tourism, followed by Lunglei with 17.86%, and the least is Lawngtlai with 16.36% income from the geotourism activities in southern Mizoram. The average per capita monthly income of the respondents in the three districts is ₹4,460 from the geotourism activities, which is significantly less than the ₹15,602 received through other livelihoods (Table 2). These results indicate that tourism is not a major means of subsistence for the majority of households in these districts, and though there are potential tourism attraction sites, the sector is underexplored in income generation.

Opportunities

The rapid growth of nature tourism as a commercial enterprise with high expectations for employment opportunities and the rural economy, with public access as an underlying basis, need to be examined (Sandell & Fredman, 2010). Furthermore, geotourism offers a wide range of opportunities, especially to the rural economy, as it boosts local prospects and job creation etc. In a study at the Rock of Acropolis, Athens, unexplored geosites not only contribute to the regional tourism economy but also generate value and bring out the area's geodiversity, promoting geoconservation (Drinia et al. 2022). There are geosites, especially in northeastern India, where several tourism sites, including Mizoram, have yet to be explored. The Southern parts of Mizoram have the potential to attract tourists; however, several geosites ranging from river sites such as Castle of Bawinu/ Beino, Phawngpui National Park (N.P.), and state-level sanctuaries such as Tokalo Wildlife Sanctuary (W.S.), Ngengpui W.S., Tipa Lake, and patrimonial sites such as Serkawr, hill resorts, etc., are not receiving enough tourists (see Figure 1). A study on tourism development challenges in Southern Ethiopia includes inadequate visitor safety, infrastructure, community awareness, product assurance, promotion, marketing, stakeholder collaboration, government, NGO, and host community contributions (Desta Haliso, 2023).

Environmental geosites are nature-based tourism sites, where travellers observe and appreciate nature and traditional cultures in natural places (UNWTO, 2002). Environmental geosites could help rationally develop geo-conservation management, through policy means, where decision-making processes often focus on local economic development (Geremia et al. 2012). Its opportunities lie in Theiriat, where it offers spending leisure time and a viewpoint (Geosite 8). Theiriat's hilltop scenery is famous in the Lunglei district, adding beauty to the nearby church. The local community owns the geosite and charges no entry fee. In Lawngtlai district, boating (Geosite 1), rock climbing (Geosite 3), forest rest houses, tourist guides, and trekkingare some of the tourism opportunities available based on nature or the environment (Geosites 6 and 7). However, boating, fishing, and agriculture tourism facilities are located in the Lunglei district (Geosites 23, 24, and 25). In the Siaha district, boating, a lake viewpoint, and sufficient rest houses are available (Geosite 34). The Forest Department at Pala Tipo offers boating facilities to observe migratory birds, varieties of reptile species, including crocodiles. Ngengpui W.S. and Tokalo W.S. have diverse wild animals, greenery landscape, thick green forest, and provide medium-standard visitors' accommodation (Geosites 6 and 35).

Socioeconomic geosites aim to impact society and benefit local people beyond economic profits. The tourism sector requires new, attractive, and innovative economic ventures (Moulin and Boniface, 2001). Few homestays and sports tourism are tourism opportunities available in the Lawngtlai district (Geosite 9). Park and many of the hill resorts with swimming pools are available in the Lunglei district (Geosite 10-21). Lunglei District Park is a hill resort along with a children's park (Geosite 21). Kwawthlangtupui, a river site, has a scenic and captivating river landscape, whereas Peheli, a riverine Islet situated in the Indo-Bangladesh border region, can attract tourists (Geosites 23 and 24). 'Hranglung Experience' resort offers sports tourism and picnic activities. In the case of the Siaha district, scenic viewpoints and forest parks are available in Geosite 8

Historical tourism is associated with geosites, especially travelling to cultural sites, heritage sites, monuments, museums, and interactions with indigenous traditions and customs. The state's oldest post office, heritage sites, and oldest health tourism, such as a civil hospital, a leprosy hospital, are the opportunities available in the Lunglei district (Geosite 26-30). Phawngpui N.P., the highest mountain in the state, has the potential to attract more tourists and is one of the state's most appealing tourist destinations (Geosite 4). Patrimonial sites and hotels are available in the Siaha district. Serkawr, a British-India patrimonial site for Baptist Missionaries established in 1914, preserved the old house and welcomed all visitors (Geosite 33).

Table 3: Opportunities and Challenges in Southern Mizoram

Environmental Tourism Geosites			
Geosites No.	District	Opportunities	Challenges
1, 2, 3, 4, 5, 6, 7,	Lawngtlai	Boating, rock climbing, forest rest house, tourist guide, trekking	Road potholes, poor road infrastructure, off-road, lack of promotion, safety measures, seasonal tourists, threatened species due to habitat destruction and poaching
23, 24, 25	Lunglei	Boating, fishing, agriculture tourism	Poor economic development
34, 35	Siaha	Boating, viewpoint, rest house, lake, and wildlife sanctuaries	Threatened species due to habitat destruction and poaching
Socio-economic Tourism Goesites			
8	Lawngtlai	Homestay, sports tourism	Land conflict
9 to 22	Lunglei	Hill resort, swimming pools	Low investment in tourism infrastructure, poor road conditions
31, 32	Siaha	Viewpoint, Forest Park	Lack of promotion, fewer tourist arrivals
Historical Tourism Goesites			
-	Lawngtlai	-	-
26 to 30	Lunglei	Health tourism, heritage sites	Lack of awareness and remoteness of the location sites
33	Siaha	Patrimonial site, hotel	Insufficient funding and personnel for effective management, Lack of visitors due to lack of awareness and remoteness of the location sites

Source: Primary Survey, March-April 2024

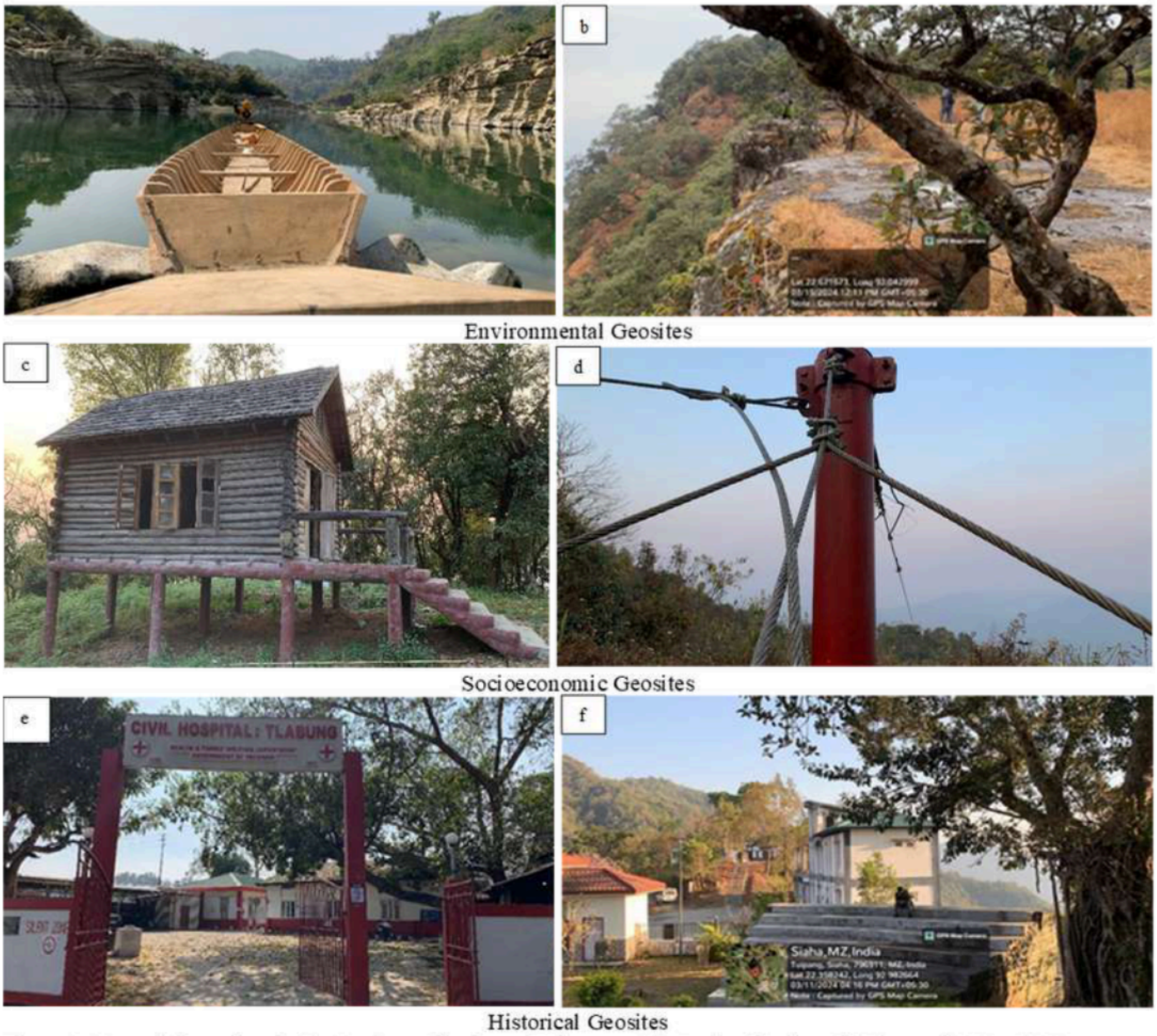

Figure 2: Potential geosites in the Southern districts of Mizoram: (a) Castle of Beino, (b)Phangpui N.P., (c) Home-stay, (d)Zip line, (e) Civil Hospital: Tlabung, (f) Serkawr. Photography by Lisan, Feb-March, 2024.

Challenges

It is difficult to find the evidence to support arguments about the challenges of sustainable tourism development, as there are problems associated with accessing information from the public and the private sectors, as well as a lack of documentation resources in most developing nations (Tosun, 2001). Lawngtlai district faced several challenges in developing nature-based tourism, including poor road conditions, pothole-filled roads, negligible promotional efforts from the state government, and problems related to safety and seasonality of tourist influx (Geosite 1-6). Although the Phawngpui N.P. has attracted a large number of visitors, the hotel and rest house management continue to be ineffective to date (Geosite 7).

The Lunglei to Theiriat route is full of potholes caused by frequent rains, occasional landslides compromise the geosite, and travellers have to deal with airborne dust on their trips (Geosite 14). Economic development in the Tlabung block of Lunglei is distinctly lacking (Geosite 23 and 24). Further, both Lunglei and Siaha districts experience a population threat to species caused by habitat depletion and poaching (Geosite 6, 7, and 35).
Inadequate investment in tourism infrastructure and bad conditions of roads are major constraints to socio-economic development in the geosites of Lunglei district (Geosite 9-22). Constitution and community awareness in the Lunglei district park and Paithar village are low (Geosite 21). Despite the high tourist attraction potential of Kwawthlangtupui and Peheli within the Tlabung, residents struggle with problems of basic utilities and the

development of livelihood infrastructures (Geosite 22 and 23). Resort operations and zip-lining have been stopped at the place of 'Hranglung Experience' resort in the Sangau block of Lawngtlai district, near Phawngpui N.P. (geosite 8) due to land dispute. In addition, the Siha district is facing a lack of promotion and a fall in tourist arrivals (Geosite 33-35).

Lack of awareness due to remoteness of the location sites, insufficient funding and ineffective management are the historical geosite challenges in Lunglei and Siaha districts. Lack of visitors due to lack of awareness and remoteness of the location sites Serkawr site possesses significant potential for patrimonial and heritage assets; nonetheless, it requires substantial finance and effective accommodation management (Geosite 33). Pala Tipo, a Ramsar site and Tokalo W.S. have attracted fewer visitors and require community awareness for the conservation of forest and wildlife (Geosite 34, 35). The language barrier is a major challenge for tourists in these three districts, as a negligible number of people can speak English or Hindi, except for the Mizo language, the state language, and the most common language of communication in the region.

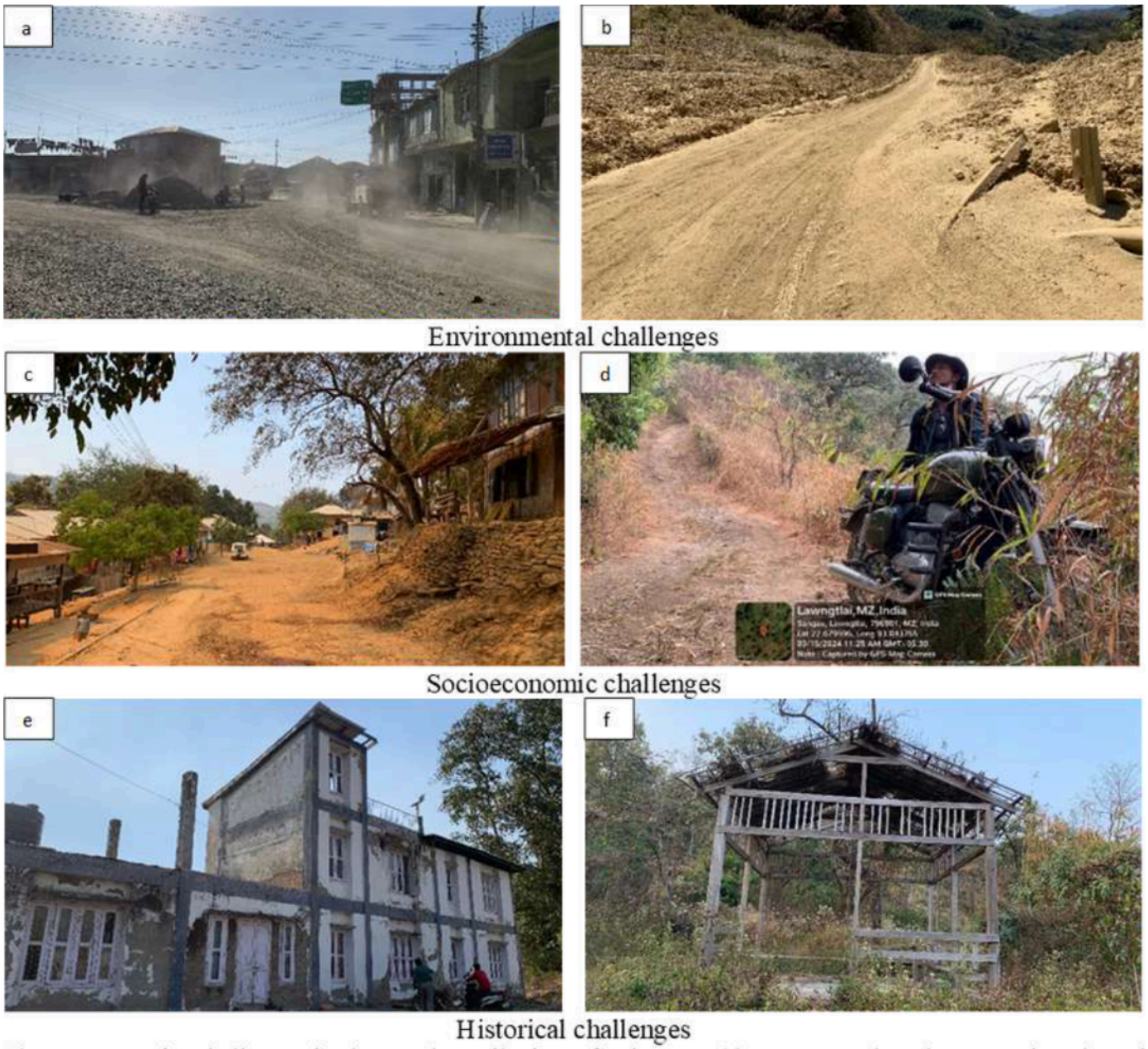

Figure 3: Geosite challenges in the Southern districts of Mizoram: (a) Dusty Road at three-way junction of Lunglei, Lawngtlai & Siaha due to frequent rainfall, (b) Mud flow & landslide at KMMTTP road, (c) Off-road leading to Beino, (d) Maintenance and management challenges at Historical geosites, Serkawr, (e) Abandoned tourist spot at Sangau due to land conflict. Photography by Lisan, Feb-March, 2024.

Tourism facilities and amenities in the region

Tourism infrastructure plays a crucial role in enhancing visitor experience and ensuring sustainable development, especially in remote and ecologically sensitive regions (Telfer & Sharpley, 2015). In geotourism destinations, however, access and amenity-related limitations often hinder tourism potential, particularly in rugged terrains with rich geological appeal (Drinia et al., 2022).Table 4 compares the indicators of facilities and amenities among the districts of Lunglei, Lawngtlai, and Siaha in Mizoram, using a Likert scale rated from 1 (very poor score) to 5 (strongly satisfied score), and reports the minimum, maximum, and standard deviation of each indicator. Among districts, Lawngtlai scores the highest in all the parameters with a mean score value of 3.73, followed by Siaha with 3.60, and Lunglei scores the lowest with a mean value of 3.41.

Table 4: Descriptive Statistics ofFacilities and Amenities at Lunglei, Lawngtlai and Siaha

Parameter	Facilities & Amenities	No. of Sample			Minimum			Maximum			Mean			Std. Deviation		
		(Lunglei)	(Lawngtlai)	(Siaha)	(Lunglei)	(Lawngtlai)	(Siaha)	(Lunglei)	(Lawngtlai)	(Siaha)	(Lunglei)	(Lawngtlai)	(Siaha)	(Lunglei)	(Lawngtlai)	(Siaha)
Basic Infrastructure	Electricity Connection	140	55	50	2	1	2	4	4	3	2.81	2.84	2.65	0.535	0.37	0.726
	Drinking Water	140	55	50	2	2	2	4	5	3	2.91	2.86	2.98	0.548	0.351	0.733
	Sanitary Condition	140	55	50	2	2	2	5	4	4	3.04	2.94	3.11	0.555	0.47	0.369
	Road Condition	140	55	50	3	2	3	5	5	5	3.68	3.96	3.89	0.681	0.832	0.712
Pubic Services	Hospital Facilities	140	55	50	2	2	3	5	5	5	3.6	3.68	3.	0.812	0.913	0.735
	Transport Facilities	140	55	50	3	2	2	5	5	5	3.77	4	3.91	0. 27	0.571	0.398
	Communication Facilities	140	55	50	2	2	2	5	5	4	3.29	3.24	3.29	0.702	0.657	0.599
	Recreation Facilities	140	55	50	2	2	2	5	5	4	3.5	3.6	3.51	0.617	0.535	0.791
Tourism related Services	Accommodation	140	55	50	3	3	2	5	5	5	4.02	4.46	4.4	0.694	0.646	0.683
	Quality of Food	140	55	50	3	3	3	5	5	5	3.9	4.38	4.02	0.346	0.697	0.38
	Tourist Guide	140	55	50	3	3	3	5	5	5	4.12	4.56	4.04	0.35	0.577	0.704
	Adventure Facilities	140	55	50	1	2	3	5	5	5	3.63	3.76	3.69	0.672	0.744	0.96
Social Environment	Safety and Security Facilities	140	55	50	2	2	3	4	5	5	3.66	3.78	3.84	0.545	0.465	0.57
	Local Community Attitude	140	55	50	1	1	2	4	4	5	3.21	3.1	3.16	0.632	1.035	0.601
Economic Services	Banking Facilities	140	55	50	2	1	3	5	5	5	3.8	4.14	3.96	0.732	0.904	0.693
	Shopping Facilities	140	55	50	3	3	3	5	5	5	4.09	4.5	4.56	0.754	0.58	0.631
Mean					2.88	3	3.44	3.88	3.9	4.25	3.41	3.73	3.6	0.28	0.19	2.22

Source: Primary Survey, March-April 2024

The Basic Infrastructure category reveals a lack of proper electricity in all three districts, where Lawngtlai scores the highest mean (2.84) and is seen as the most dissatisfying by residents. Whereas the quality of drinking water is positively rated by all respondents, with Siaha scoring the highest with a mean value of 2.98. Sanitation and road conditions are also scored slightly better in Siaha, with mean values of 3.11 and 3.89, respectively, which indicates better basic infrastructure conditions than the other two districts.

On the aspects of the Public Services category, indicate an average of hospital facilities in all districts, where Lawngtlai, with a mean value of 3.68, is slightly better compared to Lunglei and Siaha, with a mean value of 3.6 each. Whereas, transport facilities got the highest score, particularly in Lawngtlai (mean: 4.00) and Siaha (3.91), suggesting that these regions are well-connected. The score ranges for Communication and Recreation facilities were between 3.24 and 3.60, indicating that these types of services are closely matched in quality among the districts.

The Tourism-related Services category shows satisfaction with accommodation in all the districts, where Lawngtlai scores the highest mean (4.46) and is the most satisfying among the residents. Food quality and especially the helpfulness of the Tourist Guide, where Siaha reached 4.64, the highest of all areas, and the adventure facilities are slightly better in all the districts, where Lawngtlai scores highest with a mean value of 3.76.

In the case of the Social Environment category, the score reveals that positive safety and security facilities are revealed with a mean value of 3.78 and 3.66 in Lunglei and Lawngtlai, whereas Siaha with the highest value of 3.84. The community attitude is also positively rated by the residents in all districts, with a mean value of 3.10 and 3.16 in Lawngtlai and Siaha, whereas Lunglei scores the highest with a mean value of 3.21.

Lastly, in the Economic Services category, the score indicates banking facilities are average in Lunglei and Siaha, with a mean value of 3.80 and 3.96, respectively, whereas Lawngtlai scores the highest with a mean value of 4.14. And, the shopping facilities are reportedly satisfactory in all the districts with a mean value of 4.09, 4.50 and 4.56, respectively.

Overall, the Lawngtlai district, particularly, performs better in tourism and economic services. Siaha has reliable basic services (for sanitation, roads and water) and is successful in promoting tourism and safety. Despite being behind slightly, Lunglei continue to satisfying people's needs for public services and easy access to the local economy. Overall, tourism facilities in Southern Mizoram are in a poor state due to the lack of investments, as most of the tourism development is taking place in and around the Aizawl district, including Swadesh Darshan[1].

[1]Swadesh Darshan is a flagship project of the Ministry of Tourism, Government of India, inaugurated in 2014-15, aimed at developing sustainable and responsible tourism destinations by providing financial assistance to state governments for tourism infrastructure development.

Conclusion

The study concludes that the number of inbound tourists is increasing annually, but at a lower rate than in prominent tourist hill states such as Himachal Pradesh, Uttarakhand, and Meghalaya. In the southern regions of Mizoram, specifically the Lunglei, Lawngtlai, and Siaha districts, diverse forms of geotourism exist; nevertheless, this regionencounterschallenges due to remoteness and insufficient development of infrastructure and tourism amenities. Rural tourism in disadvantaged areas reduces poverty and enhances economic development. However, the study revealed that the residents' income cannot be entirely reliant on tourism activities, as the location lacks connectivity during the monsoon season, while the peak tourism season occurs in winter. Consequently, greater investigation and economic growth are required to assure local communities that the notion of geotourism is both safe and entirely viable.

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REVAMPING HIGHER EDUCATION IN NORTH EAST INDIA UNDER NEP 2020: CHALLENGES AND ROADMAP

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Abstract

The North Eastern Region (NER) of India, characterized by cultural richness and ecological diversity, faces distinctive challenges in advancing higher education due to geographical isolation, limited infrastructure, and uneven institutional access. The National Education Policy (NEP) 2020 presents a transformative opportunity to address these challenges through reforms centered on flexibility, inclusivity, and skill integration. This article critically explores the implications of NEP 2020 for higher education in the NER, focusing on three key reform areas: the introduction of four-year undergraduate programs (FYUGP), the integration of vocational and skill-based training, and the promotion of multidisciplinary learning. It evaluates institutional readiness and highlights contextual challenges such as digital access, faculty capacity, and infrastructural limitations. The article also outlines a strategic roadmap involving institutional autonomy, capacity building, industry collaboration, and digital infrastructure development to ensure effective policy implementation. By aligning NEP reforms with regional strengths and needs, the North East can emerge as a dynamic educational hub contributing to national growth and inclusive development.

Keywords: NEP 2020, North East India, Higher Education Reform, Skill Development, FYUGP, Multidisciplinary Learning

Introduction

The North Eastern Region (NER) of India, comprising eight states, is marked by rich cultural diversity, ethnic vibrancy, and ecological wealth. Despite these unique attributes, the region continues to face longstanding challenges in the domain of higher education. Geographical isolation, socio-political instability, inadequate infrastructure, limited access to quality institutions, and disparities in faculty availability have hindered the equitable growth of higher education in the region. Although several central and state universities, alongside autonomous institutions, have been established to address regional needs, a large gap persists between educational outcomes and national standards. The employability of graduates, research output, and institutional capacity-building remain areas of concern.

In this context, the National Education Policy (NEP) 2020 offers a transformative framework aimed at overhauling India's education system. The policy places a strong emphasis on accessibility, equity, quality, affordability, and accountability across all levels of education. Particularly significant are the reforms proposed for higher education, including the introduction of four-year undergraduate programs, multidisciplinary and holistic curricula, skill integration, flexible academic pathways, and the establishment of robust digital infrastructure. For the North Eastern region, which has often remained peripheral to national developmental narratives, NEP 2020 represents an opportunity to redefine its academic landscape, improve regional capacity, and foster inclusive socio-economic growth.

This article aims to critically examine the challenges and opportunities associated with the implementation of NEP 2020 in the context of higher education in North East India. It focuses specifically on three key pillars of reform: the four-year undergraduate programs, integration of skill development, and promotion of multidisciplinary learning. By analyzing the readiness of the region's institutions and identifying systemic barriers, the article proposes a pragmatic roadmap for effective implementation. Through this exploration, the paper seeks to contribute to policy discourse and offer actionable recommendations for regional and national stakeholders committed to educational transformation in the North Eastern states.

Current state of Higher Education in North East India

Higher education in the North Eastern Region (NER) of India has evolved gradually over the decades, beginning with the establishment of premier institutions such as Gauhati University (1948) and North Eastern Hill University (1973). The later decades witnessed the expansion of higher education with the creation of state universities, central universities, technical institutions, and colleges in various parts of the region. Institutions like Tezpur University, Assam University, Rajiv Gandhi University, and the Indian Institute of Technology (IIT) Guwahati have contributed to strengthening the academic environment. However, despite this institutional proliferation, the overall development of higher education in the region remains uneven and faces several persistent challenges.

One of the most pressing issues is limited access and equity. Many parts of the NER, particularly the hilly and remote areas, lack adequate institutions of higher learning. Students often have to migrate long distances to pursue undergraduate and postgraduate education. This disproportionately affects marginalized communities and women, deepening regional disparities. Infrastructure constraints, including poor connectivity, outdated laboratories, lack of hostel facilities, and limited digital access, further weaken the educational experience.

The quality of education also suffers due to outdated curricula, limited exposure to emerging fields, and a shortage of qualified faculty. Employability of graduates remains low, as academic programs are often disconnected from industry needs and practical skill requirements. This gap contributes to rising youth unemployment, even among degree holders.

Moreover, the linkages between academia and industry are minimal. There are few formal mechanisms for internships, collaborative projects, or curriculum development in partnership with local industries. This has restricted the ability of institutions to align education with the socio-economic context of the region.

Addressing these multi-dimensional challenges is essential for harnessing the full potential of the NE region. The implementation of NEP 2020 offers a timely opportunity to overcome these limitations and build a robust, inclusive, and forward-looking higher education system.

NEP 2020: Key reforms relevant to the NE Region

The National Education Policy (NEP) 2020 represents a landmark reform in India's educational landscape, aiming to align the system with the demands of the 21st century while preserving its indigenous roots. For the North Eastern Region (NER), which has long struggled with issues of access, equity, and quality in higher education, NEP 2020 offers a transformative framework to reimagine academic structures, enhance learning outcomes, and promote inclusive development.

One of the central reforms is the introduction of the Four-Year Undergraduate Programme (FYUGP), which replaces the conventional three-year model with a more flexible, learner-centric approach. This structure offers multiple entry and exit points, facilitating academic mobility and reducing dropout rates—an issue of particular concern in remote and under-resourced areas of the NER. The inclusion of a research component in the fourth year also encourages early exposure to academic inquiry and critical thinking.

The policy emphasizes multidisciplinary and holistic education, enabling institutions to offer a wide array of subjects across disciplines. This reform is especially relevant for the North East, where cultural diversity and indigenous knowledge systems can be integrated into curricula to make learning more contextually relevant. The promotion of liberal arts, sciences, and vocational subjects within a single academic framework encourages a well-rounded intellectual development.

Skill integration and vocational education form another critical pillar of NEP 2020. By introducing skill-based courses, internships, and vocational training within degree programs, the policy seeks to enhance employability and reduce the disconnect between education and the job market. This is vital for the NER, where employment opportunities are limited and conventional academic programs have not sufficiently addressed local economic realities.

The Academic Bank of Credits (ABC) facilitates credit accumulation and transfer across institutions, thereby offering students flexibility in designing their academic journeys. This is particularly advantageous for students in the NER who may need to relocate or adapt their studies to personal or socio-economic conditions. A flexible curriculum also promotes choice-based learning, creativity, and lifelong education.

Institutional reforms such as the establishment of the Higher Education Commission of India (HECI), National Research Foundation (NRF), and Model Multidisciplinary Education and Research Universities (MERUs) aim to streamline governance, enhance research quality, and set benchmarks for excellence. For the North East, such structural overhauls present opportunities to strengthen institutions, attract funding, and create research ecosystems that are responsive to regional needs.

Four Year undergraduate programs: Opportunities and Constraints

The Four-Year Undergraduate Programme (FYUGP) under NEP 2020 marks a significant shift in India's higher education system. Aimed at providing a flexible and

comprehensive learning experience, FYUGP equips students with critical thinking, interdisciplinary knowledge, and research skills—better preparing them for academic and career opportunities.

The program extends undergraduate education to four years, allowing deeper engagement with core disciplines while encouraging exploration of complementary subjects. It fosters a stronger research orientation through project work, internships, and thesis writing, culminating in a capstone project. FYUGP also introduces specialization options and offers multiple exit points—with certificate, diploma, or degree qualifications—addressing diverse student needs and socio-economic backgrounds.

For the North Eastern Region (NER), FYUGP brings clear benefits. It supports skills aligned with local industries and indigenous knowledge, encourages mobility via the Academic Bank of Credits, and enhances the value of regional degrees. Early exposure to research fosters innovation vital to the region's socio-economic growth.

However, NER faces notable implementation challenges. Many institutions lack adequate labs, digital tools, and research infrastructure. Limited funding hinders their ability to meet the demands of a four-year curriculum. Student preparedness also varies, with many needing foundational support in English, critical thinking, and digital literacy. Affordability remains a concern, as extended programs could increase financial pressure unless backed by scholarships and support systems.

An encouraging model is Sri Sri Aniruddhadeva Sports University (SSASU) in Assam, which offers a four-year program in physical education aligned with NEP principles. SSASU combines academic rigor with skill development and research, showing that FYUGP can succeed in regional contexts with focused planning.

Thus, FYUGP offers transformative potential for higher education in the North East. Realizing its benefits will require strategic investment, capacity building, and a commitment to inclusive, region-specific implementation.

Integrating Skills and Vocational Training

The North Eastern Region (NER) of India has a unique socio-economic profile, where traditional higher education often fails to ensure employment. Integrating skill development and vocational training into higher education is essential to boost employability, promote self-reliance, and support regional development.

NER's economy—largely agrarian and artisanal—requires education that aligns with its cultural and economic needs. National bodies like the National Skill Development Corporation (NSDC) and Sector Skill Councils (SSCs) have introduced sector-specific training initiatives.

These efforts are supported by state governments and NGOs focusing on regionally relevant vocations such as weaving, bamboo craftsmanship, and organic farming.

NEP 2020 strongly advocates integrating vocational education into mainstream curricula. In NER, this means tailoring programs to key sectors like agriculture, tourism, IT, handloom, and sports. Such alignment offers practical career pathways and supports youth entrepreneurship.

Community Colleges and Skill Universities play a key role in this transformation. While Community Colleges provide flexible, short-term courses, Skill Universities integrate advanced vocational training with academic content—bridging the gap between education and employment, especially for rural and marginalized communities.

Despite progress, challenges remain. Curricula often lack alignment with local industries, and faculty may be untrained in vocational pedagogy. The absence of standardized certification also limits the recognition of skills. Addressing these gaps requires collaboration among institutions, industries, and policymakers to create relevant curricula, train faculty, and implement quality assurance systems.

Thus, skill development and vocational training are vital to inclusive growth and economic resilience in the NER. NEP 2020 offers a strategic framework to align higher education with regional aspirations and workforce needs.

Promoting multidisciplinary and Holistic Education

The educational landscape in the North Eastern Region (NER) has traditionally been characterized by disciplinary silos, where arts, sciences, technology, and humanities are taught in isolated streams. This fragmentation limits students' ability to approach complex real-world problems through multiple perspectives, which is increasingly essential in today's interconnected global environment. To foster well-rounded graduates equipped to address regional and global challenges, NEP 2020 underscores the urgent need for multidisciplinary and holistic education.

Breaking down disciplinary barriers requires deliberate efforts to integrate arts, science, technology, and humanities within academic programs. This integration enriches learning by encouraging critical thinking, creativity, and adaptability. For example, combining environmental science with indigenous cultural studies can produce graduates who are not only scientifically literate but also culturally sensitive—an asset in the culturally diverse NER. Likewise, blending technology with social sciences can generate innovative solutions tailored to local development needs.

To facilitate this, the establishment of Interdisciplinary Research and Innovation Centers is crucial. These centers can serve as hubs for collaborative research across departments, promoting problem-solving that draws on

multiple fields. They also create opportunities for students and faculty to engage in innovative projects addressing regional challenges such as sustainable development, climate resilience, and social inclusion.

However, promoting such an educational model in the NER faces several challenges. There is often cultural resistance within institutions accustomed to traditional disciplinary boundaries. Many faculty members, trained and specialized in specific fields, may resist or feel unprepared for interdisciplinary teaching. Moreover, designing a curriculum that effectively balances breadth and depth across disciplines requires careful planning, resources, and capacity-building.

Despite these hurdles, there are promising model institutions within and outside the region that offer useful lessons. Institutions like Ashoka University and Shiv Nadar University have pioneered multidisciplinary curricula combining liberal arts with sciences and technology. Closer to the NER, institutions like Tezpur University have begun offering integrated programs that blend various disciplines, setting examples for others to follow.

Thus, embracing multidisciplinary and holistic education is pivotal for transforming higher education in the North East. It nurtures versatile graduates capable of innovation and leadership, aligned with NEP 2020's vision for an inclusive, flexible, and future-ready education system.

Roadmap for effective implementation in North East India

Successfully revamping higher education in the North Eastern Region (NER) under NEP 2020 requires a well-coordinated and strategic roadmap that addresses the region's unique challenges while leveraging its inherent strengths. The following key areas must be addressed:

1. Institutional Restructuring and Autonomy

Institutions in the NER must be empowered to innovate in academic programs, research, and governance. Granting greater autonomy to universities and colleges will enable flexible curriculum design, faster decision-making, and the ability to form responsive industry linkages—essential for meeting the dynamic demands of NEP 2020.

2. Capacity Building of Faculty and Administrators

This is another cornerstone of effective implementation. Training programs should be designed to enhance pedagogical skills, interdisciplinary teaching, digital literacy, and research competencies. Additionally, administrators must be equipped with modern management skills to navigate institutional reforms, quality assurance, and resource mobilization. Partnerships with national bodies such as the University Grants Commission (UGC), the National Institute of Educational Planning and Administration (NIEPA), and sector-specific training agencies can facilitate such capacity enhancement.

3. Strengthening Digital Infrastructure and Connectivity

This is vital for bridging geographical and resource gaps in the NER. Many institutions still face limitations in internet access, digital libraries, and online learning platforms. Investment in robust broadband networks, cloud-based resources, and virtual classrooms will ensure that students and faculty have access to quality learning materials and collaboration tools. The COVID-19 pandemic has underscored the importance of digital readiness, making this an urgent priority.

4. Building Collaborative Networks with Industry and Higher Education Institutions (HEIs)

This is essential for aligning education with employability and innovation. Formal linkages with local industries in agriculture, tourism, IT, handloom, and sports can facilitate internships, skill training, and joint research projects. Similarly, partnerships with premier institutions across India and abroad can promote faculty exchange, joint degree programs, and research collaborations, thereby strengthening the academic ecosystem in the NER.

5. Incentives for Innovation, Research, and Entrepreneurship

To foster a culture of innovation and entrepreneurship, appropriate incentives such as research grants, seed funding for startups, and recognition awards should be institutionalized. Establishing innovation hubs, incubation centers, and entrepreneurship cells within universities can nurture young innovators and address regional developmental challenges through local solutions.

6. Role of Government, North Eastern Council (NEC), and Civil Society

This role is pivotal. Central and state governments must ensure adequate and sustained funding, policy support, and infrastructure development. NEC can coordinate regional initiatives, facilitate inter-state collaboration, and monitor progress. Civil society, including NGOs and local communities, can contribute by providing contextual insights, supporting outreach efforts, and fostering an inclusive education culture.

7. Monitoring, Evaluation, and Feedback Mechanisms

These are necessary to track implementation progress, identify gaps, and enable timely course corrections. Transparent and data-driven assessment frameworks, coupled with stakeholder feedback—especially from students and employers—will ensure that reforms under NEP 2020 are effectively localized and sustained.

Conclusion and Policy Recommendations

Revamping higher education in North East India under NEP 2020 presents a transformative opportunity to address longstanding regional challenges while unlocking the full potential of its youth and resources. This roadmap demands an integrated approach involving institutional autonomy, capacity building, digital infrastructure, strategic partnerships, innovation incentives, and multi-stakeholder collaboration.

Key policy imperatives include the adoption of four-year undergraduate programs to enhance research orientation and flexibility, the integration of skill development aligned with regional economies, and the promotion of multidisciplinary and holistic education to dismantle traditional disciplinary silos. However, realizing these objectives requires addressing critical gaps—particularly in infrastructure, faculty preparedness, digital access, and industry linkages while also navigating cultural and institutional resistance to change.
Given the region's socio-economic diversity, a strategic and contextualized implementation plan is essential. Policies must be tailored to local realities to ensure inclusivity, equity, and sustainability, while leveraging the unique cultural and ecological strengths of the North East.

Effective reform hinges on coordinated action. Meaningful transformation requires sustained funding, policy coherence, and greater institutional autonomy. Collaborative engagement among universities, industry partners, regional development bodies, and civil society organizations will be instrumental in fostering innovation and ensuring relevance. Prioritizing capacity building and investment in digital infrastructure is essential to modernize teaching, research, and academic governance.
Thus, the transformative vision of NEP 2020 can only be realized in the North East through a shared commitment, adequate resources, and persistent engagement. This coordinated effort will empower the region to emerge as a vibrant hub of quality higher education, contributing to inclusive socio-economic development and national integration.

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HOMESTAYS AS AN ALTERNATIVE TO PROMOTE SUSTAINABLE TOURISM: A STUDY IN GUWAHATI CITY

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Abstract

As more and more travellers want real and engaging experiences, homestays have become an important part of sustainable tourism. This research examines the function of homestays in fostering sustainable tourism in Guwahati, a significant urban entry point to Northeast India. The study seeks to assess the economic, socio-cultural, and environmental impacts of homestays, as well as to pinpoint the operational difficulties encountered by hosts. This descriptive study utilised a mixed-methods strategy to gather primary data from a purposive sample of 100 homestay operators in Guwahati City. The results showed that while additional income is the primary motivation for the operators, but many of them are also motivated by their love for hospitality. Homestays are a big part of the local economy. In fact, 73% of operators say that this activity brings in more than a quarter of their entire income. The results of this study show that homestays in Guwahati are a powerful way to reach many of the Sustainable Development Goals (SDGs), but their full potential has not yet been realized. But the industry has a lot of problems, such as tough competition and money problems. There is a lot of focus on building in a way that is good for the environment, but waste management is still an issue that is not getting enough attention. The study finds that homestays are an important part of Guwahati's sustainable development, but they need specific policy support, including an easier registration, financial help, and infrastructure improvements, to get over the problems they face and reach their full potential.

Keywords: Sustainable Tourism, Homestays, Community-Based Tourism, Economic Impact, Sustainable Development, Guwahati, Assam.

Introduction

The global tourism industry is undergoing a paradigm shift, moving away from mass-market models towards more sustainable, authentic, and community-centric experiences. This evolution aligns with the principles of sustainable tourism, defined by the UNWTO as "tourism that takes full account of its current and future economic, social and environmental impacts, addressing the needs of visitors, the industry, the environment and host communities." In this context, homestays have become a vital component, offering travellers an alternative to conventional hotels by providing immersive cultural exchange, direct economic benefits to local communities, and a potentially smaller environmental footprint. A homestay is a form of lodging where visitors share a residence with a local host, offering an experience that is deeply personal and rooted in the local lifestyle. This model is an example of the sharing economy and aligns with ancient traditions of hospitality, such as "AtithiDevoBhava" in India, which regards guests as divine (Richards, 2018). The modern concept, formalized through digital platforms like Airbnb and Booking.com, has made home stays globally accessible, emphasizing authenticity and personal connection (Guttentag, 2020).This study focuses on Guwahati City, the largest urban centre in Assam and the primary gateway to Northeast India. As a rapidly growing tourism hub, Guwahati presents a unique case for examining the role of home stays in an urban context.

Sustainable Development Goals (SDGs):

The **Sustainable Development Goals (SDGs)** are a universal set of 17 goals adopted by all United Nations Member States in 2015 as part of the **2030 Agenda for Sustainable Development**. These goals aim to address global challenges including poverty, inequality, climate change, environmental degradation, peace, and justice. These goals are interconnected and are designed to balance the economic, social, and environmental dimensions of sustainable development. The sustainable development goals like Gender Equality (SDG 6), Decent Work and Economic Growth (SDG9), reducing

inequalities (SDG 11), Responsible consumption and Production (SDG 13) are considered in this study.

Literature Review

The literature on homestay tourism highlights its multifaceted role in sustainable development. Economically, homestays can reduce urban-rural disparities by attracting tourists to underserved areas and distributing income more equitably than conventional hotels (Scheyvens, 2002; Sharma & Dey, 2021). They promote local employment, foster entrepreneurship, and create a multiplier effect by sourcing food and materials locally (Kumar et al., 2020).From a socio-cultural perspective, homestays provide a platform for direct engagement with local cultures, offering an authentic alternative to standardized hotel experiences (Singh & Singh, 2019). This immersive interaction allows tourists to learn about local traditions, cuisines, and lifestyles, which not only enriches the visitor with new perspectives but also encourages hosts to preserve their cultural heritage (Richards, 2018). However, some scholars warn of the risk of cultural commodification, where traditions may be altered to meet tourist expectations (Reimer & Walter, 2017).Environmentally homestays are often considered inherently eco-friendly as they utilize existing infrastructure, consume fewer resources, and produce less waste than large-scale hotels (Jamal & Camargo, 2018). Goodwin (2020) highlights the potential of homestays to minimize the environmental footprint of tourism through practices like waste reduction and responsible consumption. Despite these benefits, homestays face numerous challenges. Fluctuating tourist demand and intense competition from hotels and other homestays can threaten economic stability (Sharma & Dey, 2021). The rise of digital platforms, while increasing market access, has also intensified competition and created new operational pressures (Guttentag, 2020; Singh et al., 2021). Furthermore, infrastructure deficits, inconsistent quality standards, and a lack of access to finance and training are significant barriers, particularly in developing regions (Giri & Rana, 2022). This study builds on this existing literature by providing specific empirical data from Guwahati, offering insights into how these global trends manifest in a key Indian urban tourism market. The Government of Assam has actively promoted home stays through various schemes like Aamaar Aalohi, Swadesh Darshan Scheme, Assam State Rural Livelihoods mission Society to foster rural and community tourism. However, the extent to which these initiatives translate into tangible sustainable outcomes in an urban setting remains under-researched. This paper seeks to fill that gap by empirically assessing the state of home stays in Guwahati.

Significance of the Study

Assam's unique combination of ethnic diversity, ecological richness, and developmental challenges makes it a perfect case study for the impact and potential of home stays. Studying them here isn't just an academic exercise; it's crucial for shaping a sustainable and inclusive future for the state.

Objectives of the Study

1. To evaluate the extent to which homestays in Guwahati support local economies through income generation, employment, and promotion of local businesses;
2. To examine the environmental practices adopted by homestays and assess operators' perceptions of environmental responsibility;
3. To assess the role of homestays in contributing to various sustainable development goals;
4. To identify the primary challenges and operational barriers faced by home stay operators in Guwahati;

Research Questions

The following are the research questions framed as per the objectives:

1. How do home stays contribute to the economic sustainability of local communities in Guwahati?
2. In what ways do homestays implement environmentally sustainable practices, and how do these compare to their perceived importance?
3. How effective are the role of homestays in contributing to various sustainable development goals

Methodology

Research Design: The research utilized a mixed-methods approach, integrating quantitative and qualitative techniques to deliver a comprehensive understanding of the homestay sector in Guwahati. The research is descriptive, intending to record the experiences, perceptions, and sustainable practices of home stay operators.

Study Area: The study was conducted in Guwahati City, Assam. Guwahati was selected due to its status as a major commercial and tourist gateway to Northeast India, its growing number of homestays, and active government initiatives promoting this form of tourism.

Universe of the Study: The entire home stays operating in and around Guwahati.
Sample and Sampling Technique: A purposive sampling method was used to select 100 homestay operators with direct experience in managing a home stay. This technique ensured that the participants possessed the relevant knowledge to answer the research questions.

Data Collection: Primary data was collected using a structured schedule-cum-questionnaire administered through a mix of face-to-face and telephonic interviews. The questionnaire included closed-ended questions for quantitative analysis. Secondary data was gathered from government tourism websites (e.g., Aamaar Aalohi scheme, Swadesh Darshan Scheme, Assam State Rural Livelihoods mission Society), academic articles, and published reports to validate and contextualize the primary findings.

Periodicity of the study: The present study has been conducted for 3 months from August to November, 2024.

Data Analysis

Quantitative data from the 100 respondents was analyzed using descriptive statistics and presented in tables. This section presents the key findings from the survey of 100 homestay operators in Guwahati.

Table 1: Demographic Profile

Age	No. of respondents	Percentage
Below25	5	5%
26-40	42	48%
41-60	38	32%
More than 60	15	15%
TOTAL	100	100%

Source: Field Survey

Respondents profile reveals a diverse but predominantly male group of operators. The majority are in the prime entrepreneurial age group of 26-40.

Table2: Gender wise distribution of respondents

Gender	No of Respondents	Percentage
Male	60	60%
Female	40	40%
Total	100	100%

Source: Field Survey

That 60% of respondents are male and 40% of homestay operators are women is a powerful statistic. It shows that the homestay sector can be a significant vehicle for female economic empowerment and entrepreneurship. Homestays often allow women to earn an income from their own homes, overcoming traditional barriers to entering the workforce. The 40% figure is a strong indicator of the sector's potential to advance SDG 5 to "Promote Gender Equality".

Table 3: Years of Operation

No. of years	No of Respondents	Percentage
Lessthan1year	8	8%
Jan 5, 2025	43	43%
Jun 10, 20...	37	37%
Nov 20, 20...	12	12%
More than 20	0	0%
Total	60	100%

Source: Field Survey

Most homestays in the sample are relatively new, with 43% operating for 1-5 years, indicating a growing industry. The data shows the distribution of the respondents based on the number of years their homestay has been in operation. A significant portion of the homestays (43%) have been operational for 1–5 years, indicating that many homestays are relatively new and likely part of the recent surge in homestay-based tourism.

Those homestays that have been running for 6–10 years comprise 37%, reflecting the growing stability and establishment of this sector over time. Only 8% of the respondents have been operating for less than a year, showcasing a smaller entry of newcomers, while12% have been in operation for over 10 years, suggesting the presence of long-standing businesses with sustained success in the industry.

Table 4: Registration with government schemes/initiatives

Options	No of Respondents	Percentage
Yes	10	10%
No	90	90%
Total	60	100%

Source: Field Survey

The data shows a significant gap in the registration of homestays with government schemes, with only 10 respondents (10%) registered and 90 (90%) unregistered. This disparity suggests issues such as a lack of awareness, complex registration processes, or mistrust in the relevance of Govt. schemes.

Table 5: Types of Home Stay

	Category	Number	Percentage
Type of Homestay	Independent	41	41%
	Traditional	27	27%
	Farmstay	17	17%
	Eco-friendly	15	15%

Source: Field Survey

A significant portion (41%) are independent setups, offering privacy to guests.27% preferred traditional setup ,A significant portion (41%) are independent setups, offering privacy to guests.27% preferred traditional setup for privacy and self-contained accommodations, particularly among families and groups. Traditional homestays remain popular with 27% (16 operators) providing traditional setups, operators continue to cater to tourists seeking cultural immersion and local experiences.

Table 5: Primary Motivation and Income Dependency

Category	Sub-Category	No. of Respondents	Percentage
Motivation	Additional Income	40	40%
	Hospitality Passion	28	28%
	Cultural Exchange	10	10%
	Govt. Incentives	10	10%
	Others	12	12%
% of Total Income from Homestay	Less than 25%	10	10%
	25-50%	41	41%
	51-75%	32	32%
	More than 75%	17	17%

Source: Field Survey

Economic factors i.e deriving additional income is the primary driver for hosts, though passion for hospitality is also a strong motivator. The data clearly shows that homestays are a critical source of income. It is a significant source of livelihood. 40% of operators are motivated by additional income.

This directly demonstrates how a specific form of sustainable tourism (homestays) is creating local jobs and economic growth at the grassroots level. Homestays inherently distribute the monetary benefits of tourism more directly to local families, rather than concentrating wealth in large, often non-local, corporations.

This helps reduce economic inequality within the tourism sector. By providing a low-barrier entry into the tourism economy, homestays promote the economic inclusion of individuals and families who might otherwise be excluded. Thus the homestay model, by its very nature, contributes to reducing inequalities (SDG 11) by democratizing access to tourism revenue.

Table 6: Environmental Practices Followed

Eco-Friendly Practice	No. of Respondents	Percentage
Sustainable construction/furnishing	30	30%
Energy conservation	25	25%
Water conservation	24	24%
Recycling	15	15%
Waste management	11	11%
Total	100	100%

Source: Field Survey

Operators prioritize sustainable construction and energy conservation. However, waste management is the least-practiced environmental measure. There is a disconnect between the perceived importance of environmental practices and their consistent implementation. The focus on sustainable construction (29%) is positive, but the neglect of waste management (11%) reveals a critical gap. Thus it adheres to the sustainable development goal (SDG 13) by adhering to the principle of responsible production. However there is a contrast between good practices (local sourcing) and poor ones (waste management) as evidence of a partial, incomplete adoption of SDG 13 principles. This calls for more training to raise awareness .

Table 7: Source of Marketing and Perceived Challenges

Category	Sub-Category	No. of Respondents	Percentage
Source of Marketing	Online booking platform	49	49%
	Travel agency	25	25%
	Social media	19	19%
	Word of mouth	7	7%
Challenges	Competition	30	30%
	Financial constraints	27	27%
	Marketing	17	17%
	Guest expectations	15	15%
	Regulations	11	11%

Source: Field Survey

A striking finding is the extremely low rate of registration with government schemes, with 90% of operators reporting they are not registered. Online booking platforms are the dominant marketing channel. The challenge of financial constraints (27%) and competition (30%) highlights the barriers to achieving "decent work" and stable economic growth within this sector. The objective is to evaluate the role of homestays in contributing to SDG 9 by examining local economic impacts. Thus supporting the homestay sector is a direct strategy for governments to meet their SDG 9 commitments. The data shows that online booking platforms are the most significant source of marketing for homestays (49% of responses), followed by travel agencies (25%), social media (19%), and word of mouth (7%).Online platforms dominate due to their convenience and reach, making them essential for visibility and bookings. Travel agencies remain relevant for personalized services, while social media is effective for engaging younger audiences through visual content. Although word of mouth ranks lowest, its credibility can drive long-term trust. The fact that 90% of operators are unregistered points to a weakness in the formal systems needed to build a truly sustainable and resilient urban tourism model. While homestays promote cultural heritage the lack of formal integration (the 90% unregistered figure) hinders the creation of strong, positive economic links within the community.

Discussion

The findings from Guwahati provide valuable, context-specific insights that both support and expand upon the existing literature. The study reaffirms the crucial economic role of homestays. With 73% of operators earning over a quarter of their income from their homestay, and 17% deriving over 75%, it is clear this is more than a supplementary activity; for many, it is a primary livelihood. This aligns with research highlighting homestays' capacity to generate local income (Kumar et al., 2020). However, this economic reliance is threatened by the top two challenges: competition (30%) and financial constraints (27%). This confirms the arguments of Sharma & Dey (2021) and Guttentag (2020) that the digital marketplace, while providing access, also creates a hyper-competitive environment where small operators struggle to stand out. The high dependency on online platforms (49%) for marketing further underscores this reality. The results on environmental practices present a mixed picture. While operators show a commitment to "hardware" solutions like sustainable construction (29%) and energy conservation (24%), "software" practices like waste management (11%) are severely lagging. This is concerning, as improper waste management can negate other sustainability efforts.

The study indicates that while homestays offer cultural exchange, it is often not a deeply integrated feature. The qualitative feedback on sharing meals and stories highlights the desire for genuine connection, but the quantitative data suggests this is not yet a consistent, core part of the business model for most. This may reflect the "commercialization" risk discussed by Reimer & Walter (2017), where cultural elements are offered pragmatically rather than holistically.

Perhaps the most critical finding for policymakers is that 90% of homestays are not registered with government schemes. This indicates a significant disconnect between government initiatives and the operators on the ground. This governance gap directly links to the challenges identified by operators. Without formal registration, operators cannot access the financial support, training, and marketing assistance needed to overcome their primary challenges, confirming the findings of Giri and Rana (2022) on the debilitating effects of inadequate support systems.

The findings of this study provide compelling evidence that homestays in Guwahati serve as a potent vehicle for achieving several Sustainable Development Goals (SDGs), although their full potential remains unrealized. Economically, the sector is a clear contributor to **SDG 9(Decent Work and Economic Growth)**, with a substantial number of operators depending on it for their livelihood. However, the precarity introduced by intense competition and financial constraints suggests that this 'work' is not yet consistently 'decent' or stable. Furthermore, the homestay model shows promise for **SDG13 (Responsible Consumption and Production)** as demonstrated by the strong tendency to source goods locally. Yet, this is undermined by a critical failure in production practices, particularly the neglect of waste management by the operators. This highlights a significant gap in operationalizing sustainability. On a positive note, the sector is advancing **SDG6 (Gender Equality)** with women comprising 40% of entrepreneurs —a significant figure that underscores the model's capacity for female economic empowerment. Ultimately, for homestays to transition from a promising concept to a robust engine for sustainable development, the governance gap identified in this research must be bridged to address these operational and environmental shortcomings.

Conclusion

Homestays in Guwahati are an important and changing aspect of the city's tourism ecosystem. They are a vital source of income for local families, show a real love of hospitality, and have a lot of potential to promote sustainable tourism. But this potential is limited by a lot of competition, high costs, and a lack of connection to established government support structures.

It is in a phase where it may either become more sustainable and open to everyone, or it could break apart because of competition. To succeed, operators need to go beyond basic services and fully incorporate cultural and environmental norms to give a befitting experience to the tourism ecosystem. Policymakers also need to close the governance gap to give operators the help they need.

Recommendations

- **Based on the findings, the following recommendations are proposed:**

- **For Policymakers (Government of Assam):**
- Make registration easier and raise awareness: It is imperative to let the operators know how good schemes like "Aamaar Aalohi" are. To make things easier for everyone, streamline the registration procedure, maybe by using a single-window digital portal.
- Provide Targeted Financial and Marketing Help: It is easy for registered homestays to acquire micro-finance loans or grants to improve their facilities and spend money on marketing. Create a government-backed website that brings together and promotes registered homestays, helping them compete with bigger sites.
- Invest in Infrastructure and Training: Improve the last-mile infrastructure (roads, internet access) in locations with homestay clusters as a top priority. Provide subsidised training programs in digital marketing, financial management, and environmentally friendly methods, including how to deal with trash.

- **For Homestay Operators:**
- Differentiate Through Authenticity: Just providing people a place to stay is not enough; give them unique, immersive experiences. Make cultural events like culinary courses, heritage hikes, or craft workshops a regular part of the guest experience.
- Embrace Holistic Sustainability: In addition to building, environmental initiatives should include strong waste management, water conservation, and getting supplies from local businesses. This can be a very useful tool for marketing.
- Collaborate to Compete: Create local homestay groups to share best practices, work together on marketing projects, and push for policy support as a group.

Future Research Scope

- Conduct a longitudinal study to track the development of these homestays over time.
- Carry out a comparative study between urban (Guwahati) and rural homestays in Assam to understand different challenges and opportunities.
- Investigate the tourist perspective to understand their motivations for choosing homestays in Guwahati and their satisfaction with the experience.

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ROLE OF ELECTRONIC MEDIA IN INFLUENCING PUBLIC PERCEPTION VIS-À-VIS VIKSIT BHARAT 2047

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Abstract

Whoever controls the media controls the mind. So, freedom of media is not just crucial, it is imperative for a functioning democracy. Media is said to be the fourth pillar of our democracy and it will play a pivotal role in the vision of Viksit Bharat 2047, an initiative aimed at realising India's aspiration of becoming a developed nation by its centennial year of independence. Electronic media is vital in shaping public perception and driving the nation towards the path of progress and modernisation. This study focuses on the relevance of electronic media in influencing public behavior regarding its operations, the perception of the public concerning the impact of electronic media on education and skill development, the role of electronic media towards cultural promotion and preservation and the ethical consideration of electronic media in disseminating information to the public. Non-parametric statistical tests are applied to test the acceptability of the proposed null hypotheses. The findings contribute to understanding the media's role as a catalyst for societal transformation while highlighting the balance required between advocacy and ethical responsibility. The study also analyses the current situation and suggests possible future strategies to enhance the role of electronic media in influencing public perception for Viksit Bharat 2047.

Keywords - Public Perception, Electronic Media, Viksit Bharat 2047, Education, Skill Development, Cultural Promotion and Ethical Considerations

Introduction

Derived from the Latin word Mēdia, meaning "the medium layer", the term 'Media' usually refers to a tool through which any kind of information whether for educational or entertainment purposes is distributed among the masses (Janssen, 2017). Moreover, Electronic media are media that uses electronics or electromechanical means to distribute as well as to access the information which differentiates itself from traditional media like Print Media (Medoff & Kaye, 2013). With the goal of Viksit Bharat as India knocks in its centennial year of independence in 2047, electronic media equipped with radio, television, internet along with social media, plays a vital role on the effect it can have on the masses which can be vast and limitless if used properly (Kumar, 2019).

Electronic media can impact the public perception, either through providing a factual unadulterated and well researched overview of a topic or by spreading biased misinformation with the narrative building capacity that they possess in their arsenal. They can influence the public behaviour from trivial matters like influencing people to buy certain products, to influencing important policy decisions of the nation, and much more (Blakeley, 2023). Electronic Media with its power to shape public perception can also have a positive impact when used for educational and skill development purposes rather than using it for entertainment purposes (Malhi, Bharti & Sidhu, 2016).

It can easily help to promote and preserve the national as well as regional heritage of a country, as it is a life changing communication medium that can promote culture, it possessing a diverse role and effortlessly influencing the masses by highlighting any current, past or future issues of the country and its people thereby being the "voice of the masses" (Umer, 2023).

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The on-trend Social Media is a powerful and cheapest medium to send and receive information, misinformation, reviews, recommendations etc. by not only the young population but also by adults, children and even many older citizens from across the world making it extremely effective mode of information transfusion (Gil Appel, 2020).

The use or misuse of Electronic Media is plagued with ethical concerns and largely depends on the intent of the user. Conversely, the existence of a thin line between what is ethical and what is unethical cannot be denied which can change with the change in the society, people, generation etc. In this research paper an effort has been made to find out what the ethical values are with respect to dissemination of information by Electronic Media that we hold as standards in today's day and age.

Brief Review of Literature

Electronic media is an important part of our lives and plays a crucial role. Our knowledge can be enhanced and loads of information can be accessed with the help of electronic media. It keeps us aware of the changes taking place in our environment. Although, there are ample advantages associated with electronic media but there is also a dark side of it. Media has the power to bring drastic changes in our daily lives and has the capacity to change the pattern of our thinking and behaviour as well. The investigation on role of electronic media in influencing human behaviour is not an unexplored area. Various researchers have already explored different aspects of electronic media upon the perception and behaviour of people. The following are the few literatures reviewed by the researchers:

Kaiser Family Foundation Study (2005) mentioned in their study that media play a central role in the lives of the youths. Their homes, indeed their bedrooms, are saturated with media. They typically are among the early adopters of personal computers and are a primary target of much of the content of the World Wide Web.

Sadaf (2011) in her research paper tried to investigate the role of media in judicial restoration and people's perception about the same. Her investigation concluded that electronic media and newspapers acts as an important link with the external world and has the power to influence and shape the attitudes and behaviour of people with respect to constructive judicial restoration.

Kalia (2013) mentioned that vocational education should be developed at par with academic education and electronic media can play a pivotal role in creating awareness amongst people.

Rehman (2014) forwarded the view that sometimes media fails to play their role responsibly. It has also been presented in the meeting that print media is very effective for the policy makers as news stated in print media are backed by editorials. Electronic media such as television, due to its visual appeal are more favoured by general public. Radio is also favoured by people in rural areas and they are also reliable as they don't sensationalize the information.

Naveena (2015) in his investigation highlighted the role of mass media in communicating health messages. The investigation observed that electronic media in the form of radio and television plays a crucial role in embracing new attitudes and behaviour and keep the public updated. It has been found in the study that 65% of the respondents can be reached by the mass media channels. 64%of the respondents are more inclined towards print and electronic media and 22% of the respondents are very much inclined towards the social media where as 12% and 14% of the respondents showed their preference towards outdoor and traditional media respectively for information, education and entertainment.

Kumar and Dubey (2016) in their study focused the effect of electronic media on skill education and development. They took a sample of fifty respondents who had undergone skill training in manufacturing and services. The investigation opined that electronic media has a fringe over other medium of advertisement to foster skill development but they found no significant relationship between electronic media and promotion of skill development. They concluded that there is an urgent need to promote and create awareness among people about skill development. Cultural preservation and promotion are important for any country. Culture gives an identity to a nation and is reflected by the values, tradition and customs followed by the people of any country.

Naaman (2016) observed that social media acts as an important platform where variety of events from local to global are highlighted reflecting various aspects of society, culture and heritage.

Saurabh Aditya (2019) in his study highlighted how the trending media influences youth behaviour and whether the youth flows in the direction of virtual world or try to understand the real aspect of the information disseminated by the media. The study concluded that time spent is a key factor in influencing human behaviour through electronic media. The study found a direct relationship between duration of time in which people are

exposed to media and behavioural changes. If electronic media usage is limited no behavioural changes occur.

Anand et. al, (2023) conducted a study to understand the relationship between electronic media use and its effect upon the adolescent's psychological health. The research also tried to investigate the amount of time spent by adolescents in electronic media. The study revealed that behavioural problems exist among adolescents who spent most of their time in electronic media. They also observed that adolescents have complete control over the content which they want to view through electronic media which is alarming for the parents.

Peter and Muth (2023) in their article tried to investigate the perception of young adults and adolescents' usage of social media and its impact upon them with respect to political news dissemination. They tried to find the role of social media in opinion formation amongst the selected category of respondents. They highlighted the different aspects of social media influences and stated that media platforms, especially social media plays a crucial role in creating cultural awareness and promotion among the youth who are very active and vigilant with respect to cultural aspects of media globalization.
Karina Indah (2024) focused on the role of social media in the genesis and recognition of cultural identity. The research concluded that usage of social media platforms is imperative in keeping alive cultural distinctiveness and participation of local coterie and engagement in online groups are important in preservation of cultural heritage.

Significance of the Study

The present study explores the fundamental role played by media in shaping public perception, thereby influencing the public behaviour. It analyses the public perception of the impact electronic media has on education and development of skills. The researchers have tried to provide insights to policymakers, media professionals and stakeholders on the role of media in India's vision of becoming a developed nation by 2047. It furthermore highlights the influence of electronic media towards preservation and promotion of culture, it's ethical responsibilities in order to enhance its credibility and effectiveness in driving national development goals.

Objectives of the Study

The following are the main objectives of the study:

- To study the relevance of electronic media in influencing public behavior regarding its operations;
- To examine the perception of the public regarding the impact of electronic media on education and skill development;
- To analyze the role of electronic media towards cultural promotion and preservation; and
- To understand the ethical consideration of electronic media in disseminating information

Research Hypothesis to be Tested

H_{01}: Electronic media has no impact in influencing public behaviour.
H_{11}: Electronic media has impact in influencing public behaviour.

H_{02}: Electronic media has no impact on education and skill development.
H_{12}: Electronic media has impact on education and skill development.

H_{03}: Electronic media plays no role towards cultural promotion and preservation.
H_{13}: Electronic media plays role towards cultural promotion and preservation.

H_{04}: Electronic media has no concern for ethical consideration while disseminating information.
H_{14}: Electronic media has concern for ethical consideration while disseminating information.

Research Methodology

Research Design: The research design adopted in this study is Descriptive in nature as the researchers had gathered information regarding the perception of the public about the contribution of electronic media in accomplishing the vision of Viksit Bharat 2047 without manipulating the variables. The study emphasized on 'what' questions and not on 'why'.

Population: The population of the study comprised of the general public in the city of Guwahati.

Sampling Frame: The sample has been drawn only from the respondents who are above 21 years of age and residing in Guwahati.

Sampling Technique: Convenience Sampling Technique has been applied as the respondents were selected based on their accessibility, geographical proximity and willingness to participate.

Sample Size: 124 valid responses were received for data analysis.

Data collecting tool: The primary data has been collected by using a structured questionnaire comprising of multiple-choice, close-ended, Likert 5-point scale and open-ended questions. The secondary data has been collected from research papers/articles, books and e-journals.

Technique for data analysis: To find out the reliability of the scales utilized in the questionnaire, a reliability test has been conducted applying Cronbach Alpha. To find out whether any relationship exists between the usage of electronic media and its influence on public behaviour, correlation statistics has been used. Likewise, correlation has been used to understand the relationship between role of electronic media and education and skill development, cultural promotion and preservation and concern for ethical consideration while disseminating information. Lastly, to investigate the impact of electronic media on various variables associated with relevance of electronic media in influencing respondent's opinion, attitude and behaviour, regression analysis has been done.

Scope of the Study

The study covers the contribution of electronic media towards creation of Viksit Bharat 2047. The electronic media considered for the study covers– television, radio, social media, OTT platform and video conferencing modes. The geographical scope of the study is confined to the city of Guwahati and the periodicity of study comprises of two months i.e. November and December 2024.

Role of Electronic Media in creating Viksit Bharat

The contributions of Electronic Media in building a developed nation by 2047 are crucial and humungous. With the rapid innovation in the field of technology and media platform, electronic media is the key driver in shaping the future of this nation in varied sectors:

- **Fostering Education and Skill Development:** In India, education has enhanced with informative television channels and virtual educational tools, specifically in rural areas. By providing free or reasonable content, these platforms play a significant role in bridging the gap between the rural and urban youth. The introduction of numerous e-learning platform like- Coursera, Udemy and Skillshare train the youth with the skills required by the contemporary economy.

- **Empowering Digital Literacy:** In this era of digital revolution, electronic media primarily the digital platform augments digital literacy amongst the people moving forward for nation's inclusive growth. With the aim of promoting digital literacy, the government's initiative for varied schemes like Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) and Pradhan Mantri Jan Dhan Yojna are extensively campaigned through electronic media creating awareness amongst the gullible people.

- **Supporting Entrepreneurs and boosting Economic Growth:** Electronic media provides a platform for the entrepreneurs regarding various vital steps to start their business. They get guidance from the success stories of other people in their fraternity which is showcased in many platforms like Startup India and Atal Innovation Mission. Show like Shark Tank India assists the entrepreneurs to raise fund and also provides them the necessary aid in managing their business. CNBC TV 18, Zee Business, ET Now channels presents business news and stock market guiding the investors to makes rational decisions.

- **Raising Awareness on Social Issues:** Electronic media plays a pivotal task in creating an Inclusive Society by supporting campaigns on key social issues like- gender equality, women safety, acid attacks, drug abuse, urbanization, pollution, child trafficking etc. Few campaigns addressed by the social media are- #PinjraTod, #SharetheLoad, #EndAcidSale, EKATVAM Campaign etc. Initiatives are taken by Electronic media to break the social stereotypes and attempts are made to build a progressive society.

- **Environmental Awareness:** With an objective to make India "Green" , media is fostering adoption of sustainable practices by the people in general by focusing on renewable energy, reducing pollution, using eco-friendly products etc through different campaigns like- Earthwise, Go Green Initiative, National Mission for Green India (GIM), Eco mark scheme etc.. Sharing news, campaigns, documentaries, stories etc, media is trying to educate people on environmental issues.

- **Cultural Promotion and Preservation:** Electronic Media serves as an effective medium in promoting and preserving India's cultural heritage, traditions, languages and art forms. It also fosters national unity by telecasting shows on different culture, customs and rituals. Many Reality Shows supports and encourages participants to share their traditions with a nationwide audience.

- **Health and Wellness**: Electronic Media helps in creating awareness regarding health matters like- sanitation, vaccination, nutrition etc. During Covid-19 pandemic electronic media played a significant role in disseminating information to the general public relating safety protocols. Yoga and wellness channels in television, OTT platforms and social media helped the public to understand their goodness in ones healthy life.

Data Analysis and Findings

Table 1(a): Case Processing Summary

		N	%
Cases	Valid	124	100
	Excludeda	0	0
	Total	124	100

a. List-wise deletion based on all variables in the procedure.

Table 1(b): Reliability Statistics

Cronbach's Alpha	N of Items
0.947	46

Source: SPSS Compilation

A Reliability test has been conducted to examine the reliability of the scales in the questionnaire. The above table reveals Cronbach Alpha as 0.947 which is considered excellent

Table 2: Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	53	42.7	42.7	42.7
	Female	71	57.3	57.3	100
	Total	124	100	100	

Source: SPSS Compilation

A total of 124 respondents participated in the survey out of which 42.7% are male and 57.3% are female.

Table 3: Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-30 years	118	95.2	95.2	95.2
	31-40 years	1	0.8	0.8	96
	41-50 years	5	4	4	100
	Total	124	100	100	

Source: SPSS Compilation

The above table reveals 95.2% of the respondents belong to the age group of 21 years to 30 years, 0.8% in the age group of 31 years to 40 years and 4.0% belong to the age category of 41 years to 50 years.

Table 4: Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	99	79.8	79.8	79.8
	Govt Employee	4	3.2	3.2	83.1
	Employee in Pvt Sec	16	12.9	12.9	96
	Self Employed	4	3.2	3.2	99.2
	Homemaker	1	0.8	0.8	100
	Total	124	100	100	

Source: SPSS Compilation

Table 4 shows the occupation of the participants in the survey. 79.8% are students, 3.2% are government employee, 12.9% are employees in private sector and 3.2% and 0.8% are self-employed and homemaker respectively.

Objective 1: Study the relevance of electronic media in influencing public behaviour:

Table 5(a): Influence of Electronic Media on the Perception of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	99	79.8	79.8	79.8
	Govt Employee	4	3.2	3.2	83.1
	Employee in Pvt Sec	16	12.9	12.9	96
	Self Employed	4	3.2	3.2	99.2
	Homemaker	1	0.8	0.8	100
	Total	124	100	100	

Source: SPSS Compilation

The researchers tried to find the influence of electronic media upon the perception of the respondents. The table shows that 41.9% of the respondents are sometimes influenced by the electronic media, 28.2% are often influenced and 20.2% of the respondents revealed that information from electronic media influences their perception.

Table 5(b): Relationship between influence of electronic media upon the perception and relevance of electronic media in influencing respondents' behaviou .

Correlations

		EM_ Perception	Report_ Accurately	Influence_ Choices	Frame_Story	Persuade_ Public	Boost_TRP	Reports_ Accurately
EM_Perception	Pearson Correlation	1	.180*	.271**	.080	.163	.045	.009
	Sig. (2-tailed)		.046	.002	.376	.071	.620	.917
	N	124	124	124	124	124	124	124
Report_Accurately	Pearson Correlation	.180*	1	.667**	.563**	.549**	.485**	.031
	Sig. (2-tailed)	.046		.000	.000	.000	.000	.733
	N	124	124	124	124	124	124	124
Influence_Choices	Pearson Correlation	.271**	.667**	1	.723**	.655**	.643**	.066
	Sig. (2-tailed)	.002	.000		.000	.000	.000	.468
	N	124	124	124	124	124	124	124
Frame_Story	Pearson Correlation	.080	.563**	.723**	1	.711**	.571**	.074
	Sig. (2-tailed)	.376	.000	.000		.000	.000	.414
	N	124	124	124	124	124	124	124
Persuade_Public	Pearson Correlation	.163	.549**	.655**	.711**	1	.645**	.087
	Sig. (2-tailed)	.071	.000	.000	.000		.000	.335
	N	124	124	124	124	124	124	124
Boost_TRP	Pearson Correlation	.045	.485**	.643**	.571**	.645**	1	.100
	Sig. (2-tailed)	.620	.000	.000	.000	.000		.268
	N	124	124	124	124	124	124	124
Reports_Accurately	Pearson Correlation	.009	.031	.066	.074	.087	.100	1
	Sig. (2-tailed)	.917	.733	.468	.414	.335	.268	
	N	124	124	124	124	124	124	124

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Compilation

Here the researchers tried to find if any relationship exist between influence of electronic media on perception and variables relating to the relevance of electronic media in influencing respondents' behaviour. A total of six variables have been analysed to measure the relevance of electronic media in influencing public behaviour. The statements include:

1. Media houses have a responsibility to report accurately in order to keep the public well-informed.
2. Media has the power to make a story/event significant and influence the public's choices.
3. The media has the ability to frame a story in such a way that influences how the public perceives it.
4. The media has the power to persuade public through compelling stories, emotional appeals and expert opinion.
5. The media presents the information in a manner designed to boost their TRP.
6. Electronic Media reports the news accurately

The above table shows clearly that none of the variables have any importance or relevance in influencing the viewer's opinion, attitude and behaviour. This is again supported by the regression table given below which shows the impact of electronic media upon the various variables related to the relevance of electronic media in influencing viewer's opinion, attitude and behaviour. Thus, we accept the H_{01} and reject H_{11}

Table 5 (c): Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.367[a]	.135	.090	.873

a. Predictors: (Constant), Reports_Accurately, Report_Accurately, Boost_TRP, Frame_Story, Persuade_Public, Influence_Choices

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.898	6	2.316	3.037	.009[a]
	Residual	89.223	117	.763		
	Total	103.121	123			

a. Predictors: (Constant), Reports_Accurately, Report_Accurately, Boost_TRP, Frame_Story, Persuade_Public, Influence_Choices

b. Dependent Variable: EM_Perception

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.052	.477		6.397	.000
	Report_Accurately	.024	.103	.028	.234	.816
	Influence_Choices	.480	.145	.494	3.309	.001
	Frame_Story	-.313	.155	-.284	-2.023	.045
	Persuade_Public	.185	.140	.181	1.323	.188
	Boost_TRP	-.215	.109	-.242	-1.982	.050
	Reports_Accurately	.005	.082	.006	.064	.949

a. Dependent Variable: EM_Perception

Source: SPSS Compilation

Table 6: Ranking given to the different Electronic Media

Rank	Televisio n	Radio	Social media	OTT	VC	Total
Rank A	16.9	4	65.3	10.5	3.2	100
Rank B	29	4.8	16.1	36.3	12.9	100
Rank C	23.4	15.3	8.9	26.6	25.8	100
Rank D	21.8	18.5	4.8	21.8	33.9	100
Rank E	8.9	57.3	4.8	4.8	24.2	100
Total	100	100	100	100	100	

Source: SPSS Compilation

If we observe the above table, we find that the social media is the most popular and preferred electronic media amongst the respondents which has been given Rank A and radio is the least preferred.

Objective 2: Perception of the public regarding the impact of electronic media on education and skill development.

Table 7: Correlation between perception of the public regarding the impact of electronic media on education and skill development.

Correlations

		EM_ Perception	Increased_ Access	EResources_ Beneficial	Easy_ Understand	Fosters_Grp_ Learning	Upgrade_ Learning	Develop_ Skills
EM_Perception	Pearson Correlation	1	.219*	.216*	.183*	.282**	.212*	.048
	Sig. (2-tailed)		.015	.016	.042	.002	.018	.600
	N	124	124	124	124	124	124	124
Increased_Access	Pearson Correlation	.219*	1	.731**	.573**	.544**	.611**	.430**
	Sig. (2-tailed)	.015		.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124
EResources_Beneficial	Pearson Correlation	.216*	.731**	1	.741**	.535**	.699**	.591**
	Sig. (2-tailed)	.016	.000		.000	.000	.000	.000
	N	124	124	124	124	124	124	124
Easy_Understand	Pearson Correlation	.183*	.573**	.741**	1	.358**	.587**	.497**
	Sig. (2-tailed)	.042	.000	.000		.000	.000	.000
	N	124	124	124	124	124	124	124
Fosters_Grp_Learning	Pearson Correlation	.282**	.544**	.535**	.358**	1	.623**	.546**
	Sig. (2-tailed)	.002	.000	.000	.000		.000	.000
	N	124	124	124	124	124	124	124
Upgrade_Learning	Pearson Correlation	.212*	.611**	.699**	.587**	.623**	1	.634**
	Sig. (2-tailed)	.018	.000	.000	.000	.000		.000
	N	124	124	124	124	124	124	124
Develop_Skills	Pearson Correlation	.048	.430**	.591**	.497**	.546**	.634**	1
	Sig. (2-tailed)	.600	.000	.000	.000	.000	.000	
	N	124	124	124	124	124	124	124

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Compilation

As stated in the objective 2, the investigators tried to find if any relationship exist between influence of electronic media upon various variables of education and skill development.

For the above objective a total of six variables have been identified. The variables include:

1. Increased accessibility from top university through Online Learning Platforms.
2. E-resources like You Tube, Podcasts and Tutorials are beneficial.
3. Videos, animations and simulations make it easier to understand complex concepts.
4. Zoom, Google classroom fosters group learning from different locations.
5. Online Courses helps to upgrade learning at one's own speed.
6. Webinar, Virtual workshops help people to develop the required skills relevant to their careers.

The correlation table reveals that electronic media have significant relationship with increased accessibility through online portals ($p<0.05<0.015$), e-resources like You Tube, podcasts etc are beneficial ($p<0.05<0.016$), animations and simulations make it easier to understand complex concepts ($p<0.05<0.042$) and online courses upgrade learning at one's own speed ($p<0.05< 0.018$) at 5% level of significance. It has also been found that relationship exist between influence of electronic media with online classrooms like Zoom and Google fosters learning ($p<0.05<0.002$) at 1% level of significance. Thus, we accept Alternative Hypothesis H_{12} and reject Null Hypothesis H_{02}

Objective 3: Role of electronic media towards promotion and preservation of culture.

Table 8: Relationship between role of electronic media towards promotion and preservation of culture.

Correlations

		EM_ Perception	Culture_ share_ globally	Archive	Cultural_ Excahnge	Dominant_ Culture_ Visible	Misinterpretation	Fosters_Pride	Preserves_ traditional_ practices
EM_Perception	Pearson Correlation	1	.096	.075	.147	.165	.117	.193*	.033
	Sig. (2-tailed)		.288	.409	.104	.067	.195	.032	.718
	N	124	124	124	124	124	124	124	124
Culture_share_globally	Pearson Correlation	.096	1	.663**	.615**	.462**	.446**	.537**	.556**
	Sig. (2-tailed)	.288		.000	.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124
Archive	Pearson Correlation	.075	.663**	1	.631**	.408**	.425**	.389**	.475**
	Sig. (2-tailed)	.409	.000		.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124
Cultural_Excahnge	Pearson Correlation	.147	.615**	.631**	1	.395**	.562**	.545**	.599**
	Sig. (2-tailed)	.104	.000	.000		.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124
Dominant_Culture_ Visible	Pearson Correlation	.165	.462**	.408**	.395**	1	.449**	.474**	.362**
	Sig. (2-tailed)	.067	.000	.000	.000		.000	.000	.000
	N	124	124	124	124	124	124	124	124
Misinterpretation	Pearson Correlation	.117	.446**	.425**	.562**	.449**	1	.460**	.512**
	Sig. (2-tailed)	.195	.000	.000	.000	.000		.000	.000
	N	124	124	124	124	124	124	124	124
Fosters_Pride	Pearson Correlation	.193*	.537**	.389**	.545**	.474**	.460**	1	.653**
	Sig. (2-tailed)	.032	.000	.000	.000	.000	.000		.000
	N	124	124	124	124	124	124	124	124
Preserves_traditional_ practices	Pearson Correlation	.033	.556**	.475**	.599**	.362**	.512**	.653**	1
	Sig. (2-tailed)	.718	.000	.000	.000	.000	.000	.000	
	N	124	124	124	124	124	124	124	124

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Compilation

For fulfilling Objective 3, seven variables relating to role of electronic media in cultural promotion and preservation have been analysed. The variables include:

1. Cultural events can be easily shared globally allowing international accessibility.
2. Old manuscripts, recordings of oral traditions can be archived in formats that can withstand time and environmental damages.
3. Social media helps to create a space for cultural exchange.
4. Dominant culture is more visible and accessible online.
5. Ease of content creation without adequate knowledge can lead to misinterpretation of cultural traditions.
6. Electronic media promotes fostering pride in local culture through documentation and educational programmes.
7. Online exhibitions and digital libraries help to preserve traditional practices and folklore.

The Correlation table above clearly shows that electronic media has no relation with any of the identified variables which helps in promotion and preservation of culture except for one variable where people believes that electronic media promotes fostering pride in local culture through documentation and educational programmes p=0.032 at 5% level of significance. Thus, we accept H_{03} and reject H_{13}.

Objective 4: Understand the ethical consideration of electronic media in dissemination of information.

Table 8: Relationship between Respondents perception and ethical consideration of electronic media in dissemination of information.

Correlations

		EM_Perception	Check_Authenticity	Info_drawn_trusted_sources	Invades_Privacy	Transparent_data	Impartial_Info	Minority_voices_inclusion	Discourage_plagiarism	Avoid_harmful_contents	Proper_headlines	Mislead_emotional_content	Errors_Addressed
EM_Perception	Pearson Correlation	1	-.013	.006	.071	.047	.034	.012	-.008	-.077	-.009	-.047	.078
	Sig. (2-tailed)		.884	.943	.435	.606	.706	.897	.930	.396	.922	.601	.392
	N	124	124	124	124	124	124	124	124	124	124	124	124
Check_Authenticity	Pearson Correlation	-.013	1	.867**	.721**	.644**	.629**	.588**	.676**	.731**	.707**	.627**	.680**
	Sig. (2-tailed)	.884		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Info_drawn_trusted_sources	Pearson Correlation	.006	.867**	1	.745**	.666**	.659**	.654**	.658**	.721**	.711**	.699**	.742**
	Sig. (2-tailed)	.943	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Invades_Privacy	Pearson Correlation	.071	.721**	.745**	1	.620**	.614**	.640**	.570**	.580**	.701**	.672**	.680**
	Sig. (2-tailed)	.435	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Transparent_data	Pearson Correlation	.047	.644**	.666**	.620**	1	.810**	.596**	.661**	.661**	.669**	.560**	.618**
	Sig. (2-tailed)	.606	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Impartial_Info	Pearson Correlation	.034	.629**	.659**	.614**	.810**	1	.626**	.698**	.725**	.677**	.609**	.626**
	Sig. (2-tailed)	.706	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Minority_voices_inclusion	Pearson Correlation	.012	.588**	.654**	.640**	.596**	.626**	1	.693**	.656**	.659**	.583**	.613**
	Sig. (2-tailed)	.897	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Discourage_plagiarism	Pearson Correlation	-.008	.676**	.658**	.570**	.661**	.698**	.693**	1	.721**	.722**	.679**	.691**
	Sig. (2-tailed)	.930	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Avoid_harmful_contents	Pearson Correlation	-.077	.731**	.721**	.580**	.661**	.725**	.656**	.721**	1	.749**	.671**	.695**
	Sig. (2-tailed)	.396	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Proper_headlines	Pearson Correlation	-.009	.707**	.711**	.701**	.669**	.677**	.659**	.722**	.749**	1	.729**	.788**
	Sig. (2-tailed)	.922	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Mislead_emotional_content	Pearson Correlation	-.047	.627**	.699**	.672**	.560**	.609**	.583**	.679**	.671**	.729**	1	.791**
	Sig. (2-tailed)	.601	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000
	N	124	124	124	124	124	124	124	124	124	124	124	124
Errors_Addressed	Pearson Correlation	.078	.680**	.742**	.680**	.618**	.626**	.613**	.691**	.695**	.788**	.791**	1
	Sig. (2-tailed)	.392	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	124	124	124	124	124	124	124	124	124	124	124	124

**. Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Compilation

A total of eleven variables have been identified by the investigators for understanding ethical consideration of electronic media in disseminating information. The variables are:

1. Media outlets should check the authenticity of the data to ensure accuracy of the content they disseminate.
2. Checking that the information is drawn from reliable and trusted sources.
3. Electronic media invades privacy by broadcasting sensitive and personal content without the consent.
4. Transparent data collection practices and safeguarding misuse of information should be encouraged.
5. Media houses should present the information in an impartial way.
6. Inclusion of minority voices in panel discussions.
7. Giving credit to the sources and discouraging plagiarism.
8. Avoiding contents that promotes violence, hate speech and harmful materials.
9. Proper presentation of sensitive headlines.
10. People should not be misled with emotional contents.
11. Errors should be addressed immediately with apologies accepting their accountability.

The analysis above reveals no correlation with any of the identified variables. Thus, we accept the H_{04} and reject H_{14}

Suggestions

Following are the few suggestions given by the researchers on how electronic media can contribute further for achieving India's vision of a Viksit Bharat:

1. Penetration of electronic media in each rural house should be aimed and Agri-tech start-ups, digital tools for farmers should be fostered.
2. Encourage Citizen Journalism amongst people and persuade them to share local news via digital platform to keep the society well informed.
3. Electronic media can revolutionized the urban spaces by spreading awareness regarding sustainable infrastructure, electronic vehicles and efficient waste management.
4. Electronic media should prioritize accuracy; avoid sensationalism, and fact-check content before publication. Upholding transparency, respecting privacy, and combating misinformation are essential. Media should promote diverse perspectives and avoid bias. Encouraging ethical journalism, fostering public trust, and adhering to regulations can ensure responsibility while balancing freedom of expression with societal accountability.
5. The Fact Checking Unit of Press Information Bureau must play a more proactive role in making people aware against fake news.
6. Initiate Virtual Tours of cities, towns and villages showcasing the rich culture, so that people actually understand the diverse cultures and sub-cultures of the country.
7. Electronic media should establish valid rules to reduce misuse, and all media houses must verify the authenticity and consistency of news before publishing.
8. The use of AI can help detect unethical and unwanted behavior online. Additionally, implementing software to automatically ban and block such accounts is essential. Furthermore, laws and policies are needed to protect individuals and promote accountability, making the public more aware of their responsibilities.
9. A thorough investigation of the matter and the source of information are necessary, as well as its relevance to the public.
10. Through Social media, we can access vast information about various topics. However, the public should not blindly trust or follow everything seen online.
11. Media should avoid using provocative headlines or emotional content. Additionally, electronic media must clearly differentiate between news, opinion, and advertisements to prevent confusion.
12. Promoting media literacy, diverse representation, and regular ethics training for journalists will help uphold standards. Encouraging audience engagement will keep media outlets accountable. By taking these steps, electronic media can prioritize accuracy and fairness, contributing to informed public discourse.
13. Electronic media has the power to change discourse they must remain a neutral force to foster India to new heights.
14. More focus should be given by the electronic media towards sustainable farming practices and also educate the rural people towards usage of eco-friendly products.

Conclusion

Electronic media is a crucial driver for implementing India's vision of a 'Viksit Bharat' by providing leverage in India's transformation from developing to developed nation, contributing immensely in the field of education, health, technological advancement, social changes, cultural cohesion and imparting digital knowledge. Viksit Bharat is a Bharat which will have all the attributes of a developed country with a per capita income that is comparable to the nine high-income countries of the world today. It is a Bharat whose social, cultural, technological, and institutional features will mark it out as a developed nation with a rich heritage and one that is capable of functioning at the frontiers of knowledge. Electronic Media therefore will have to play a pivotal role

in this important juncture of India's journey. It has to be unbiased and ethical as it ever has been than in the past, to ensure trust and credibility making it a positive force that will lead India to new heights of education, skill development, environmental and developmental equilibrium, minimum digital divide and cultural promotion and preservation highlighting its potential to empower individuals and communities and bring them closer, strengthening public confidence in it. Electronic media should present content in its truest form. The current trend of exaggerating stories or fabricating information for the sake of views, likes, or TRPs must be kept in check. Media outlets should not neglect their responsibility to the billions of people who rely on them as a source of information. It is essential for electronic platforms to strike a balance between the quality and entertainment value of their content while maintaining its authenticity. As we reach closer to our dream of Viksit Bharat, i.e. a developed India by 2047, the responsibility of Electronic Media will increase manifold but not only until 2047 but beyond 2047, aiming for new albeit sustainable heights.

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FROM ORAL TO DIGITAL: TRANSFORMING MIZO FOLKLORE IN THE AGE OF INSTAGRAM AND YOUTUBE

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Abstract

Mizo folklore, historically rooted in oral tradition, is undergoing a transformation through digital platforms like YouTube and Instagram. This study explores how these media spaces reshape the form, representation, and cultural role of Mizo folktales. Grounded in Michel Foucault's discourse theory and Stuart Hall's concept of cultural identity and representation, the study employs digital ethnography and critical discourse analysis.

Eight folktale adaptations from 2013–2024 were selected based on cultural relevance and audience engagement. The findings show that while core themes: kinship, resilience, justice persist, visual aesthetics often reflect globalized norms, raising concerns around authenticity and representation. The emergence of hybrid forms illustrates both innovation and tension, as traditional narratives adapt to platform logics and visual standards.

Audience responses, particularly nostalgic and intergenerational reflection demonstrate that digital folklore functions as a space of cultural memory and identity negotiation. Ultimately, digital storytelling in Mizoram is not merely a medium shift but a reconfiguration of cultural discourse, where heritage, power, and visibility are continually redefined.

Keywords: Mizo folklore, digital storytelling, cultural identity, representation

Introduction

Storytelling has always been central to human culture, serving as a vital mechanism for transmitting knowledge, values, and collective memory across generations (Bruner, 1991; Ong, 1982). In indigenous communities such as the Mizo of Northeast India, storytelling transcends mere entertainment; it functions as a living tradition, preserving cultural identity, oral history, and moral philosophy. Mizo folklore, rich in myths, legends, proverbs, and songs, has historically been conveyed through oral narratives in communal gatherings, anchoring social cohesion and intergenerational continuity (Zama, 2006).

This oral tradition not only encapsulates the wisdom of ancestors but also reflects values such as kinship, bravery, and reverence for nature. Tales of migration, tribal warfare, and cosmological beliefs have long informed the Mizo worldview and cultural belonging. Scholars like Lalthansangi Ralte (2023) argue that Mizo myths often serve as narratives of territoriality and identity, reinforcing ideas of kinship, social memory, and cultural sovereignty. Importantly, these stories are not static, they evolve with each retelling, shaped by the socio-cultural changes surrounding the community.

In recent decades, the digital age has brought about a fundamental transformation in the way stories are created, shared, and consumed. Digital storytelling, the use of multimedia platforms like YouTube, Instagram, and Facebook to share personal and cultural narratives has emerged as a new cultural practice that blends oral traditions with visual and participatory media (Lundby, 2008). For indigenous communities like the Mizos, digital storytelling presents a critical opportunity to revitalize traditional narratives and connect with diasporic and younger audiences, enabling a dynamic negotiation between cultural preservation and innovation (Ahmed, 2020; Jenkins, 2006).

Mizoram has seen a surge in digital media usage, with over 60% internet penetration by 2022 (TRAI, 2022). This growth is mirrored in the rise of Mizo digital creators who are actively engaging in the narration and dramatization of folk stories across platforms. YouTube, in particular, has emerged as a powerful medium, with channels such as PC Hras adapting folk stories like "TlingilehNgama" and "Mauruangi," the latter achieving over a million views, indicative of growing audience engagement and cultural resonance (Colney, 2023).

Digital storytelling, as a hybrid form that blends oral traditions with video, animation, and music, offers both possibilities and dilemmas. It revitalizes endangered folklore and engages younger and diasporic Mizo audiences (Ahmed, 2020; Robin, 2008), yet it also raises concerns around authenticity, representation, and the politics of visibility (Smith, 2012; Hall, 1997). How are traditional values retained or reshaped in the digital age? What happens to cultural identity when stories are

reframed through platform logics and visual trends? This paper examines the transformation of Mizo folklore through digital storytelling on YouTube and Instagram. Grounded in Michel Foucault's discourse theory (1972) and Stuart Hall's concept of cultural representation (1997), it explores how folklore in digital spaces reflects larger negotiations around power, identity, and heritage in contemporary Mizoram.

Background & Literature Review

Mizo Folklore and Oral Traditions

Mizo folklore, rooted in pre-literate oral traditions, has long functioned as a medium of cultural preservation, moral education, and social cohesion. Narratives were traditionally passed down through communal storytelling by village elders, women, and youth, reinforcing intergenerational knowledge and identity (Zama, 2006; Lalengkimi, 2018). These oral forms encoded values such as kinship, bravery, and harmony with nature, and often served as vehicles for transmitting migration histories, cosmological beliefs, and tribal memory (Ralte, 2023).

Scholars such as Dundes (1980) and Taylor (1984) conceptualize folklore as a form of "communal autobiography," authored collectively and evolving with each retelling. In the Mizo context, these folktales: such as Tlingileh Ngama and Liandovate Unau, act not only as cultural artifacts but as expressions of sovereignty and territorial belonging (Lalthansangi Ralte, 2024). Bawitlung (2022) emphasizes their role in reflecting everyday struggles and aspirations, reinforcing a shared emotional and historical consciousness.

However, globalization poses challenges to oral traditions. Zama (2006) warns of the potential distortion of indigenous narratives due to external cultural influences. As oral knowledge systems interact with global media, questions emerge about preservation, adaptation, and authenticity.

Digital Storytelling: Concept and Relevance

Digital storytelling refers to the integration of narrative with digital media elements, such as images, video, audio, animation, and interactive platforms to craft engaging and often multimodal stories (Lambert, 2013). Globally, digital storytelling has gained traction among indigenous and marginalized communities as a strategy for cultural preservation, identity assertion, and creative autonomy. Robin (2008) highlights that the method allows communities to document oral traditions and preserve them in a form that resonates with younger, digitally native generations. Yet scholars like Lundby (2008) caution that the digitization of storytelling may also lead to shifts in narrative form, structure, and purpose, particularly due to the influence of platform logics and algorithms.

In the Mizo context, digital storytelling has emerged as a significant form of cultural expression over the past decade. Colney (2023) observes that the period between 2019 and 2021 saw a marked increase in Mizo YouTube channels dedicated to folklore narration. This transition is not merely technological—it marks a cultural shift in how stories are consumed and circulated. While early adaptations like Tlingileh Ngama (2013) had limited reach, recent versions like Mauruangi by Pc Hras (2019) have achieved over 1.1 million views, indicating both broader access and deeper engagement.

However, this evolution raises critical concerns about authenticity, representation, and authorship. Jenkins (2006), in his theory of transmedia storytelling, notes that digital platforms inevitably reconfigure narratives, often privileging those that are more adaptable to fast-paced, visually driven consumption. This can lead to the oversimplification or commodification of traditional tales. Van Damme and Neluvhalani (2004) warn that indigenous epistemologies being holistic and relational do not always translate well into fragmented digital formats, risking distortion or decontextualization.

Further, Colney (2023) and Smith (2012) highlight the digital divide, noting that access to the technical skills and equipment required for digital storytelling may exclude traditional storytellers, shifting narrative authority toward younger, tech-savvy creators. This not only changes who gets to tell the stories but may also impact how they are told, potentially sidelining traditional modes of expression and transmission.

Theoretical Framework

This study draws on Michel Foucault's discourse theory and Stuart Hall's concept of cultural representation to examine how Mizo folklore is reimagined in digital environments. Foucault (1972) conceptualizes discourse as the system through which knowledge and power are produced, structured, and circulated. Traditionally, Mizo folklore was governed by oral customs passed down by elders within the community. Today, digital platforms like YouTube and Instagram shift narrative authority to content creators, platform algorithms, and audience metrics, reshaping who controls cultural meaning and how that meaning is legitimized.

Hall's (1997) theory of representation complements this by asserting that cultural identity is not fixed, but constantly constructed through media and symbolic forms. In digital storytelling, identity is shaped not only by what stories are told, but how they are visualized, narrated, and circulated. Representation becomes a site of negotiation, where ethnic specificity, visual aesthetics, and platform norms intersect. Together, these frameworks enable a critical reading of digital folklore as a discursive space where tradition, identity, and power are continually redefined.

Methodology

This study adopts a qualitative, interpretive approach informed by digital ethnography and critical discourse analysis. In examining how Mizo folklore is reimagined through digital platforms, the study treats online media as culturally meaningful texts, embedded with power dynamics, aesthetic choices, and identity constructions. This approach is especially appropriate for indigenous media research, where representation and cultural authorship are deeply contextual and symbolic (Smith, 2012; Robin, 2008).

Rather than relying on interviews or surveys, this research focuses on publicly available digital content, particularly folktale-based videos circulated on YouTube and Instagram. These platforms serve as primary sites for contemporary storytelling among Mizo creators and audiences. The selection of materials followed a purposive sampling strategy, guided by criteria such as:

- Clear adaptation of traditional Mizo folktales, myths, or moral narratives;
- Content published between 2013 and 2024 to capture both early and current digital trends;
- Demonstrated audience engagement, defined as minimum 5,000 views or active interaction (e.g., comments, shares, likes).

The final sample consists of eight digital storytelling artifacts representing diverse stylistic approaches, production scales, and target demographics:

Table 1. Selected Digital Folklore Samples

Title	Creator / Channel	Format / Style
Mauruangi	Mizo Tualchher Cartoon	2D animation
Rairahte-a	PC Hras	Slideshow-narrative with voiceover
Samdal-a	Mizo Cartoon Studio	3D animation
Liandovate Unau	Vulnerable Poultry	2D animation
NgurKanLal Lai	Zo Animation Studio	3D Nusery Rhyme
Chemtatrawta	Zotoon Animation	3D animation
Thinlanga	Mizo Cartoon Studio	3D animation
Chem Tat Rawta	Tetea Chhangte	2D animation, voice over

Each video was subjected to close textual and visual analysis, focusing on elements such as narrative structure, character design, use of traditional motifs, sound design, and animation techniques. Public comment sections, like/dislike ratios, and view counts were also reviewed to gauge audience engagement, emotional resonance, and participatory feedback—crucial elements in digital ethnography (Lundby, 2008; Hausknecht et al., 2021).

The analytical framework draws on Michel Foucault's discourse theory (1972) and Stuart Hall's theory of cultural representation (1997). Foucault's model allows the study to interrogate shifting regimes of narrative authority, from oral tradition to digital authorship, while Hall's framework reveals how visual and linguistic choices shape and contest Mizo identity in algorithmic, globalized spaces. Together, these perspectives enable a nuanced understanding of digital storytelling not simply as media content, but as a cultural discourse negotiating tradition, visibility, and modernity in contemporary Mizoram.

Findings and Analysis

Thematic Continuity and Cultural Transmission

Across the eight selected videos, core themes such as orphanhood, kinship, resilience, and justice remain consistent, indicating strong continuity from traditional oral storytelling. For example, Rairahte-a by PC Hras follows a familiar arc of suffering, moral trial, and resolution, echoing the oral-formulaic structure described by Ong (1982). Similarly, Mauruangi portrays maternal sacrifice through a linear narrative that mirrors traditional Mizo storytelling values.

Even stylistically divergent works such as Chem Tat Rawt A, which uses minimalist visuals, preserve narrative cadence through voiceover. This suggests that while the medium has changed, the didactic and cultural functions of folklore persist.

From a Foucauldian perspective, this shift reflects a decentralization of narrative authority—from elders to digital creators and algorithms (Foucault, 1972). Audience comments further reinforce this continuity. Phrases like "This reminds me of my grandmother's version" illustrate what Hall (1997) calls "representational anchoring," where digital media reconnects viewers to cultural memory.

Thus, thematic resilience in digital storytelling reflects not stagnation but adaptive continuity, preserving identity across formats and generations.

Aesthetic Strategies and the Politics of Representation

Visual representation in digital folklore reveals tensions between cultural authenticity and globalized aesthetics. High-production videos like Mauruangi and NgurKanLal Lai feature Mizo-language voiceovers and symbols like the puanven, anchoring them in local culture. Yet their characters often resemble pan-Asian or Eurocentric models, reflecting platform-driven visual norms.

Hall's (1997) theory of representation explains how identity is shaped not just by what is shown, but how it is framed. In Mauruangi, the protagonist's pale, doll-like features contrast with the ethnic specificity of the narrative, raising concerns of "soft erasure" through aesthetic universalism. The use of standardized animation tools like Toonly or Animaker reinforces this flattening effect (Van Damme & Neluvhalani, 2004).

Foucault's discourse theory helps reveal how platforms function as aesthetic regimes of power. Visual choices are shaped by templates designed for global visibility, not cultural specificity. Yet exceptions like Rairahte-a resist this flattening. Its simple visuals and traditional symbols generate strong emotional responses despite lacking visual polish, demonstrating that cultural fidelity can outweigh production quality.

These findings show that creators often operate within a double bind: the need to preserve identity while remaining visible in algorithmic systems shaped by external norms.

Cultural Hybridity and the Emergence of Glocal Folklore

A recurring pattern in the videos is hybridization, where traditional narratives merge with digital humor, meme formats, and cinematic editing. This creates a form of "glocal folklore" stories that retain local moral foundations but adopt global styles.

Samdal-a exemplifies this with its 3D humor, pop-culture references, and meme-like tone. While the aesthetic is distinctly modern, the core narrative of transformation and justice remains intact. Likewise, Liandovate Unau uses cinematic pacing and stylized narration to modernize an emotionally resonant folk tale.

As Bhabha (1994) suggests, such hybrid forms emerge in a "third space" where translation and distortion coexist. While these adaptations expand folklore's reach—especially among younger or diasporic audiences, they also risk simplifying symbolic depth for platform-friendly appeal.

In Chemtatrawta and Thinlanga, montage editing and non-linear sequences enhance viewer engagement but deviate from traditional pacing. This shift reorients folklore from communal reflection to rapid, entertainment-first consumption. Yet, this hybridity also signals cultural survival. Rather than erasure, it reflects creative negotiation—keeping folklore alive by making it relevant to modern media logic.

Thus, hybridity is not a loss but a strategic adaptation, balancing visibility with heritage.

Audience Engagement: Nostalgia, Memory, and Affective Belonging

Audience interaction plays a vital role in shaping digital folklore's meaning. Comments on Mauruangi and LiandovateUnau show deep emotional connection, often recalling childhood memories or village life. These responses reflect affective belonging and what Boym (2001) terms "reflective nostalgia" a longing to reconnect with cultural roots through mediated experiences.

Such engagement transforms viewers from passive consumers into active participants in cultural memory. Hall's (1997) notion of representation as co-constructed is evident in comment sections that affirm, reinterpret, or extend the story's meaning. Jenkins (2006) calls this a "participatory culture," where interpretation and memory circulate socially, not hierarchically.

Importantly, even playful or hybrid forms like Samdal-a attract affective commentary. Viewers often affirm their cultural value, despite stylistic shifts. This suggests that emotional resonance outweighs format fidelity in cultural retention.

From a Foucauldian lens, these interactions reflect how power circulates through emotion. Algorithms prioritize what is liked and shared, making emotional feedback a form of cultural validation. In this way, digital storytelling becomes a prosthetic extension of oral tradition, not replacing it, but extending its reach through screens,

comments, and memories.
Thus, digital platforms are not only dissemination tools but spaces of identity-making, where folklore is remembered, felt, and reshaped collectively.

Conclusion

This study examined the transformation of Mizo folklore from oral to digital spaces, focusing on how platforms like YouTube and Instagram reshape narrative form, visual aesthetics, and cultural meaning. Through qualitative content analysis of eight representative folktale adaptations, the research reveals that digital storytelling in Mizoram is not merely a technological shift but a discursive reconfiguration of cultural identity, authorship, and power.
The findings demonstrate that core themes—such as kinship, resilience, orphanhood, and justice—remain intact, showing that the digital medium can preserve the moral and symbolic logic of traditional narratives. At the same time, the visual and aesthetic strategies employed by content creators often reflect globalized norms, leading to tensions around representation and cultural authenticity. These tensions highlight the influence of platform constraints and design tools in shaping how folklore is visualized and received.
The emergence of hybrid storytelling forms, which blend Mizo tradition with meme culture, cinematic editing, and nursery aesthetics, illustrates the adaptive capacity of folklore in the face of globalization. Far from signaling cultural loss, these hybrid forms enable creative survival, particularly for youth and diasporic audiences. However, the risk of aesthetic flattening and algorithm-driven commodification remains real.
Importantly, audience engagement emerges as a central force in the digital folklore ecosystem. Emotional responses, nostalgic recollections, and intergenerational sharing practices show that viewers are not passive consumers but co-producers of meaning and memory.
In conclusion, the transition from oral to digital storytelling in Mizoram reflects a broader negotiation between tradition and innovation, heritage and platform logic, identity and visibility. To sustain this cultural resurgence, future efforts must prioritize inclusive digital tools, community led archiving, and culturally sensitive design, ensuring that Mizo voices continue to shape how their stories are told in the digital age.

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MULTILINGUAL EDUCATION AND ITS REFLECTION IN NEP 2020: OPPORTUNITIES, CHALLENGES, STRATEGIES

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Abstract

Acknowledging the essence of Indian languages,including English and other foreign languages globally, may pave the way towards internationalization. NEP 2020 envisions the importance of multilingual education for a holistic approach to language learning, recognizing the worth of linguistic diversity. Challenges may arise, such as narrow nationalism, cultural conflicts, etc. The latest dictionaries in multiple languages will be utilized in education. It is envisioned to prepare quality instructional materials in bilingual texts, thereby aiding students to subsequently attain proficiency in Indian and Foreign languages (NEP 2020, MoE, GOI). Adhering to a conceptual study, the investigators intend to highlight the attainable opportunities encompassing multilingual education.
The paper outlines the problems that may emerge with implementing multilingual education as well as thestrategies that may be adopted to counteract these.

Keywords: Multilingual education, NEP 2020, opportunities, challenges, strategies

Introduction

India's National Education Policy NEP 2020 brings an indispensable paradigm shift in its educational scenario. Multilingual education, a significant element of this policy, intends to provide learners with proficiency in multiple languages, thereby fostering enculturation and henceforth celebrating its rich linguistic diversity. The policy aims to elucidate the essence of multilingual education in shaping an inclusiveand culturally enriched educational system in India. The integration of languages will induce mutual collaboration, bridging the incongruities, for instance, as cultural conflicts, narrow nationalism, communal violence, social disharmony, casteism, etc. Due impetus will be conferred on the minority languages, and adequate initiatives will be incorporated to pay equal regard to all the languages.

It will aid in initiating cross-cultural understanding, student exchange, mobility of teachers, etc., enhancing global partnerships.

Multilingual education refers to the utilization of two or more languages as the primary language of instruction. Multilingual education promotes critical thinking, an appreciation of cultural diversity, and social cohesion (Dhokare et al., 2023). UNESCO created the term "multilingual education" in 1999 to describe the use of the mother tongue, a regional or national language, in the classroom setting(Tripathi, 2023). According to Bashir and Jan, 2024, the NEP-2020 emphasizes the value of allowing pupils to continue learning in theirmother tongue until Class 5, and ideally until Class 8 or later.

Keeping in compliance with the policy, the three-language formula will be applied in a flexible way that is easy for students to understand. Languages will be freely chosen by the states,paving forth, enhancing their uniqueness (Ray et al., 2023). Two of the languages should, however, be native to the region (Srivastava & Ghatak, 2022).It is anticipated that the Central/Union and State Governments will assist language teachers worldwide in disbursing fundsto enhance the local languages included in the Indian Constitution's Eighth Schedule (NEP 2020, MoE, GOI).

The researchers have taken recourse to secondary sources of data as a basis for the discussion. Adhering to a conceptual study, the investigators intend to highlight the attainable opportunities encompassing multilingual education.

The paper outlines the problems that may occur with implementing multilingual education and the possible strategies that may be adopted to address these.

Review of Related Literature

The National Education Policy, NEP2020, has highlighted multilingualism in education, aiming to promote cognitive development and cultural awareness. Bashir and Jan (2024) emphasized the flexibility in adopting the three-

language formula while identifying critical challenges such as low literacy rates, a lack of trained teachers, and inadequate learning materials. They advocated for community-based teacher recruitment and language training programs. Acharya (2023) highlighted multilingualism as central to India's composite culture, yet pointed out the practical obstacles in material and instructor availability. Dhokare et al. (2023) underlined the prospects of mother tongue acquisition for enhancing academic performance and cognitive abilities, stressing the need for teacher training, curriculum revision, and technology integration. Similarly, Ray et al. (2023) observed that using the mother tongue significantly aids early learning, particularly in complex subjects like Mathematics and Science. However, implementation difficulties, especially in tribal regions, such as resource scarcity and teacher shortages, remain pressing.Sachdeva (2023) proposed integrating design thinking into multilingual education, fostering innovation and deeper understanding through teaching content in multiple languages. Tripathi (2023) echoed concerns about infrastructural gaps, recommending the development of textbooks and resources in local languages, aligned with appropriate pedagogical strategies. Godwin and V (2022) discussed the cognitive advantages of bilingual education, promoting stress-free learning and skill enhancement through experiential activities and smooth language transitions. Srivastava and Ghatak (2022) suggested translation as a tool to bridge linguistic diversity, citing Odisha's integration of tribal languages as a successful model. Ray (2021) and Singh (2020) stressed the importance of English as a global link language, essential for career advancement. However, they noted the challenges faced by rural schools lacking English-medium resources and technical education opportunities. Sharma (2020) reiterated the role of multilingualism in fostering national unity and holistic development, though he pointed to persistent gaps in basic language competencies among students.

Research gap

Though significant studies have highlighted the theoretical challenges of implementing multilingual education through NEP 2020, there remains a gap in observing the attainable strategies and opportunities that can be tailored to overcome the challenges. Addressing these gaps is essential for the policy's effective translation into worthwhile execution.

Need and Significance of the Study

Indian languages are entwined with our deep-rooted tradition and cultural heritage. NEP 2020 highlights the essence of imparting due recognition to the indigenous languages. Additionally, the policy envisions the indispensable fervor of foreign languages to acknowledge international collaboration, streamlined with international understanding between and among nations. Imparting multilingual education by incorporating innovative ways and means may stimulate curiosity and generate creativity among the students, not only in learning but also in paying due regard to their Mother Tongue, regional languages, indigenous as well as foreign languages. Besides, unfurling the richness and glory, it may strengthen their base to attain appropriate skills in the acquisition of native languages. The study may draw awareness among the stakeholders in education and policymakers to take necessary actions for the enrichment of linguistic diversity. It may also acquaint the stakeholders in education, NGOs, etc., to monitor the function of language policy and multilingual education.

Objectives of the Study

1. To study the concept of multilingual education outlined in the NEP 2020.
2. To identify the opportunities in promoting multilingual educationin the NEP 2020.
3. To explore the challenges in promoting multilingual education within the framework of NEP 2020.
4. To become acquainted with the possible strategies to counteract the obstacles to the successful promotion of multilingual education.

Methodology

The present study is descriptive and qualitative in nature. Data are gathered from secondary sources- e-books, e-articles, e-journals and e-government documents, websites, etc.

Analysis and Discussion

Objective 1:Concept of Multilingual Education

Multilingual education refers to the use of two or more languages as the primary medium of instruction. UNESCO in 1999 referred to multilingual education as the employment of at least three languages in the classroom —the mother tongue, a regional or national language, and an international language (Tripathi, 2023). Given India's linguistic diversity, the government also implemented the "Three-Language Formula" to foster both national unity and multilingualism (Tripathi, 2023). Greater flexibility is also provided by the three-language system without forcing any language on the residents.Nevertheless, at least two of the three languages ought to be native.

Considering the recommendations of the National Education Policy, 2020, it is envisioned that the medium of instruction should be imparted in the mother tongue/local language/regional language till Grade V and Grade VIII or later. (NEP 2020, MoE, GOI, pp.13)

Ahome language can be spoken by family members quite different from the mother tongue or local language(NEP 2020, MoE, GOI). Quality textbooks should be made available in one's home language (NEP 2020, MoE, GOI). Teachers are advised to adopt a bilingual approach in the selection of instructional materials during content delivery. (NEP 2020, MoE, GOI).

- From the preparatory level onwards, multilingual education helps in the development of a child's cognitive faculty. Speaking and writing abilities can be improved through creative and engaging methods. (NEP 2020, MoE, GOI).
- To sustain quality, both the Union and the State governments should invest in language teachers. (NEP 2020, MoE, GOI).
- Using technologywill sparkinterest among the students to study the languages (NEP 2020, MoE, GOI).

Objective 2: Opportunities in promoting Multilingual Education

1. Courses and programs in Indian languages, internationally relevant curricula in the sciences, and social sciences will facilitate opportunities for social engagement to attain global quality standards and attract a great mass of international students to achieve the goal of 'internationalization at home' (NEP 2020, MoE, GOI, pp.39).
2. Multilingual education enables to promotion, preservation, and transmission of India's rich cultural heritage. It tends to celebrate diverse cultures and languages. By attaining knowledge of one's cultural history, languages, and tradition, students can boost their self-esteem, cultural awareness, cultural identity, and expression (NEP 2020, MoE, GOI, pp.53).
3. It will expand high-quality opportunities for employment in varied sectors as education, marketing, tourism, business, etc., both locally and globally. (NEP 2020, MoE, GOI, pp.55).
4. In the last 40 years, near about 220 languages have become extinct. Around 197 languages, according to UNESCO, are threatened (NEP 2020, MoE, GOI, pp.53). Hence, by incorporating these languages in the educational curricula, multilingual education will contribute to their revitalization.
5. Instead of viewing bilingualism as a deficit, multilingual education recognizes it as a valuable resource that contributes to individual and societal development.
6. AICTE technical book-writing is envisioned to be translated into 12 Indian languages. It identifies 128 Online MOOCs to be converted into regional languages. Common University Entrance exams are to be conducted in 13 regional languages. Engineering and Technical courses will be imparted in 6 regional languages- Bengali, Hindi, Marathi, Kannada, Tamil, and Telugu. Artificial Intelligence auto translation tools will be available in Indian languages. More than 8000 Higher Education Institutions have started adopting Indigenous languages in their curriculum and worked on the digitization of 1.5 lakh books (Singh, 2020).

Objective 3:Challenges in Promoting Multilingual Education

1. There has been ascarcity of efficient language teachers in India, regardless of the measures taken. (NEP 2020, MoE, GOI, pp.54).
2. Cultural conflicts, pedagogical differences, and narrow nationalism among diverse language speakers may create a hindrance to promoting multilingual education. (Tripathi, 2023).
3. Lack of translation of resource books is also one of the causesfor dropout from schools in rural areas. There persists the vocabulary gap as many local languages lack scientificand geographical terminologies (Srivastava & Ghatak, 2022).
4. Maintaining consistent standards across different languages can be challenging as variations in dialects and vocabulary may exist (Acharya, 2023).
5. Developing assessments that accurately measure learning outcomes in multiple languages can be complex, requiring careful consideration of language policy. (Srivastava & Ghatak, 2022)
6. Insufficient monitoring of the execution of language policy on the part of the government may hamper in effective promotion of multilingual education (Tripathi, 2023).
7. Lack of concrete provision for teaching South Indian languages in Hindi-speaking States and vice versa, and limited disbursement bythe government. Centrally prescribed textbooks tend to provide insufficient flexibility in integrating local resources, local texts, and native culture in the teaching and learning process. (NEP 2020, MoE, GOI, pp. 54).

Objective 4:Possible Strategies to counteract the obstacles for the successful promotion of Multilingual Education

1. Teaching and learning of Indian languages will be integrated at all levels of education.Literary works such as poems, novels, and magazines should be produced with a strong emphasis on quality and excellence. (NEP 2020, MoE, GOI, pp. 53).
2. Few cultural items from the local context can be included in textbooks as instances of great men, temples, random natural species, heritage sites, etc. (Srivastava & Ghatak, 2022). Appropriate translation of science and mathematics textbooks, too, should be in local languages.
3. To enable experiential language learning, distinguished local artists, writers, and subject experts will be engaged across disciplines such as humanities, sciences, arts, crafts, etc., into the curriculumto share their unique knowledge and skills. (NEP 2020, MoE, GOI, pp. 54).

4. The National Research Foundation (NRF) will disburse grant-in-aid to promote quality research in the areas of indigenous languages.(NEP 2020, MoE, GOI, pp. 54).
5. The Indian Institute of Translation and Interpretation (IITI) will be established to prepare quality learning materials in Indian and foreign languages. It will employ numerous multilingualsubject experts through extensive use of technology for the promotion of indigenous languages. (NEP 2020, MoE, GOI, pp. 55).
6. Sanskrit education will be revitalized through engaging and creative methods that link the language to modern and relevant disciplines such as mathematics, astronomy, philosophy, linguistics, performing arts, and yoga.(NEP 2020, MoE, GOI, pp. 55).
7. Classical language institutes will merge with universities, maintaining autonomy, inducing the stakeholders to work collaboratively in rigorous multidisciplinary programs. (NEP 2020, MoE, GOI, pp. 55).
8. Scholarships will be granted for individuals irrespective of any differences to study Indian languages under local instructors. (MoE, GOI, NEP 2020, pp. 56).
9. BhashaKendras will be set up to prepare study materials and transmit them in Indian languages. As per the IKS national coordinator, Ganti S. Krishnamurthy, each center will develop at least one course in their respective language at the UG level. (Iftikhar, F, October 16, 2022, 11.13 PM, Hindustan Times).
10. Incorporation of language games and fun-filled projects, activities on the languages of India will be undertaken under the initiative "Ek Bharat Shrestha Bharat", enabling students to learn about the unity of Indian Languages. (NEP 2020, MoE, GOI, pp. 53).
11. Observance of multilingualism at all levels of schooling, including Higher Education, ought to be considered.(MoE & MSDE, 2023).
12. Adequately developed curriculum materials, Braille books, ramps, braces, and calipers will be provided for the children with special needs (NEP 2020, MoE, GOI, pp. 55).

Suggestions

1. To pique students' interest, Indian languages should be taught using creative techniques, including role-playing, local theme skits, script writing, creating stories from images, etc.
2. To effectively train and improve the competencyof language teachers in Indian educational institutions, sufficient finances, government grants should be awarded.
3. The curriculum designers are encouraged to make further efforts to includeillustrations from local contexts in textbooks so that students feelfamiliar with the material.
4. Educational institutions should have access to sufficient infrastructure and material resources, such as internet connectivity, smart boards, LCD projectors, audio recorders, audio-visual aids, language labs,and qualified staff.
5. Adopting a bilingual approach to language teaching and learning will enable the students to generate ideas in one's mother tongue and regional languages, simultaneously initiating one's self self-esteem to express in the English language.
6. The assessment procedure for language learning should be practical, based on situational experiences rather than on cramming and rote memorization.
7. A National Centre for Information on Indian Languages under CIIL (Central Institute of Indian Languages) should be set up to develop methods, materials for translation in Indian languages (NEP 2020, MoE, GOI).
8. The content prepared for "Divyang" students, for instance, braille books, should be learner-friendly and disseminated through standardized Indian and local sign languages.
9. It is the ardent duty on the part of the govt., NGOs and the stakeholders in education to frequently monitor the proper implementation of language policies, ensuring follow-up and continuous feedback for improvement.

Conclusion

Language as a means of communication is the mutual interchange of ideas, opinions, etc. between and among individuals. India's National Education Policy NEP 2020) envisions renovating its existing educational structure along with its indispensable aspects. Multilingual education intends to unfurl the richness and glory of linguistic diversity. Needless to say, one's language is entwined with one's culture and tradition. The policy contemplates reviving the endangered Indian languages to be acquired through interesting and novel ways. It will enable the students not only to imbibe the languages but also to acknowledge the significance and show due reverence.

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CHALLENGES OF ORGANIC FARMING: A COMPARATIVE STUDY ON ORGANIC AND CONVENTIONAL FARMERS

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Abstract

A comparative analysis was done on the challenges perceived by organic and conventional farmers about the challenges associated with organic farming. For this, a survey was conducted among 250 organic paddy farmers registered under the Paramparagat Krishi Vikas Yojana scheme and 250 conventional paddy farmers with the help of a schedule. Thirteen important challenges were identified during the survey, and after analyzing the responses using median scores and Mann-Whitney U test, it was found that the responses of the two groups were significantly different for eleven of these challenges. Some of the important policy recommendations made by the study were development of farmers' markets exclusively for organic products near the production sites, better regulation of extension services, provision of processing and cold storage facilities, correct mix of theoretical and practical training, intensive and extensive educational campaigns for both farmers and consumers, subsidized irrigation facilities, and farmer-friendly loans in the organic farming sector.

Keywords: Organic farming, challenges, Paramparagat Krishi Vikas Yojana, Kamrup district, comparative analysis.

Introduction

The Green Revolution, which had its advent in India during the 1960s, transformed the nation from one that was food deficit to one that could not only meet its own food requirements, but also export to other countries. However, on the flip side, Green Revolution gave rise to a farming culture characterized by excessive groundwater extraction for irrigational purposes, monoculture, and increasing dependency on synthetic fertilizers and pesticides. As a result of this, groundwater levels depleted, soil quality deteriorated, indigenous varieties of crops disappeared besides several other negative consequences.

It became imperative for the nation to foster an agricultural system marked by thriving productivity while taking care of the natural resource base. The plethora of positive benefits offered by organic farming makes it a possible remedy to the ill-impact of conventional farming. Several research studies have found organic farming to be advantageous towards soil quality, human health, biodiversity, climate change mitigation, preservation of indigenous farming knowledge, food security and improvement of livelihood.Acknowledging these benefits, the Government of India has been promoting organic farming, mainly in the regions which have continued the traditional practice of farming using organic inputs.

A number of favourable factors have led to the North Eastern Region (NER) of India being recognized as a focus area for the development of organic farming in the country. These include- apathy towards the use of chemical inputs by the regions' farmers, usage of 'low input-low risk-low yield' techniques which helps easier transition to organic farming, livestock maintenance by almost all the agricultural households that can act as an important source of farm manure, heavy rainfall leading to large biomass availability, varied ecosystem that supports different categories of agro products, etc. Centrally sponsored schemes like RashtriyaKrishiVikasYojana (RKVY), ParamparagatKrishiVikasYojana (PKVY), and Mission Organic Value Chain Development (MOVCD) have been implemented in this region from time to time to promote organic farming. The present study shall focus on the challenges faced by the organic farmers under the PKVY scheme in Kamrup district, and compare the same with the challenges perceived by conventional farmers in relation to organic farming. The PKVY scheme have been specifically selected for the study as this was the first scheme under which final certification (PGS-Organic) was received by the farmers, making their products eligible to be sold as organically certified within India. The findings of the study are expected to throw light on the problems faced by the farmers of the region in making organic farming a commercial success.

Review of Literature

By reviewing the literature of both theoretical and empirical nature, a conceptual framework could be developed based on the existing ideas and concepts. In this section, the researcher has identified the key challenges highlighted by related works of research:

Sl. No.	Key Challenge Identified	Author(s)
1	Lower yield level in organic farming	Margasagyam, 1999; Narayan, 2005; Ramesh, et. al., 2010; Reddy, 2010; Singh &Grover, 2011; Amarnath& Sridhar, 2012; Kaur&Kalra, 2015; Kumar, et. al., 2015; Mohanty&Mandal, 2015; Suganthi, 2015;Yepthomi, 2016; Barik, 2017; Mukherjee, 2017; Devi,et. al., 2020; Gurung&Choubey, 2021
2	Lack of awareness and training among farmers	Brodt&Schug, 2008; Slathia, et. al., 2013; Annakamu, 2014; Swarna, 2016; Sivaraj, et. al., 2017; Gurung&Choube, 2021; Khadda, 2021)
3	Dearth of good quality organic inputs	Margasagyam, 1999; Singh, 2007; Pandey& Singh, 2012; Slathia, et. al., 2013; Kaur&Katla, 2015; Mohanty&Mandal, 2015; Aulakh&Ravisankar, 2017; Barik, 2017; Sivaraj, et. al., 2017; Das, et al. 2018; Murry, 2019; Gurung&Choubey, 2021
4	Non-availability of adequate marketing facilities	Borse, 2004; Prasad, 2005; Gosavi, 2010; Panneerselvam et. al., 2011; Pandey& Singh, 2012; Kaur&Kalra, 2015;Aulakh&Ravisankar, 2017; Santhoshkumar, et. al., 2017; Das, et. al., 2013; Das & Bhattacharya, 2018;Azam, et. al., 2019; Devi, et. al., 2020; Khadda, 2021
5	Inability of farmers to cover the cost involved in organic farming	Kler, et. al., 2001; Narayan, 2005; Prasad, 2005; Ramesh et. al., 2010;Pandey& Singh, 2012; Mohanty&Mandal, 2015; Mukherjee, 2017; Hanglem, et. al., 2019; Murry, 2019;Khadda, 2021;
6	Lower profitability	Ramesh, et. al., 2010; Dadhwal, et. al., 2011; Kaur&Kalra, 2015; Hanglem, et. al., 2019; Murry, 2019; Devi, et. al., 2020; Gurung&Choubey, 2021

Sl. No.	Key Challenge Identified	Author(s)
7	Cost and complexity of third-party certification	Reddy, 2010; Amarnath& Sridhar, 2012;Kumari, et. al., 2016; Aulkah&Ravisankar, 2017; Das, et. al., 2018; Das & Bhattacharya, 2018; Hanglem, 2019
8	Shortcomings of government initiatives	Eyhorn, 2004; Narayan, 2005; Brodt&Schug, 2008; Reddy, 2010; Panneerselvam, et. al., 2011; Pandet& Singh, 2012; Kaur&Kalra, 2015; Kumari, et. al., 2016; Swarna, 2016; Babu, et. al., 2017; Mukherjee, 2017; Das, et. al., 2018; Das 8 Bhattacharya, 2018
9	Ineffective management of pests and diseases	Singh, 2007; Slathia, 2013; Mohanty&Mandal, 2015;Swarna, 2016; Barik, 2017; Sivaraj, 2017; Das& Bhattacharya, 2018; Das, et. al.,2018; Murry, 2019; Devi, et.al., 2020; Gurung&Choubey, 2021

Objective of Study

After a thorough review of the literature available on the topic, the following objectives have been set for the study:
(i) To assess the socio-economic characteristics of the sample respondents.
(ii) To make a comparative analysis of the perception of organic and conventional farmers in relation to the challenges associated with organic farming.

Research Methodology

The study was conducted in Boko block of Kamrup district of Assam. Two universes were considered for the study. The first universe consisted of all the organic paddy farmers registered under the Paramparagat Krishi Vikas Yojana scheme in Kamrup district. Population size for this universe was found to be 519 (Source: Directorate of Agriculture, Government of Assam, 2019). After application of the Taro Yamane formula (1967) with 95% confidence level, the sample size for this population was found to be 226, which was rounded off to 250. Respondents for the sample were selected using lottery method after obtaining the list of farmers from the PGS (Participatory Guarantee System) group leaders. For the second universe, all the conventional paddy farmers of Kamrup district were considered.

As the population size of this universe was undefined, the number of sample respondents taken was same as that for the first universe, i.e., 250.Respondents for this sample were selected using convenience sampling method. First-hand data was collected mainly with the help of a schedule. A five-point Likert scale consisting of the following ratings was used for collecting data related to challenges associated with organic farming: Very important = 5, Important = 4, Neutral = 3, Unimportant = 2 and Very unimportant = 1. Percentage analysis was used for analyzing the socio-economic profile of the farmers. For analyzing the data related to perception and motivation of farmers, median scores were calculated and Mann-Whitney U test was conducted.

Socio-Economic Profile of the Respondents

Table 1: Table showing the socio-economic profile of the respondents

Parameters	Organic farmers	%	Conventional farmers	%
Gender				
Male	245	98	242	96.8
Female	5	2	8	3.2
Total	250	100	250	100
Age (in years)				
Upto 40	130	52	140	56
41-60	90	36	97	38.8
Above 60	30	12	13	5.2
Total	250	100	250	100
Marital status				
Married	220	88	197	78.8
Unmarried	22	8.8	50	20
Widowed	8	3.2	3	1.2
Divorced/Separated	0	0	0	0
Total	250	100	250	100
Type				
Nuclear	142	56.8	128	51.2
Joint	108	43.2	122	48.8
Total	250	100	250	100
Family size				
1-3	35	14	45	18
4-6	183	73.2	168	67.2
7 and above	32	12.8	37	14.8
Total	250	100	250	100
Average number of adults in family				
Male	1.79	-	2.01	-
Female	1.79	-	1.87	-
Educational level				
No formal education	25	10	10	4
Primary	142	56.8	96	38.4
Matriculation	55	22	77	30.8
Higher secondary	23	9.2	42	16.8
Graduation	5	2	25	10
Total	250	100	250	100

Parameters	Organic farmers	%	Conventional farmers	%
Religion				
Hinduism	245	98	246	98.4
Islam	0	0	2	0.8
Christianity	5	2	2	0.8
Others	0	0	0	0
Total	250	100	250	100
Caste				
General	2	0.8	22	8.8
Other Backward Caste (OBC)	37	14.8	23	9.2
Scheduled Caste (SC)	33	13.2	12	4.8
Scheduled Tribe (ST)	178	71.2	193	77.2
Total	250	100	250	100
Primary occupation				
Agriculture and allied activities	245	98	233	93.2
Trade and business	3	1.2	8	3.2
Salaried job	2	0.8	9	3.6
Total	250	100	250	100
Annual income				
Upto Rs.50,000	50	20	35	14
Rs.(50,001-1,00,000)	123	49.2	121	48.4
Rs.(1,00,001-1,50,000)	39	15.6	37	14.8
Rs.(1,50,001-2,00,000)	10	4	20	8
Above Rs.2,00,000	28	11.2	37	14.8
Total	250	100	250	100

Source: Field Survey

The major findings that can be observed from the above table are as follows: -

- 98% of the organic farmers were male, while 2% were female. 96.8% of the conventional farmers were male and 3.2% were female.
- Majority of the organic and conventional farmers, i.e. 52% and 56% belonged to the age group of 40 years and below.
- 88% of the organic farmers and 78.8% of the conventional farmers were married.
- 56.8% of the organic farmers and 51.2% of the conventional farmers stayed in nuclear families.
- 73.2% of the organic farmers lived in families consisting of 4 to 6 members, with an average of 1.79 adult males and 1.79 adult females. 67.2% of theconventional farmers lived in families consisting of 4 to 6 members, with an average of 2.01 adult males and 1.87 adult females.
- 56.8% of the organic farmers and 38.4% of the conventional farmers had completed education upto the primary level. This was followed by 22% of organic farmers and 30.8% of conventional farmer who had completed education upto the matriculation level.
- 98% of the organic farmers and 98.4% of the conventional farmers practiced Hinduism.
- 71.2% of the organic farmers and 77.2% of the conventional farmers belonged to the Scheduled Tribe (ST) category.
- Agriculture and allied activities was the primary occupation for 98% of the organic farmers and 93.2% of the conventional farmers.
- The annual income for 49.2% of the organic farmers and 48.4% of the conventional farmers ranged between Rs. 50,001 and Rs. 1,00,000.

Challenges Associated with the Practice of Organic Farming: A Comparative Analysis using Median Scores and Mann-Whitney U test

Table 2: Table showing the challenges associated with organic farming

Sl. No.	Challenges	Median scores		p-values (Mann-Whitney U test)
		Organic farmers	Conventional farmers	
1	Lack of proper markets	5	4	0.000**
2	Lack of optimum price	5	4	0.000**
3	Lack of finance	4	3	0.000**
4	Lack of processing facilities	5	5	0.002**
5	Lack of promotional activities	4	5	0.018*
6	Lack of proper storage facilities	3	4	0.006**
7	Lack of quality inputs	4	3	0.000**
8	Lack of incentives from government	5	5	0.601
9	Lack of technical knowledge and skills	4	5	0.000**
10	Difficulty in getting proper advice and information	4	4	0.001**
11	Poor extension services	5	3	0.000**
12	Lack of training facilities	4	4	0.011*
13	Lack of irrigation facilities	4	5	0.076

Source: Computed Data
**Significant at 5% level*
***Significant at 1% level*

The above table can be interpreted as follows:
-The responses for the challenge 'lack of proper markets' had a median score of 5 for the organic farmers and 4 for the conventional farmers. The p-value obtained from the Mann-Whitney U test was below 0.01 and therefore there exists a significant difference in the perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of proper markets for organic products" is rejected.

-The responses for the challenge 'lack of optimum price' had a median score of 5 for the organic farmers and 4 for the conventional farmers. The p-value obtained from the Mann-Whitney U test was below 0.01 and therefore there exists a significant difference in the perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of optimum price for organic products" is rejected.

-The responses for the challenge 'lack of finance' had a median score of 4 for the organic farmers and 3 for the conventional farmers. The p-value from the Mann-Whitney U test was below 0.01, which indicates that there is a significant difference in the perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of finance for organic farming" is rejected.

-The responses for the challenge 'lack of processing facilities' had a median score of 5 for both the organic and conventional farmers. The p-value obtained from the Mann-Whitney U test was below 0.01 and therefore there is a significant difference in perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of processing facilities for organically grown crops" is rejected.

-The responses for the challenge 'lack of promotional activities' had a median score of 4 for the organic farmers and 5 for the conventional farmers. The p-value obtained from the Mann-Whitney U test was below 0.05, which indicates that there is a significant difference in the perception between organic and conventional farmers regarding this challenge, at 5% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of promotional activities for organic farming" is rejected.

-The responses for the challenge 'lack of proper storage facilities' had a median score of 3 for the organic farmers and 4 for the conventional farmers.The p-value obtained from the Mann-Whitney U test was below 0.01, which indicates there is a significant difference in the perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of proper storage facilities for organically grown crops" is rejected.

-The responses for the challenge 'lack of quality inputs' had a median score of 4 for the organic farmers and 3 for the conventional farmers. The p-value obtained from the Mann-Whitney U test was below 0.01, which shows that there is a significant difference in the perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of quality inputs for organic farming" is rejected.

-The responses for the challenge 'lack of incentives from government' had a median score of 5 for both the organic and conventional farmers. The p-value obtained from the Mann-Whitney U test was above 0.05, which indicates that there is no significant difference in perception between organic and conventional farmers regarding this challenge, at 5% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of incentives from government for organic farming" is accepted.

-The responses for the challenge 'lack of technical knowledge and skills' had a median score of 4 for the organic farmers and 5 for the conventional farmers.The p-value obtained from the Mann-Whitney U test was below 0.01, which indicates that there is a significant difference in the perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of technical knowledge and skills for organic farming" is rejected.

The responses for the challenge 'difficulty in getting proper advice and information' had a median score of 4 for both the organic and conventional farmers. The p-value obtained from the Mann-Whitney U test was below 0.01, which indicates there is a significant difference in

-in the perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of difficulty in getting proper advice and information for organic farming" is rejected.

-The responses for the challenge 'poor extension services' had a median score of 5 for the organic farmers and 3 for the conventional farmers.The p-value obtained from the Mann-Whitney U test was below 0.01 and therefore there exists a significant difference in the perception between organic and conventional farmers regarding this challenge, at 1% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of poor extension services for organic farming" is rejected.

-The responses for the challenge 'lack of training facilities' had a median score of 4 for both the organic and conventional farmers. The p-value obtained from the Mann-Whitney U test was below 0.05, indicating that there is a significant difference in the perception between organic and conventional farmers regarding this challenge, at 5% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of training facilities for organic farming" is rejected.

-The responses for the challenge 'lack of irrigation facilities' had a median score of 4 for the organic farmers and 5 for the conventional farmers. The p-value obtained from the Mann-Whitney U test is above 0.05, which indicates there is no significant difference in the perception between organic and conventional farmers regarding this challenge, at 5% level of significance. Hence, the null hypothesis that "there is no significant difference in the perception of organic and conventional farmers regarding the challenge of lack of irrigation facilities for organic farming" is accepted.

Conclusion

This study was an attempt to understand the perception of organic and conventional paddy farmers regarding the challenges of organic farming and if there exists a significant difference in the perception of the two groups of farmers. It was found that the perception of organic and conventional farmers significantly differed for all the identified challenges, except for 'lack of incentives from government' and 'lack of irrigation facilities. Based on the above findings, the researcher recommends that (1) farmers' markets exclusively for organic products should be developed near the production sites, where farmers can sell their produce, without the involvement of middlemen, at good profit margins (2) extension services should be regulated in a manner that provision of inputs, information, and training is done at the right time and follows proper standards (3) processing facilities should be availed to farmers for value-addition, through government initiatives (4) the farming community should be involved as participants while policies are being framed for organic farming (5) a proper mix of theoretical and practical training should be provided to the farmers, with proper feedback and no discriminatory practice (6) intensive as well as extensive educational campaigns about the benefits of organic farming on soil, health, economy and the overall environment should be conducted among farmers and the general public (7) farmers should be provided subsidized irrigation facilities to help them overcome productivity losses and cultivate for more than one season (8) the quality of inputs for organic farming should be improved through research undertakings, and such inputs should be made readily available at reasonable rates near the farmers (9) loan facilities for organic farming should be made easily accessible to farmers, so that they can afford inputs of the right quality and quantity (10) proper storage facilities, including cold storages should be provided to farmer groups, thus making their products suitable for sale overlonger time periods and in far-off markets (11) farmers' forums and village leaders need to be involved more actively in knowledge exchange and dissemination of information about organic farming.

Though there lay numerous challenges in the organic farming sector of the region, it is sure to drive both farmers and consumers in the upcoming future, given its potential for sustainable economic and environmental development. Hence, it is the need of the hour that the organic farming sector receives holistic support from different groups of the society.

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MULTI AREA POWER SYSTEM LOAD FREQUENCY CONTROL APPLICATION SELF-DETERMINING TO SLIDING MODE CONTROL

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Abstract

The motivation of the paper is two-area interconnected power system of load frequency control using sliding mode. The two areas signify distribution of two non reheat power system. Governor dead band comprises in this system, also generation rate constraint should be another important parameter, which implies to generation. The major outcome of our research is the control action and the frequency re motive of our control action is to normalize the error occurred for frequency, error occurred fortie-line power and error occurred due to area control in presence of external load disturbance as well as system uncertainties. Result is verified using simulation models of sliding mode load frequency controller which was applied in two-area interconnected nonlinear power system to justify the robustness of the sliding mode controller. The parameter which are included were error variations and external disturbances.

Keywords: Load frequency control, two area control, sliding mode control, power system errors

Introduction

Present day electric power frameworks comprise of several power framework units that may be interconnected by a system of transmission as well as dispersion lines. Because of the expansion of vitality utilization, control frameworks turn out to be progressively unpredictable keeping in mind the end goal is to fulfill the scarcity of power purchasers. A power framework may be interconnected with the others in neighbouring zones through tie lines. Each interconnection goes about as a substantial machine and every generator inside an area works in couple with the others in different locales to supply power. An unsettling influence in one zone will bring about a recurrence deviation here and additionally in neighbouring ranges.

Frequency deviation from the original frequency is known as frequency error which is related to tie-line power with integration; it is proportional to it. We have incorporated a decentralized, nonstop, sliding-mode control of load frequency in a two-area interconnected in presence of external disturbance, another parameter of system uncertainties are also added in the same.

Modelling of LFC

This section discusses the control mechanism used to maintain the system frequency. The process of maintaining a constant system frequency is commonly referred to as automatic load frequency control (ALFC). ALFC provides control during small and slow load changes.

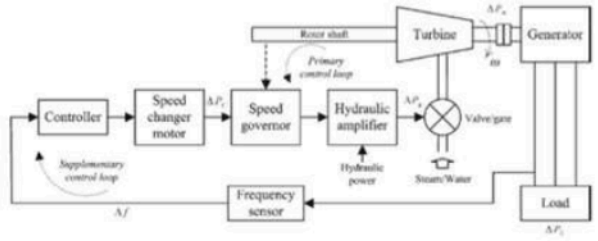

Figure 1: System block diagram using control loops

In Figure 1, when load will change, the generation power adjusts to meet the load demand. This change results in a corresponding variation in the turbine's mechanical power output. The output from the speed governor also adjusts accordingly, forming the primary frequency control (PFC). However, PFC alone is insufficient for load frequency control (LFC), as it cannot restore the frequency. Therefore, a supplemental frequency controller, known as the LFC, is required to adjust the load reference point through the speed changer motor. In the LFC, the frequency deviation detected by adding a frequency sensor in the primary control loop using the controller.

Power System for 1 Area

The system shown in Fig. 2 consists of a governor (G_{Hi}), one turbine (G_{Ti}), and one generator (G_{Pi}). From where output of generator be similar to the frequency error of the system. The relation between tie-line power error

and frequency error is the integral of frequency error is linearly proportional as shown in this section. The linear amalgamation of the frequency error (FE) and tie-line power error (TPE) is referred to as the Area Control Error (ACE). The control objective is to mitigate ACE to zero.

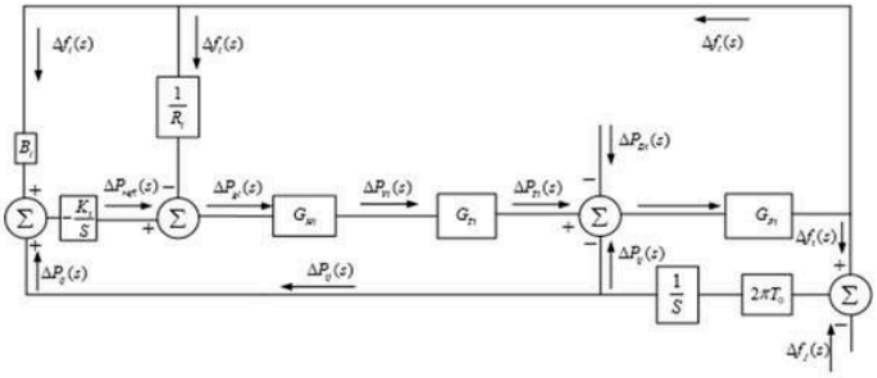

Figure 2:1 Area in Interconnected Power System

Power System for 2 Area

The block diagram is shown in Figure 2. Non-reheat turbines are located in two separate areas. The model includes nonlinearities such as the governor dead band (GDB) and governor response characteristics (GRC). In Figure 2, the following terms are defined:

ΔP_{Li}: Load disturbance in various areas (where i = 1, 2)
Δf_i: Frequency error in various areas of i
ΔP_{tiei}: Tie-line power differences for 2 areas
ACE_i: Area control error for various areas i
u_i: Control input in various i ares
B_i: Frequency response coefficient for various i ares
R_i: Coefficient of Speed droop for area i
T_{12}: Difference in coefficient of Tie-line coefficient for two areas
ΔX_{gi}: Valve/gate position differencein various i ares
ΔP_{gi}: Mechanical power for in various i ares
K_{Pi}: Constant gain of power system for various i ares
T_{Pi}: Time constant in various i ares
T_{ti}: Steam chest time constant in various i ares

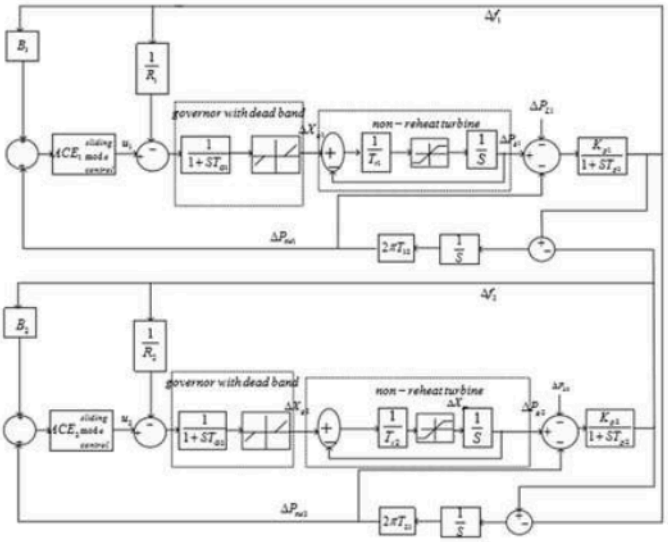

Figure 3:2 Area interconnected non-linea[illegible]er system

Mathematical Model 2 Area System

In this section actual two area models are shown, with non-reheat turbines. For mismatch power in (1) it is shown like (ΔP_{g1}-ΔP_{tie1}-ΔP_{L1}) and $\Delta f_1$is the frequency error of area 1.

$$\Delta \dot{f}_1 = \left(\frac{K_{P1}}{T_{P1}}\right)\left(\Delta P_{g1} - \Delta P_{tie1} - \Delta P_{L1}\right) - \left(\frac{1}{T_{P1}}\right)\Delta f \quad (1)$$

In area 1 what is mechanical power plus valve/gate position change are shown as

$$\Delta \dot{P}_{g1} = \left(\frac{1}{T_{t1}}\right)\Delta X_{g1} - \left(\frac{1}{T_{t1}}\right)\Delta P_{g1} \quad (2)$$

Now control input, frequency error, and valve/gate position change can be expressed as

$$\Delta \dot{X}_{g1} = \left(\frac{1}{T_{G1}}\right)u_1 - \left(\frac{1}{T_{G1}R_1}\right)\Delta f_1 - \left(\frac{1}{T_{G1}}\right)\Delta X_{g1} \quad (3)$$

The derivative of TLP error of area 1 can be shown by

$$\Delta \dot{P}_{tie1} = 2\pi T_{12}(\Delta f_1 - \Delta f_2) \quad (4)$$

Similarly for area 2 the following equations can be developed

$$\Delta \dot{f}_2 = \left(\frac{K_{P2}}{T_{P2}}\right)\left(\Delta P_{g2} - \Delta P_{tie2} - \Delta P_{L2}\right) - \left(\frac{1}{T_{P2}}\right)\Delta f \quad (5)$$

$$\Delta \dot{P}_{g2} = \left(\frac{1}{T_{t2}}\right)\Delta X_{g2} - \left(\frac{1}{T_{t2}}\right)\Delta P_{g2} \quad (6)$$

$$\Delta \dot{X}_{g2} = \left(\frac{1}{T_{G2}}\right)u_2 - \left(\frac{1}{T_{G2}R_2}\right)\Delta f_2 - \left(\frac{1}{T_{G2}}\right)\Delta X_{g2} \quad (7)$$

$$\Delta \dot{P}_{tie2} = 2\pi T_{21}(\Delta f_2 - \Delta f_1) \quad (8)$$

The purpose of SMC is to initiate the plant trajectory to a sliding surface and keep the trajectory on that surface for all subsequent times. The first step in designing an SMC is to choose an appropriate sliding surface. The feedback is used to find different controller gains if the system's trajectory is overhead or underneath the surface.

Considering a nonlinear system as below,

$$x^{(n)} = f\left(x, \dot{x}, \ddot{x}, \dddot{x}, x^{(n-1)}, t\right) + b(x,t)u(t) \quad (9)$$

$$s(x,t) = \left(\frac{d}{dt} + \delta\right)^{n-1}\tilde{x}(t) \quad (10)$$

Where δ is a strictly positive constant, and $\tilde{x}(t)$ represents the error between the output state x(t) and the desired output $x_d(t)$.

For 2nd order system, the sliding surface is defined as s = ė + ce, here e is the tracking error difference of output and desired output. The prognosis of the sliding surface in the phase plane. In Figure 4, SMC should confirm that in a finite time initial states reach should reach to the surface. To achieve the desired states the tracking error and the derivative of the tracking error should be zero.

C is the constant slope of the sliding surface. Therefore, if s = 0, the desired states will be found.

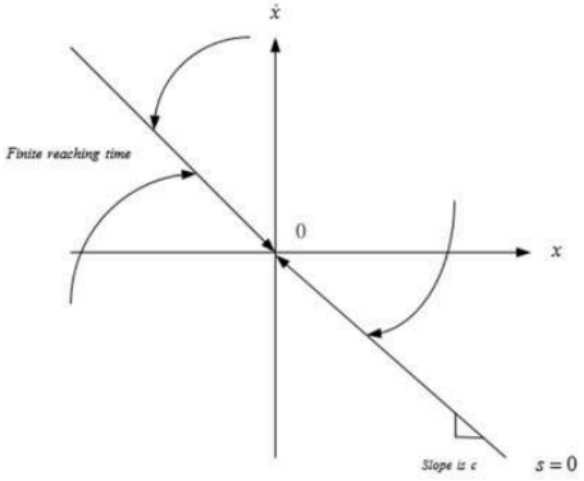

Figure 4: Sliding Surface

The switching law is shown below,

$$u = u_0 sgn(s) \tag{11}$$

Differentiating (11) yields

$$\dot{S}(x,t) = f\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right) + b(x,t)u(t) - x_d^n(t) + \delta^n x(t) - \delta^n x_d(t) + \cdots \tag{12}$$

Estimating$f\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right)$is defined as$\hat{f}\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right)$. If we choose the equivalent control input $\hat{u}(t)$as below the sliding surface derivativewill be zero,

$$\hat{u}(t) = -\frac{1}{b(x,t)}\hat{f}\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right) + \frac{1}{b(x,t)}[x_d^n(t) - \delta^n x(t) + \delta^n x_d(t) + \cdots] \tag{13}$$

Lyapunov's direct method is,

$$V(s) = \frac{1}{2}s^2 \geq 0 \tag{14}$$

The sliding mode control is:

$$u_{real}(t) = -\frac{1}{b(x,t)}\hat{f}\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right) + \frac{1}{b(x,t)}[x_d^n(t) - \delta^n x(t) + \delta^n x_d(t) + \cdots] - \frac{k}{b(x,t)}sgn(s(t)) \tag{14}$$

If u(t) is replaced with $u_{real}(t)$, then

$$\dot{S}(x,t) = f\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right) + b(x,t)\left[-\frac{1}{b(x,t)}\hat{f}\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right) + \frac{1}{b(x,t)}[x_d^n(t) - \delta^n x(t) + \delta^n x_d(t) + \cdots] - \frac{k}{b(x,t)}sgn(s(t))\right] - x_d^n(t) + \delta^n x(t) - \delta^n x_d(t) + \ldots \tag{15}$$

Let,$\hat{f}\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right)$ is an preciseappraisal of $f\left(x,\dot{x},\ddot{x},\dddot{x},x^{(n-1)},t\right)$. Lyapunov function from 3.8 we will get

$$\dot{V(s)} = \frac{1}{2}\frac{d}{dt}(s(t))^2 = -ksgn(s)s \tag{16}$$

When k is a bigger value, equation (17) will be satisfied. Henceforth the stability of SMC is verified

$$-ksgn\left(s(t)\right)s \leq -k|s(t)| \tag{17}$$

3.2 SMC for area 1

Let the frequency error be Δx_1.

$$\Delta f_1 = \Delta x_1 \tag{18}$$

As we know,

$$\Delta P_{g1} = \Delta P_{L1} + \Delta P_{tie1} + \frac{T_{P1}}{K_{P1}}\Delta x_1 s + \frac{1}{K_{P1}}\Delta x_1 \tag{19}$$

Now,

$$(\Delta X_{g1} - \Delta P_{g1}).\frac{1}{T_{t1}}.\frac{1}{s} = \Delta P_{g1} \quad (20)$$

Replacing the ΔP_{g1}

$$\Delta X_{g1} = \Delta P_{L1} + \Delta P_{tie1} + \frac{T_{P1}}{K_{P1}}\Delta x_1 s + \frac{1}{K_{P1}}\Delta x_1 + T_{t1}\Delta P_{L1} s + T_{t1}\Delta P_{tie1} s + \frac{T_{t1}T_{P1}}{K_{P1}}\Delta x_1 s^2 + \frac{T_{t1}}{K_{P1}}\Delta x_1 s \quad (21)$$

The ODE

$$\Delta X_{g1} = \Delta P_{L1} + \Delta P_{tie1} + \frac{T_{P1}}{K_{P1}}\Delta \dot{x}_1 + \frac{1}{K_{P1}}\Delta x_1 + T_{t1}\Delta \dot{P}_{L1} + T_{t1}\Delta \dot{P}_{tie1} + \frac{T_{t1}T_{P1}}{K_{P1}}\Delta \ddot{x}_1 + \frac{T_{t1}}{K_{P1}}\Delta \dot{x}_1 \quad (22)$$

Now,

$$\left(u_1 - \frac{1}{R_1}\Delta x_1\right).\frac{1}{1+T_{G1}s} = \Delta X_{g1} \quad (23)$$

The ODE model of (23) is

$$\Delta \dot{X}_{g1} = \frac{1}{T_{G1}}\left(u_1 - \frac{1}{R_1}\Delta x_1 - \Delta X_{g1}\right) \quad (24)$$

Substituting (22) into (24) yields

$$\begin{aligned}\Delta \dddot{x} = & -\left(\frac{1}{T_{P1}} + \frac{1}{T_{T1}} + \frac{1}{T_{G1}}\right)\Delta \ddot{x} - \left(\frac{1}{T_{G1}T_{P1}} + \frac{1}{T_{t1}T_{P1}} + \frac{1}{T_{G1}T_{t1}}\right)\Delta \dot{x} - \left(\frac{K_{P1}}{T_{G1}T_{P1}T_{t1}} + \frac{1}{T_{G1}T_{P1}T_{t1}}\right)\Delta x_1 \\ & - \frac{K_{p1}}{T_{P1}}\left(\Delta \ddot{P}_{L1} + \Delta \ddot{P}_{tie1}\right) - \left(\frac{K_{P1}}{T_{P1}T_{t1}} + \frac{K_{P1}}{T_{G1}T_{P1}}\right)\left(\Delta \dot{P}_{L1} + \Delta \dot{P}_{tie1}\right) - \frac{K_{P1}}{T_{G1}T_{t1}T_{P1}}(\Delta P_{L1} + \Delta P_{tie1} \\ & + \frac{K_{P1}}{T_{G1}T_{t1}T_{P1}}u_1)\end{aligned} \quad (25)$$

Third-order ODE model is shown in eq 25. Below is given a sliding surface as per eq 10

$$s(\Delta x_1, t) = \left(\frac{d}{dt} + \delta\right)^2 \Delta \widetilde{x_1} = \Delta \dddot{\widetilde{x_1}}(t) + 2\delta\Delta \ddot{\widetilde{x_1}}(t) + \delta^2 \Delta \dot{\widetilde{x_1}}(t) \quad (26)$$

In (26), the desired frequency is zero, so we have

$$\Delta \widetilde{x_1} = \Delta x_1 \quad (27)$$

After takingsliding surface derivative

$$\dot{S}(x, t) = \Delta \dddot{x}_1(t) + 2\delta\Delta \ddot{x}_1(t) + \delta^2 \Delta \dot{x}_1(t) \quad (28)$$

Whensliding surface derivative standszero, then (25) may be solved by using (28), where control law $\hat{u_1}(t)$may be and becomes:

$$\begin{aligned}\hat{u}_1(t) = & \left(\frac{T_{G1}T_{P1}}{K_{P1}} + \frac{T_{G1}T_{t1}}{K_{P1}} + \frac{T_{P1}T_{t1}}{K_{P1}} - \frac{2\delta T_{G1}T_{P1}T_{t1}}{K_{P1}}\right)\Delta \dddot{x}_1 + \left(\frac{T_{G1}}{K_{P1}} + \frac{T_{P1}}{K_{P1}} + \frac{T_{t1}}{K_{P1}} - \frac{\delta^2 T_{G1}T_{P1}T_{t1}}{K_{P1}}\right)\Delta \ddot{x}_1 + \left(\frac{1}{R_1} + \frac{1}{K_{P1}}\right)\Delta \dot{x}_1 \\ & + T_{G1}T_{t1}\left(\Delta \ddot{P}_{L1} + \Delta \ddot{P}_{tie1}\right) + T_{G1}\left(\Delta \dot{P}_{L1} + \Delta \dot{P}_{tie1}\right) + T_{t1}\left(\Delta \dot{P}_{L1} + \Delta \dot{P}_{tie1}\right) + \Delta P_{L1} + \Delta P_{tie1}\end{aligned} \quad (29)$$

$$u_1(t) = \hat{u}_1(t) - k_1 sgn(s(\Delta x_1, t)) \quad (30)$$

Similarly the control law $\hat{u}_2$for the area 2 can be developed

Results

Figure 5 shows the Simulink model for the two-area interconnected power system with non-reheat turbines. Both GDB and GRC are considered in the system. In the simulation, a load disturbance is applied to area 1 at 2 seconds and to area 2 at 4 seconds. The magnitudes of the disturbances are set to 0.01 pu for both areas, respectively. Parameters like GDB and GRCs for turbines are examined during simulation modelling. The usefulness of proposed method SMC is to mitigate the ACE error.

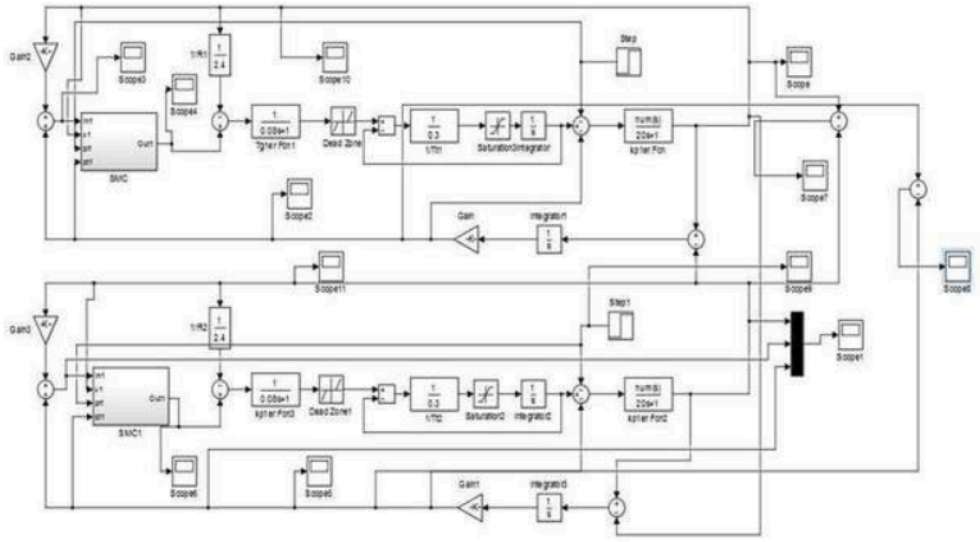

Figure5:Simulinkmodelfortwo-areainterconnectedpowersystem

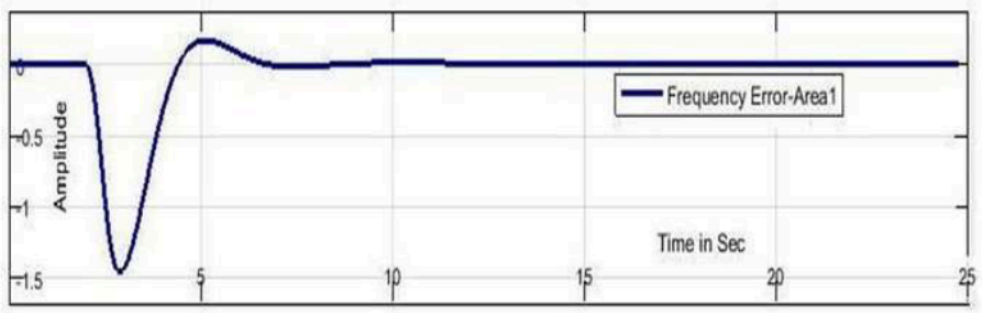

Figure6:Area1frequencyerrorat0.01p.uloaddisturbance

Figure7:area1Tielinearea control

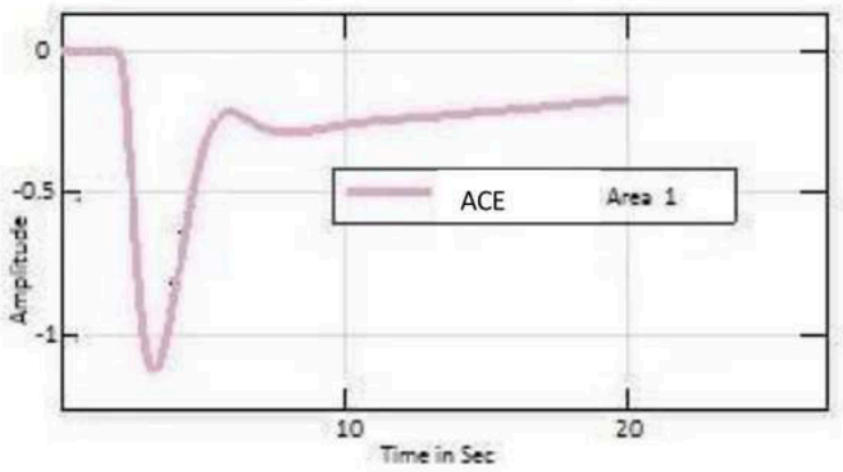

Figure8:Area1Areacontrolerror

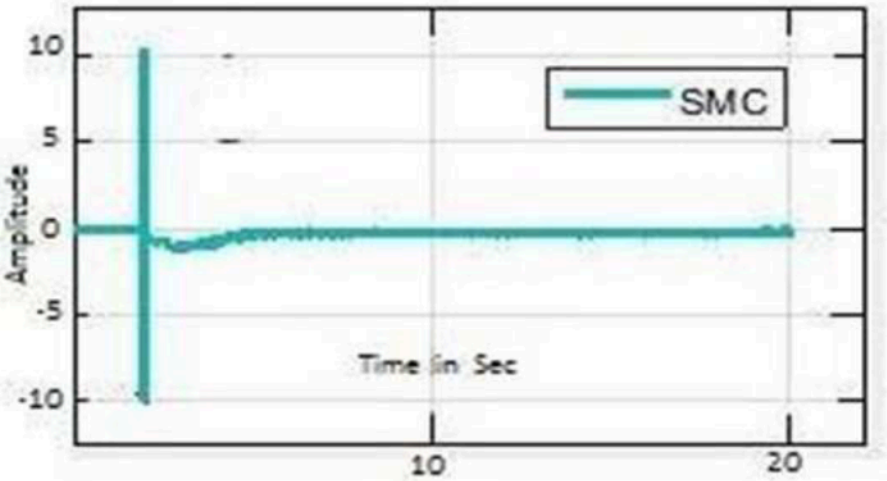

Figure9:Controlsignalu1inarea1

Figure10:area2Tie-linepowererror(blue),ACE(purple)andfrequencyerror(yellow)

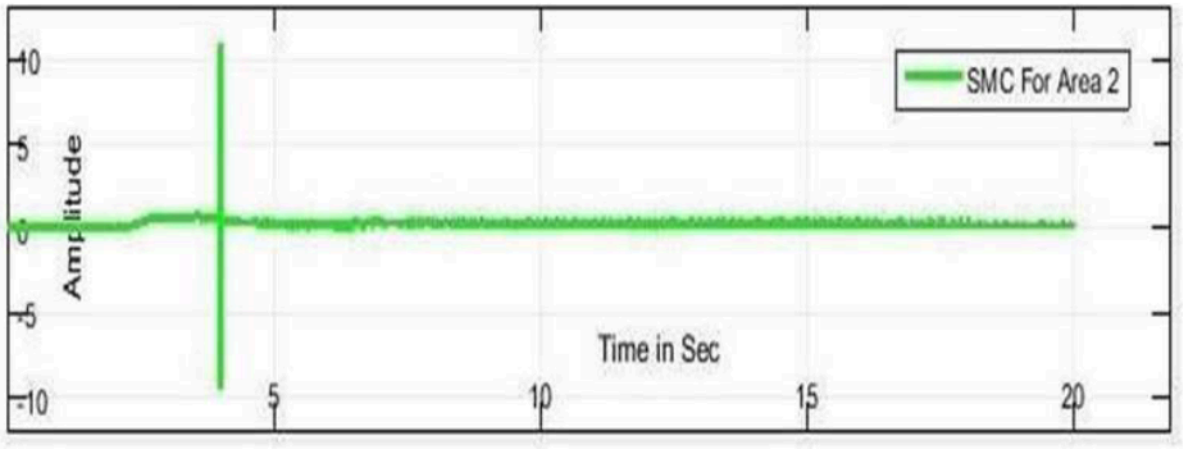

Figure11:area2Controlsignalu2in

Figure6 Shows that Δf1 i.e frequency error under 0.01p.u load disturbance is rejected after 6 seconds [10]. As we can observe the disturbance rejection is very fast with SMC. Figure 7 is expressing tie line power error curve for area 1 which is below Zero line as described in [11]. Figure 10 is describing the area control error (ACE) in area 2 which is becoming less than 0 [11]. It is also describing Tie line power error and frequency error in area 2 is rejecting disturbance after around 8 seconds resulting in stable operation. Figure 9 and Figure 11 shows the control signal u1and u2for area 1 and 2 respectively. It can be observed that control signal rises rapidly as soon as disturbance is experienced in the respective area to reject disturbance at t=2 seconds in area 1 an

Conclusions

In this paper SMC is penetrated for a 2-area interconnected nonlinear system. The parameters of nonlinearity GDB and GRC, are included in the block diagram model also. It's been found in simulation that the FE, TPE and ACE are successfully mitigated to zero under various load disturbances.

From the simulation results, it is evident that chattering behaviour of the SMC appears in the time responses of tie-line power errors. Chattering may be caused due to similarly in systems for canonical space, and by fast dynamics. These unmodeled dynamics, which have small time constants, are typically ignored in models of servomechanisms, sensors, and data processors. The second reason for chattering is the use of digital controllers with a finite sampling rate, leading to what is called 'discretization chatter'. Theoretically, ideal sliding mode control implies infinite switching frequency. Since the control remains constant within a sampling interval, the sampling frequency should be always higher than the switching frequency, that results chattering.

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GAMIFICATION OF TEACHER TRAINING: DESIGNING GAME-BASED PEDAGOGICAL SCENARIOS

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Abstract

This study examines the impact of gamification on teacher training by designing and testing game-based pedagogical simulations in pre-service teacher education. Employing a mixed-methods approach—quantitative surveys, quasi-experimental contrasts, and design-based research (DBR)—the study examines (1) pre-service teachers' acceptance of gamified training, (2) comparative impacts of competitive and collaborative game elements, and (3) iterative development of a gamified module, Pedagogy Quest: Level Up Your Teaching Skills. A total of 40 pre-service teachers, randomly assigned to competitive or collaborative gamified conditions, reported that collaborative designs produced higher perceived learning (mean=4.6), motivation (mean=4.4), and enjoyment (mean=4.5) with lower stress (mean=2.4) in comparison to competitive designs. Qualitative data from focus group (n=20) informed the DBR process, ensuring alignment with learner needs and theoretical orientation (Self-Determination Theory, Constructivism). Findings revealed strong participant support for gamification (overall mean=4.1, SD=0.80), reflecting its effectiveness in enhancing engagement, skill retention, and practical application of pedagogical skills. The study concludes that gamified training, and specifically collaborative designs, offer a transformative, scalable model of teacher training, bridging theory and practice as well as motivation and stress reduction.

Keywords: Gamification, teacher training, pre-service teachers, competitive vs. collaborative learning design based research, pedagogical competencies

Introduction

For more than ten years, researchers have been studying gamification, or the process of creating game-like experiences outside of games. However, the concept of user-specific gamification is still developing and has been reviewed in a number of ways (Phosanarack et al., 2025).

Teachers are concerned with encouraging high levels of student enthusiasm, engagement, and participation as well as streamlining the teaching-learning process. The gamification experience used to teach family engagement and educational programs in two courses—one at the master's degree level and the other at the bachelor's degree level—is presented in this work as a solution to this problem (Alonso-Sánchez et al., 2025). Online student engagement will have a direct impact on the effects and results of learning and teaching since these methods are quickly becoming popular in education. Online learners' learning experiences will be enhanced and a better virtual learning environment will be created for online learners globally if gamification is applied scientifically in online teaching, learning, and course design (Meng et al., 2024). When used effectively in training and education, gamification can boost students' motivation and engagement while encouraging them to modify certain parts of their behavior to aid in learning. While there may be benefits to gamification of the learning process, its ability to improve training and education has not yet been shown (Triantafyllou et al., 2025). Over the last several years, the terrain of teacher education has been revolutionized through technological innovation and growing sensitivity towards active, student-centred pedagogies. To enhance student teachers' learning experiences, it recommends creating game-based pedagogical scenarios that include game components and are consistent with ideas of self-efficacy and self-determination (Dasoo, 2024). Gamification- the process of applying game design mechanics outside of games in order to improve user engagement, motivation, and learning- is one such innovation with the potential to revolutionize teacher preparation and reinvigorate teacher education.It is an enjoyable and inspiring learning environment that successfully imparts knowledge and skills for future instruction. The potential of educational gamification in the classroom is demonstrated by this study(Manzano-León et al., 2022). (Saavedra Vallejos et al., 2024) It promotes a diversified approach to sustain interest without overburdening students without overburdening students with a single teaching style,

highlighting enhanced motivation, involvement, and learning through gamified experiences.As pre-service teachers struggle to master the art of classroom management, inclusive pedagogy, and reflective teaching, gamified learning spaces present dynamic, interactive, experimental paths to learn pedagogical competencies more successfully than conventional ones. In order to improve in-service teachers' competencies and teaching practices, the necessity of effective design features in game-based pedagogy (GBT). It also offers insights into creating gamified scenarios that increase teacher training by creating stimulating and engaging learning experiences (Palha et al., 2024).

Teacher preparation has traditionally relied on lectures, lesson planning activities, and classroom management observations. While these activities have advantages, they are unlikely to engage students or prepare prospective teachers for the dynamic and challenging environments of contemporary classrooms. (Rice, 2012) The Gamification of Learning and Instruction: Game-based approaches and strategies for training and education, written by Karl Kapp, contains ideas for gamification strategies in academic and business contexts.Gamification introduces challenges, narratives, instant feedback, progress tracking mechanisms, and elements of competition or cooperation, making the learning environment more dynamic and engaging. Through simulations, trainee teachers' interest and involvement can rise, enhancing the fun and participatory nature of the learning process. They also aid in the development of critical thinking, problem-solving, and teaching skills. The authors recommend more investigation into the long-term effects of simulation-based training on student results and the efficacy of instruction(Kelleci & Aksoy, 2021). (Ragni et al., 2023)A framework for effective DGBL training for teachers and pre-service teachers, as well as the factors that influence teachers' attitudes toward implementing DGBL in schools, are provided by the results of an analysis of 20 papers from Scopus, ERIC, and Web of Science.(Helms et al., 2015)the application of gamification in training and education. In order to illustrate how game elements affect learning, it creates a taxonomy of them and offers an Educational Game Element Database (EGEDB). The gamification analysis and design in this study are based on a number of theoretical frameworks that collectively inform pedagogical design and assessment of learner performance.

Self-Determination Theory (Deci & Ryan, 1985)

Gamifications foundation lies in the principle of intrinsic motivation. In Self- Self-Determination Theory (SDT). Students are most motivated when their psychological need for autonomy, competence, and relatedness is met. Gamified environments, with adaptive learning routes (autonomy), orderly challenge progression (competence), and social engagement (relatedness), can effectively promote these conditions. This conceptual framework will be applied to measure the impact of gamified modules on pre-service teachers' motivation to learn intensive pedagogical content. Constructivist Learning Theory (Piaget, Vygotsky)

The gamified strategy is informed by constructivist principles of education, which hold that people construct knowledge through engagement and social interaction. Gaming situations mirror actual classroom issues, which challenge pre-service teachers to translatetheoretical models into practical action in a meaningful manner. The ZPD concept ofVygotsky is particularly pertinent in peer collaborative gaming situations, where support and collaboration among peers expand learning possibilities beyond individual capabilities.

Experimental Learning Theory (Kolb, 1984)

Kolb's experimental learning cycle- Concentrate Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation- is extremely well-suited to game-based pedagogy. Gamified modules usually consist of scenario-based simulations and decision-making problems that enable learners to experience classroom-like situations, observe the consequences of their strategies, and adapt based on feedback, thereby reinforcing the cyclical nature of teacher learning.

Flow Theory (Csikszentmihalyi, 1990)

Flow theory holds that optimal learning results from an interplay of challenge and skill, resulting in a state of immersion and focus. By adjusting task difficulty levels and offering continuous feedback, gamified training modules can create a flow state, enhancing engagement and retention of instructional material.

Social Learning Theory (Bandura, 1977)

Bandura's theory emphasizes observational learning, modelling, and social reinforcement. Pre-service teachers model peer behaviors during both collaborative and competitive play, receive immediate feedback, and model good pedagogical behaviors, and model good pedagogical behaviors and it becomes possible to learn high-level teaching competencies.

This research will develop and test gamified training modules specially attached to pedagogical competency development among pre-service teachers. (Miranda Ribeiro & Ribeiro Neto, 2021) Gamifying instructional techniques by teaching Pará teachers how to create educational games with Scratch. Teachers can develop contextually appropriate games that enhance student engagement and learning outcomes by using this method, which promotes interactive learning.In addition, it will investigate the effects of varying game mechanics types- i.e., competitive vs. collaborative architectures- on the effectiveness of learning and professional development. Lastly, we need to understand pre-service teachers' attitudes and opinions on these gamified activities in order to ascertain the sustainability and scalability of such innovations in teacher education programs.

Significance of the Study

The current study is of special significance in that it attempts to bridge the gap between pedagogical theory and practice through the vehicle of gamification. By investigating the differential impacts of competitive and cooperative game mechanics, the study also assists in further maximizing the effectiveness of gamified approaches to teacher training. As a further contribution, research on students' attitudes towards gamified training sheds light on areas of user experience design, thus helping educators and institutions make well-informed decisions towards incorporating such approaches into formal curricula. In atime defined by the need for flexibility, empathy, and evidence-based decisions in teaching practice, gamification is a robust tool to prepare future teachers not just to teach, but to succeed in diverse and dynamic learning environments.

Review of Related Literature

Carr, R. A. (2024) With an emphasis on teacher candidates' motivation, engagement, and vocabulary acquisition, the study investigates the application of gamification and game-based learning in English language instruction in Cuban environments with limited resources. Results indicate that gamification is positively perceived and has the potential to revolutionize ELT in Cuba.

Kager et. al (2024)A board game created for instructors' first lesson study (LS) introduction is presented in this research. The game is educational, inspiring, and engaging. 49 teacher candidates and 57 teachers tested the game, and both quantitative and qualitative methods were used for analysis. Most players were inspired to play and work together since they thought the game was appealing for their professional growth. One of the earliest attempts to create and assess a game-based LS introduction is this one.

Mateos & López (2024) The idea for a master's degree in teaching staff that emphasizes gamification and challenge-based learning is covered in this article. The goal is to foster meaningful and immersive learning by strengthening the Vitruvian Teacher's abilities through various challenges related to fictitious characters. The project was assessed utilizing a qualitative methodology, analyzing student testimonies given via Google Drive using NVivo software. Students' interest, expectancy, enjoyment, and emotion were highlighted in the results, which demonstrated a favorable impact on their learning. This combination's training potential is emphasized, underscoring the significance of active techniques and methodologies that offer contextualized and transferable learning. The promise of this method for preparing aspiring teachers is highlighted in the article's conclusion.

PIELE & Sava (2024) To increase learning's effect and engagement, researchers are introducing games and entertaining activities into the classroom. This strategy is supported by research from the Lego Foundation and UNICEF. This study identifies successful teacher preparation programs for advancing playful pedagogy by analyzing 20 articles published between 2014 and 2024. The outcomes display a range of formats and solutions, such as virtual simulations and specialized courses. A major factor in the successful integration of fun pedagogy into teaching, learning, and evaluation activities is participation in these courses.

Xu & Buhalis., (2022) The purpose of this study was to determine the essential components of a gamification-related teaching process for 24 initial training (TIT) teachers. The study examined the teaching process using audio recordings, field diaries, and classroom observations. The findings demonstrated that the process of learning about gamification evolved from the creation of gamified classes, and that the correlation between gamified activities and digital technologies enhanced the advancement of education in digital culture.

Gallego-Durán et al., (2019) Although many experts find it difficult to comprehend the ideas of gamification, it is a potential strategy for enhancing education. There is no scientific agreement on how game design generates enjoyment, and creating captivating games is a difficult undertaking. This paper breaks down game design into ten distinct qualities and provides a rubric for researchers and instructors who have never worked in the field. The purpose of the rubric is to assist teachers in evaluating current games or gamified activities, identifying their advantages and disadvantages, and refining or redesigning them. The rubric's foundations include prior design experience, a review of related research, and empirical testing using gamified activities and sample games.

Objectives of the Study

1. To design and implement gamified training modules tailored for developingPedagogical Competencies among Pre-service teachers.
2. To analyze how competitive vs. collaborative game elements affect learning outcomes in teacher preparation.
3. To explore participants'perceptions and attitudes toward gamified teacher education experiences.

Research Methodology

Research Methods

The study utilized a mixed methods approach, including quantitative, quasi-experimental and design-based

research (DBR) designs, to investigate the impact of gamified teacher training on pre-service teachers. A systematic survey was utilized to assess the participants' attitudes toward gamified experiences in teacher training. A quasi-experimental design was utilized, dividing 40 pre-service teachers into two groups: one being offered a collaborative gamified training module, and the other being offered a competitive one. The DBR design was utilized to guide the interactive design, implementation, and refinement of a gamified module entitled "pedagogy Quest: Level Up Your Teaching Skills." The module was based on constructivist learning theory, Experimental Learning Theory, and self-determination theory emphasizing learner autonomy, collaboration, and context-dependent skill development. Aspects of gamification, including XP points, badges, leaderboards, scenario-based challenges, and reflective journals, were incorporated into the virtual learning environment. The study was carried out in adherence to ethical research principles and ensured carried out in adherence to ethical research principles and ensured informed consent of all participants.

Population

Pre-service teachers from two teacher training institutions, Kharagpur Tribal B.Ed. Training College and Government Vidyasagar Teacher Training College (Paschim Medinipur, West Bengal)were the subject of the study. These participants constituted a group of aspiring teachers enrolled in official teacher preparation programs, and they were in the foundational and intermediate phases of their pedagogical training.

Sample and sampling Technique

Forty pre-service teachers made up the primary sample, which was chosen using basic random sampling procedures to guarantee equal representation and reduce bias. For the comparative analysis in Objective 2, these 40 participants were subsequently randomized to either a collaborative gamification group (n=20) or a competitive gamification group (n=20). Furthermore, a sample of 20 participants participated in focus groups to offer qualitative insights for Objective 3's design-based research component, while other participants tested the "Pedagogy Quest" module iteratively. This multi-pronged sampling strategy made it possible to examine gamified teacher training approaches in depth qualitatively and quantitatively.

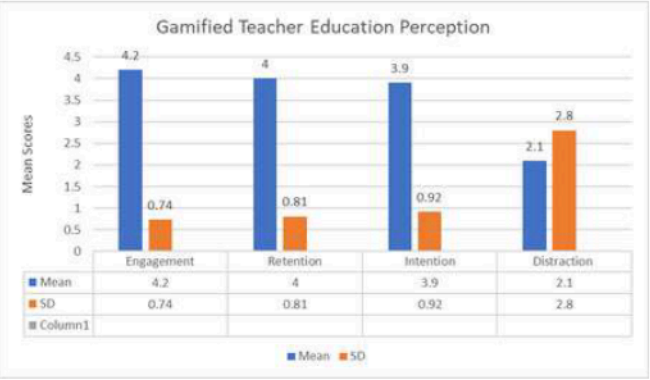
Tools

The researcher created self-administered questionnaires specific to each research goal in order to collect data for the study. A structured 5-point Likert-scale questionnaire was developed for Objective 1 in order to evaluate four important aspects: motivation (such as the desire to finish tasks and make progress), perceived learning effectiveness (such as the retention and application of knowledge), engagement (such as participation levels and attention), and general attitudes toward gamification (such as preferences and recommendations). In order to compare competitive and collaborative environments, a standardized survey was created for Objective Two. It measured factors like motivation, engagement, stress levels, enjoyment, and perceived learning results in both groups.Qualitative methods were used for the design-based research component of Objective 3, such as peer interaction diaries, performance tracking sheets to measure progress, usage analytics tools to assess interaction patterns, and focus group discussion guides for thematic analysis. To get detailed participant input, the gamified session also included scenario-based challenge ratings and reflective notebook prompts. In order to preserve reliability and validity through expert validation and pilot testing, the researcher meticulously created each instrument to guarantee conformity with the study's theoretical framework and research goals.

Analysis

Objective 1: To design and implement gamified training modules tailored for developing Pedagogical Competencies among Pre-service teachers.

A standardized survey was used to gather a sample of 40 teacher candidates and examine their attitudes and opinions towards gamified experiences in teacher preparation. To provide a balance representation of participants' feedback, the survey includes Likert: scale questions and open-ended questions. Descriptive Statistical analysis techniques were used to examine the quantative data to facilitate the identification of trends and patterns in participant's feedback.

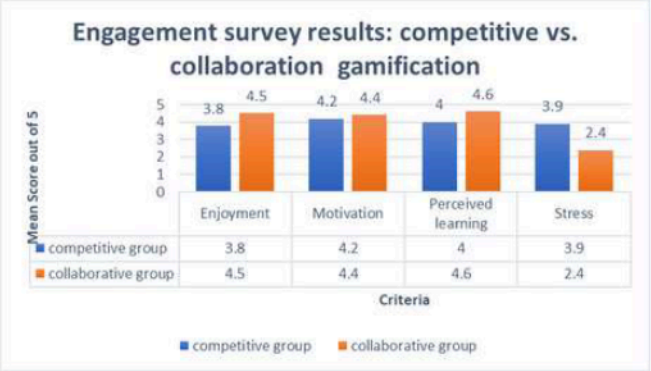


The results of the survey were that most of the participants supported gamified teacher training. Overall, the mean of all the items in the surveys was 4.1 (SD=0.80) which reflected high agreement on the effectiveness of gamified methods. This implies that, overall, the participants felt that gamification was highly relevant to increasing their interest in the training sessions, increasing their engagement, and helping them recall the thing that they had learned.

The comparatively low Standard deviation (SD= 0.89) among the answers reflects high consensus among the participants, with an overwhelming majority stating that gamified elements positively affect learning. Notably, the finding showed that most of the respondents did not feel that gamification distracted from significant learning. The mean answer to this question was very low, which reflects that gamified elements were all seen as a positive influence on the learning process and not a negative one. Given their capacity to provide an enhanced interactive and productive learning process, our descriptive findings categorically suggest that gamified strategies are well received by future teachers. The uniformity of responses, suggesting that gamification might prove to be a beneficial technique for enhancing teacher training outcomes.

Objective 2: To analyze how competitive vs. collaborative game elements affect learning outcomes in teacher preparation.

In teacher preparation programs, where pedagogical skill acquisition and emotional intelligence matter most, gamified learning has the potential to be an effective pedagogy. Yet, the competitive versus cooperative nature of gamification has the potential to significantly impact outcomes and experiences tied to learning. Competitive features such as leaderboards and point-challenge systems are a classic example of gamified features that are likely to promote motivation but also increase stress. Cooperative features such as group assignments and shared goals, on the other hand, promote teamwork and potentially lead to greater understanding and emotional support. While both models have their value, there is pressing need for a full review of the impact of these various gamification strategies on teacher candidates' motivation, enjoyment, stress, and perceived learning within the context of teacher training. This study makes an attempt to fill the gap by investigating the impact of competitive and cooperative game features on motivation, enjoyment, stress, and perceived learning in the context of teacher training.



The data gathered with the engagement survey revealed evident differences in the learning experiences of the participants brought about by cooperative and competitive game mechanics. The cooperative group always registered higher performance over the competitive group in perceived learning (4.6 vs. 4.0), motivation (4.4 vs 4.2) and enjoyment (4.5 vs. 3.8). In contrast,the competitive group's mean of 3.9 indicated a much higher stress level compared to the score for the cooperative group (2.4). the finding demonstrate that cooperative gamification facilitated a healthier and less stressful learning experience, although both gamification approaches augmented engagement.

Objective 3: To design and implement gamified training modules tailored for developing Pedagogical Competencies among Pre-service teachers.

The training module "Pedagogy Quest: Level-Up Your Teaching Skills has been developed as an interactive, game-based training module that modifies traditional pedagogical approaches in response to the changing needs of preservice teacher preparation. The module attempts to re-engineer passive, traditional teaching techniques into active, participatory, and student-focused channels by utilizing the gamification paradigm. The module promotes increased engagement, internal motivation, and long-term knowledge retention through the use of native questioning, gradual level-ups, and realistic teaching simulations.

Integration of Focus Group Insights

Focus group discussion served as the foundation for the gamification module for pre-service instructors, which was essential in addressing the distinct requirements, difficulties, and interests of students. Traditional teacher training programs, which were mostly passive and concentrated on lectures and textbook pedagogy, did not satisfy the participants. Additionally, they believed that the theoretical knowledge they had learned in training did not translate to actual classroom situations. Additionally, they believed that the theoretical knowledge they had learned in training did not translate to actual classroom situations. They underlined the necessity of additional experimental learning opportunities and inclusive teaching strategies. Engagement, practical application, accessibility, and interactive learning were given top priority in the creation of the gamified training session.

Module structure and Game Design

It starts with the orientation stage, also known as "The Pedagogy Portal, where students are systematically introduced to the gamified environment, finish a preliminary self-assessment, and create their avatars, establishing the foundation for a personalized and immersive learning experience. The module centre includes four thematic levels, each addressing a specific area of pedagogical skill: classroom kingdom (classroom management), inclusion island (inclusive teaching), Assessment Arena (formative and summative

Assessment), and Engagement Empire (learner motivation and technology integration). These levels reinforce competencies through time-bounded exercises and proactive problem-solving, and they feature role-play simulations, decision making quest, and mini-games that mimic actual classroom obstacles. Through forums that encourage group reflection and strategy sharing, learners earn experience points, badges, and peer recognition. In order to foster metacognitive awareness and increase the application of information in authentic teaching scenarios, the last levels, reflection recountable asks participants to synthesize the learning through journaling, peer evaluation, and a capstone assignment. By combining organized and flexible progression, this modular framework not only makes it easier to acquire new abilities but also maintains motivation and engagement.

Gamification Mechanics and Educational Rationale

To optimize learning returns, Pedagogy Quest's design is bolstered by thoughtfully selected gamification mechanisms that are each precisely alignes with specific pedagogical aims. At the heart of the module is a narrative thread that frames the training within the framework of a heroic quest, providing an engaging narrative that stimulates student engagement and emotional commitment. While XP (experience points) and achievement badges support positive reinforcement and mastery-based advancement, avatars add uniqueness and a sense of ownership to the experience. A nice sense of competitiveness is added by leaderboards, which keeps people motivated and promotes regular involvement. Time-limited puzzles and scenario-based role-playing simulations foster quick decision-making and empathy by reintroducing the pressure and unpredict abilities of real classroom environments. Peer discussion and reflective journaling questions promote metacognitive analysis and critical evaluation of pedagogical choices, which furthers understanding. Strong educational theories such as constructivism, experimental learning(kolb,1984), and self-determination theories (Ryan &Deci, 2000) are incorporated into this multi-layered mechanism to make sure the module promotes autonomy, competence, relatedness- all of which are key components of successful adult learning. These mechanisms are seen as instruments that transforms teacher training into a significant, participatory, and practice-focused experience rather than only being decorative flourishes.

Pedagogical Competency Focus and Customization

An unweaving dedication to creating fundamental pedagogical capabilities that are particularly linked to national teaching standards and the expressed requirements of pre-service teacher lies at the heart of Pedagogy Quest. Each level of the modules is thoughtfully designed to focus on a certain aspect of teacher professional development.

Through interactive simulation and behavior- response exercises, classroom kingdom teachers'student's classroom management while enhancing their ability to think strategically in real time. By simulating difficult classroom situations involving special needs students, linguistic differences, and diverse identities, inclusion island fosters empathy and inclusive teaching methods. Through quiz missions that replicate classroom evaluation procedures, feedback analysis, and rubric design, Assessment Arena teachers' learners the fundamentals that propel assessment excellence. Finally, by using digital tools like Flipgrid, Jam board, and Kahoot! In experimental quests, engagements empire gives students the mentality and abilities to engage students. These levels incorporate participation input from the module's design phase in addition to aligning with the skills in models like InTASC, guaranteeing that the learning process is tailored, genuine, and adaptable to a range of educational contexts. This level opersonalization guarantees that the module will continue to be applicable, useful, and efficient for aspiring educators in a variety of classroom environments.

Implementation strategy

The implementation of Pedagogy Quest was designed with flexibility, scalability, and learner accessibility in mind, employing a blended delivery model that combines both online and face to face engagement. The module is easily integrated into existing teacher education programs and may be installed on well-known learning management systems like Moodle or Classcraft. In order to balance depth and manageability, each of the central levels is designed to take between sixty and ninety minutes to finish. This allows learners to progress either independently, or with the assistance of a trainer. Formative and summative assessment practice is made possible by the module's use of a variety of assessment techniques, including reflective essays, peer review, and in-game challenge scores. Real- time dashboards provide an open and dynamic feedback loop by tracking learner progress through badge collection, level attainment, and XP accrual. In peer forums, facilitators are in charge of facilitating reflective practice, supporting collaborative learning, and scaffolding discussions. With the help of this effective implementation technique, Pedagogy Quest may adapt to a variety of institutional situations while maintaining its primary goal of offering an interesting, practice-focused, and empirically supported teacher training model.

A paradigm breakthrough in teacher education, Pedagogy Quest: Level-Up Your Teaching Skillseffectively closes the gap between classroom experience and pedagogical theory. This module differs from other gamified learning modules in that it is evidence-based and context-sensitive, grounded in pre-service teachers' real-world observations and in line with competency-based standards.

. Professionals' development becomes an active, introspective, and proactive process by incorporating experimental learning into a quest-based framework. Its design guarantees that students not only acquire knowledge but also internalize the fundamentals of good teaching, which include involvement, adaptability, inclusion, and teamwork. The module is perfectly adapted to various training situations because of its adaptable learning routes, variable delivery methods, and integrated assessment systems.

Results and Discussions

The findings of the study indicate overwhelming support for gamified teacher training from the study respondents. survey responses indicated strong agreement (mean =4.1, SD= 0.80) with the potential of gamification to boost interests, engagement, and retention. The low standard deviation indicated consistency of thought, and most of the respondents dismissed the notion that gamification is detrimental to learning. Instead, they considered it a valuable feature that simplifies interaction and boosts productivity in training. (Kulaksız & Kelleci, 2025) Created a framework for teaching pre-service teachers in the creation of digital educational games, emphasizing technological skills, pedagogy, scenario, and game design. Earlier, blog-based programming language training was included to overcome obstacles. Participants gave the updated course structure positive feedback and higher self-efficacy scores, emphasizing the earlier incorporation of technical skills.(Güzel, 2023) Demonstrates how well gamified modules increase pre-service teachers' motivation and engagement, and it suggests that by combining interactive exercises, game mechanics, and collaborative learning opportunities that are suited to their educational requirements, such training can enhance pedagogical competencies. (Meletiou-Mavrotheris & Prodromou, 2016)In order to improve pre-service teachers' pedagogical competencies and create a more engaging learning environment for students, the study used the TPACK framework to build an instructional intervention that gave them the tools to include educational games into mathematics instruction. (Akcaoglu & Kale, 2016)highlights that by offering practical experiences, encouraging critical thinking, and incorporating game design into their teaching practices, game design workshops can successfully improve preservice teachers' pedagogical skills and aid in the development of critical communication skills.(Krishnan et al., 2021)Created a Classcraft-based online gamified learning module with the goal of improving the proficiency of English language instructors. In order to guarantee successful design and implementation, it made use of the ADDIE Model and expert consensus; this approach might be modified for the pedagogical training of pre-service teachers.

Further, an examination of cooperative vs. competitive game modes showed that the cooperative team outperformed the competitive team consistently in perceived learning, motivation, and fun while reporting much less stress. These results point to cooperative game design as being able to promote a more positive and productive learning experience. (Alshiha & Al-Abdullatif, 2024)It has been demonstrated that competitive aspects in flipped classrooms raise post-test scores, but they do not always result in higher cognitive achievement than cooperative elements.(Ho et al., 2021)The effectiveness of gamification in learning is not significantly moderated by collaborative components, indicating that its influence may vary depending on the environment.(Xu et al., 2023)As demonstrated by studies where students' performance improved in competitive situations as a result of the pressure to surpass classmates, competitive gamification can dramatically increase motivation and engagement.(Peppler et al., 2013)Collaborative play fosters constructive social connections that might improve learning experiences, like offering encouraging remarks and participating in pertinent conversations. (Craig et al., 2019)While still less successful than traditional techniques, collaborative play was found to be more beneficial than competitive play in vocabulary learning, significantly improving learning outcomes.

The gamified training module, Pedagogy Quest, based on feedback gathered through focus groups, was a success as a model innovation. It transformed traditional lecture-based training into a motivational, story-like experience with focus on practical application, reflection, and skill-buildingin key areas of classroom management, inclusive teaching, assessment, and engagement techniques. Story Quests, simulations, badges, and peer-to-peer interaction ensured a motivating and inspiring learning process. Finally, the study proves that gamified, cooperative, experimental learning can significantly enhance the efficacy and enjoyment of teacher training and, as a consequence, make it more relevant, engaging, and pertinent to real classroom needs.

Conclusion

This research aimed to investigate gamified teacher education impact and structure through the construction and implementation of a pedagogical module grounded in a game-based approach, Pedagogy Quest: Level-Up Your Teaching Skills. Results unequivocally attest to gamification as a means of raising pedagogical proficiency in pre-service teachers. The guided survey indicated robust consensus among participants that gamified learning is effective, especially in enhanced engagement, motivation, and material retention.

Comparative gameplay analysis of cooperative and competitive game elements further substantiated that cooperative gameplay resulted in greater enjoyment levels, lower stress levels, and improved perceived learning outcomes.

The design-based research methodology ensured that the training module was grounded in actual learner requirements, and its structure-firmly based on experimental, constructivist, and self-determination theories of learning-enabled genuine, interactive, and reflective learning experiences. Through the integration of storytelling, simulations,peer interaction, and technology tools into central domains of teacher preparation, the module successfully bridged theoretical understanding with real-world classroom application. Overall, gamification, when well designed and contextually situated, presents a compelling, scalable, and learner-focused approach to rethinking teacher education in ways that are both significant and forward-looking.

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